MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION
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NAMED AFTER ABU ALI IBN SINO

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INNOVATIVE METHODS FOR THE PREVENTION OF METABOLIC SYNDROME

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ABBREVIATIONS AND NOTATIONS ACCEPTED

AH - arterial hypertension

BP - blood pressure

HHK - hyperglycemic coefficient - fasting glycemia/glycemia
1 hour after glucose loading;

GC - glycemic coefficient - fasting glycemia / glycemia after 2 hours
after glucose loading.

HTG - hypertriglyceridemia

GC - hypercholesterolemia

DBP - diastolic blood pressure

CHD - coronary heart disease

MI - myocardial infarction

BMI - Overweight

MK - Code of Minnesota

MS - metabolic syndrome

Post-glycemic coefficient – glycemia 1 hour after
glucose loading/glycemia 2 hours after loading;

NTG - impaired glucose tolerance

Phase I - glycemia 1 hour after glucose loading

Phase II - glycemia 2 hours after glucose loading

SBP - systolic blood pressure

DM - diabetes mellitus

CVD - Cardiovascular Disease

TG - triglycerides

TSH - glucose tolerance test

RF - risk factor(s)

CH - cholesterol

HR is the number of heart contractions

CT – in tables means the frequency of the indicator vertically

GT – in the tables means the frequency of the indicator relative to the total number of patients examined

RT – in tables means the frequency of the indicator horizontally

* or § - indicates in the tables the certainty of the differences - $P< 0.05$

** or §§ - indicates in the tables the reliability of the differences - $P< 0.01$

or §§§ - means in the tables the reliability of the differences - $P< 0.001$.

INTRODUCTION

Relevance of the problem. At present, there is no doubt that the most effective, economical way to reduce morbidity, disability and mortality is prevention based on the identification and elimination of risk factors. It should be noted that the importance of individual risk factors in the formation of metabolic syndrome (MS) in different populations is not entirely clear. Therefore, it is necessary to study the epidemiology of diseases taking into account risk factors for the creation and adequate implementation of preventive Programs. For MS, this means identifying and tracking its key components. MS and its major components need to be studied in each region and population. This is due to the fact that factors such as lifestyle, ecology, dietary habits, as well as genetic and behavioral characteristics of the population, are of great importance in the diagnosis of metabolic syndrome and many other diseases. The main priorities of WHO are to preserve and improve the health of the world's population. The current state of health of the population is mainly related to non-communicable diseases. In this regard, the high prevalence of metabolic syndrome should be noted. The overall prevalence of MS in different countries ranges from 6-7% to 35-56%. According to experts, most people "spend an average of 10 years of their lives in a state of illness."[1]

In world practice, a lot of work is being done to identify and treat MS. According to WHO experts, "every fourth inhabitant of our planet suffers from metabolic syndrome."[2] At the same time, MS is one of the leading causes of mortality. Alarmingly, the prevalence of MS continues to increase rapidly. It should be noted that metabolic syndrome occurs against the background of insulin resistance. At the same time, insulin resistance leads to painless coronary heart disease and "silent" myocardial infarction. This is one of the reasons why the risk of sudden coronary death in MS increases by 5-6 times.

In Uzbekistan, much attention is paid to the diagnosis and treatment of chronic

[1] The World’s Women 2020: Trends and Statistics. /WHO. Tuesday, October 20, 2020
[2] WHO. Where do we stand on women's health in 2020 /https://www.euro.who.int/en/ healthtopics/health-determinants/ gender/news/news/2020/3/where-do-we-stand-onwomens-health-in-2020.

non-communicable diseases. These diseases are the main cause of premature mortality of the population. In order to prevent them, "... promotion of a healthy lifestyle, development and implementation of targeted programs for diseases and their risk factors..."[3] is of urgent importance.

This dissertation research is aimed at preventing the formation of metabolic syndrome and related cardiovascular diseases (CVD) and contributes to solving the tasks defined in the Decrees of the President of the Republic of Uzbekistan "On comprehensive measures to radically improve the health care system of the Republic of Uzbekistan" dated December 7, 2018 No UP-5590, NoPP-4063, "On measures to prevent non-communicable diseases, support a healthy lifestyle and improve the level of physical activity of the population" dated December 18, 2018 No PP-4063, "On additional measures to ensure public health by further improving the effectiveness of medical prevention work" dated November 12, 2020 No PP-4891, as well as the tasks outlined in other regulatory documents related to solving problems in this direction.

Compliance of the study with the priority areas of development of science and technology of the republic. The dissertation work was carried out in accordance with the priority direction of science and technology of the Republic of Uzbekistan VI "Medicine and Pharmacology".

Connection of the dissertation research with the plans of research work of the higher educational institution where the dissertation was performed. The dissertation research was carried out in accordance with the research plan of the Bukhara State Medical Institute. No 000004 "The influence of risk factors on human health and the study of the course, spread of diseases, diagnosis and development of new methods of treatment" (2018-2022).

The aim of the study is to develop proposals and recommendations for reducing the risks of metabolic syndrome among the population based on a

[3] Resolution of the President of the Republic of Uzbekistan NoPP-4063 "On measures to prevent non-communicable diseases, support a healthy lifestyle and increase the level of physical activity of the population" dated December 18, 2018.

multicomponent analysis and to develop an innovative program for non-drug treatment and prevention of metabolic syndrome, including a software product.

Objectives of the study:

to study the incidence of MS and its main components among a representative sample from the unorganized population and to assess the risk of developing this syndrome and its main components from the standpoint of multivariate analysis;

to assess the awareness of the population about metabolic syndrome, its main components and the damage they cause to health, as well as the number of people with metabolic syndrome who turn to doctors and the degree of their compliance with the recommendations of the attending physician;

to study the state of the main components of metabolic syndrome depending on the degree of patients' awareness of metabolic syndrome and attitude to their health among people of different ages;

to assess the effectiveness of prevention and control of metabolic syndrome with multifactorial prophylaxis targeting a wide range of major components of metabolic syndrome and its risk factors, including both pharmacological and non-pharmacological interventions;

to assess the effectiveness of multifactorial prophylaxis when using survey diagnostic methods and screening examinations in order to identify comorbid conditions;

to study the possibility of new technologies for the prevention of MS using modern innovative methods that allow communicating with the patient remotely and carrying out some diagnostic and preventive measures remotely.

Research methods: survey, biochemical, instrumental, preventive, statistical, information and communication.

The scientific novelty lies in the following:

it has been proven that the risk of developing cardiovascular diseases in patients with metabolic syndrome depends not only on the number of its main components, but also on their level;

It has been established that other risk factors, along with the main components of metabolic syndrome, are of great importance in the pathogenesis of the development of cardiovascular diseases;

It has been established that the state of the main components of metabolic syndrome is closely related to individual psychological characteristics of the individual, which affect the patient's self-assessment of his own health, referral to doctors and compliance with medical recommendations;

the pathogenetic basis for the use of the developed digital program for the assessment, control and prevention of multifactorial risk of metabolic syndrome has been proved;

for the first time in the course of using the digital prevention program, the effectiveness of remote monitoring of the dynamics of the main components of this syndrome in patients with metabolic syndrome was proved;

For the first time, the economic and social efficiency of using a digital program for the diagnosis, control and prevention of metabolic syndrome among the unorganized population is substantiated.

Practical value of the work.

The introduction of an innovative program in the primary care setting makes it possible to improve the early detection and systematization of metabolic syndrome and its main components. This, in turn, contributes to an increase in the early detection of various diseases associated with metabolic syndrome.

Measures for non-drug prevention and treatment of metabolic syndrome increase the activity of the population in the detection and prevention of diseases associated with this syndrome.

The use of a digital innovative prevention program creates additional conditions for monitoring the patient's condition in the implementation of programs to prevent metabolic syndrome and control its main components.

CHAPTER I. LITERATURE REVIEW

EPIDEMIOLOGY AND PREVENTION OF METABOLIC SYNDROME AND ITS MAIN COMPONENTS

1.1. Metabolic syndrome: history and modern ideas.

Metabolic syndrome is a complex pathological condition that unites a number of different diseases and disease states [1, 13, 15, 17, 23, 24, 33, 38, 70, 76]. The history of the study of metabolic syndrome dates back to the very first decades of the last century. During this time, the terminology of this syndrome has undergone significant changes. This is largely due to the fact that the authors and researchers dealing with this problem contributed their vision to the etiology, pathogenesis, and clinical presentation of MS. In different years, pizza hospital syndrome was called differently:

- 20s of the XX century - obesity can be accompanied by arterial hypertension, changes in blood lipid composition, impaired glucose tolerance and type 2 diabetes
- 1980 - the term "metabolic syndrome" (M. Henefeld and W. Leonhardt)
- 1988 - "Syndrome X - Deadly Quartet" (decreased tissue sensitivity to insulin) (G.Reaven)
- 1989 - emphasizes abdominal obesity (N. Kaplan)
- 1992 - the term "insulin resistance syndrome" (S.Haffner)
- 1993 - "generalized cardiovascular metabolic disease" (L. Resnick)
- 90s - the term "metabolic syndrome" begins to prevail

In the 20s of the last century, this syndrome implied the presence of arterial hypertension, dyslipidemia, carbohydrate metabolism disorders, type 2 diabetes mellitus. In the following years, interest in this syndrome was not very high. However, in the last decades of the 20th century, several large studies were carried out, which proved and showed how significant this syndrome is, the formation of various diseases and, first of all, cardiovascular diseases. In 1980, the term metabolic

syndrome appeared and implied the presence of such components as arterial hypertension, insulin resistance, obesity and lipid metabolism disorders.

8 years later, in 1988, this syndrome became known as Syndrome X or the Death Quartet. Why did this term appear? This term was proposed by G. Reaven, who cited interesting figures: as it turned out, among patients with metabolic syndrome, which became known as the lethal quartet, the mortality rate was 20-25 times higher than in patients without metabolic syndrome. Given this prognostic value of the syndrome in relation to cardiovascular mortality, it was called the lethal quartet.

A year later, at the suggestion of N. Kaplan, the term abdominal obesity was introduced. This is due to the fact that studies have been conducted that have proven the high importance of abdominal obesity as a risk of cardiovascular disease. And a few years later, in 1992, S. Haffner proposed the term insulin resistance syndrome. This was explained by the fact that, according to Haftar, insulin resistance is the leading triggering mechanism for the development of metabolic syndrome.

In the 1990s of the last century, the term metabolic syndrome again began to prevail. For many years there has been a discussion about what comes first? One group of researchers believes that the leading pathogenetic mechanism is insulin resistance, which triggers such processes as dyslipidemia, arterial hypertension and, of course, type 2 diabetes mellitus. At the same time, there is an opinion that obesity has a decisive influence on the formation of metabolic syndrome. This point of view is also not solved by logic, since a high incidence of insulin resistance has been revealed in obese patients.

In addition, experimental and clinical studies have shown that with an increased amount of fat mass in the body, there is an increased need for insulin and, thus, beta cells that produce insulin work with a heavy load, which leads to their depletion. Currently, different authors propose to include up to 20-27 components in metabolic syndrome. These include such components as non-alcoholic fatty liver disease, hyperuricemia and some other diseases and painful conditions. Nevertheless, most authors agree that the leading main components of metabolic syndrome are

insulin resistance in the form of type 2 diabetes mellitus or impaired glucose tolerance, arterial hypertension, abdominal obesity or overweight, as well as dyslipidemia.

In total, several classifications of metabolic syndrome have been proposed, including the WHO classification, the ATP classification, as well as the classification of the International Diabetes Federation (IDF). Currently, the classification proposed by the International Diabetes Federation is widely used in many scientific studies, as well as in clinical practice.

"In 2009, the International Diabetes Federation, with the participation of the American National Heart, Lung, and Blood Institute, the American Heart Association, the World Heart Federation, the International Atherosclerosis Society, and the International Society for the Study of Obesity, updated the criteria for the diagnosis of metabolic syndrome. The diagnosis of MS is made in the presence of:

- central obesity (waist circumference > 94 cm) and
- At least two of the following factors:
  - Increased triglyceride levels ≥ 150 mg/dL (1.7 mmol/L)
  - or normal triglyceride levels with appropriate therapy,
- a decrease in HDL levels < 40 mg/dL (1 mmol/L) (men), < 50 mg/dL (1.3 mmol/L) (women) or normal HDL levels with appropriate therapy,
- arterial hypertension (BP ≥ 130/85 mm Hg or normal BP controlled by antihypertensive drugs),
- plasma glucose elevation ≥ 100 mg/dL (5.6 mmol/L), or hyperglycemia therapy.

The difference is that, according to the new definition, ***the presence of abdominal obesity is not a mandatory criterion for the diagnosis of MS.*** This diagnosis can now be made by detecting a combination of any 3 of the 5 above signs that define this syndrome (Circulation. 2009, Oct 20; 120(16):1640-5).

The above classification of diabetes has peculiarities in the criteria for selecting the components of metabolic syndrome, and, very importantly, some criteria are chosen taking into account the race of patients, in particular, abdominal obesity, determined by waist circumference, has different criteria for Europeans, Asians,

Chinese. At the same time, the IDF classification provides for lower indicators of arterial hypertension, in particular, systolic blood pressure of more than 130 millimeters of mercury and diastolic above 85 mm Hg. These components, proposed by most researchers and today being officially the main components, are the basic for diagnosing metabolic syndrome in clinical conditions.

To diagnose metabolic syndrome, it is enough for the patient to have 3 of these 5 signs. At the same time, in scientific studies, along with these components and their criteria, additional criteria are also used, in particular, the thickness of the skin fold, the determination of immune reactive insulin, and this is justified, since scientific research requires very accurate diagnostic methods that allow not only to diagnose metabolic syndrome, but also to monitor, as well as assess the severity of the disease and assess the effectiveness of therapeutic and preventive measures, in particular, one of these criteria is the HOMA index, this is the insulin resistance index.

If we talk about the importance of metabolic syndrome for practical health care, it should be noted that patients with this syndrome are much more likely to have various diseases, both therapeutic and others, in other areas of medicine we mean surgical diseases, extragenital diseases, including pregnant women, urological problems, neurological diseases and many other pathologies. At the same time, patients with metabolic syndrome have an increased risk of developing complications of various diseases, in particular, myocardial infarctions, cerebral stroke, and kidney failure. Given the long-term chronic course and severity of these diseases, as well as the costs of their treatment, it becomes clear that metabolic syndrome also causes enormous economic damage to both the state and the patient [14, 19, 58, 63]. It should also be noted that metabolic syndrome is also caused by a social freak, since many patients develop disability, as well as significantly reduce the quality of life [14, 19, 58, 63].

In assessing the significance of a disease or syndrome as a health problem, prevalence is one of the criteria. According to modern data obtained from numerous population studies, the frequency of metabolic syndrome on average in the world is more than 30-35%. Moreover, this indicator increases as the population ages. Some

studies conducted in Australia, North America and other countries, for example, show that the frequency or, say, prevalence of metabolic syndrome can reach more than 60%. For example, in Australia, an epidemiological study was conducted, which found that the prevalence of metabolic syndrome in this country is 64.2 percent of the population.

Another important problem of metabolic syndrome is the constant, steadily increasing increase in the number of patients with this pathology. It is especially important that every year there is an increase in the frequency of MS among young people, as well as among children and adolescents.

Based on the above, it becomes obvious that metabolic syndrome requires close attention. At the same time, along with active therapeutic measures in relation to both metabolic syndrome as a whole and its main components, special attention should be paid to the prevention of this syndrome As it is known, preventive measures are affordable, low-cost, and, according to the results of numerous studies, very effective, but it is the patient who plays a large role in this process. This is due to the fact that preventive measures include, first of all, a change in lifestyle, the formation of a healthy lifestyle, restrictions in diet, increase in physical activity and some other points that fully depend on how competently, accurately and regularly the patient fulfills the doctor's prescription [Kalashnikova M.F. Metabolic syndrome: a modern view of the concept, methods of prevention and treatment // Effect. pharmacoter. – 2013. – No 55. – P. 52-63]. Therefore, the development and implementation of preventive programs for the prevention, treatment and prevention of metabolic syndrome is a priority [Bokarev I.N., Shubina O.I., Aleksandrova E.V. Treatment of arterial hypertension in patients with metabolic syndrome by selecting a special diet.

For a deep understanding of the pathogenesis, clinical presentation and consequences of metabolic syndrome, it is necessary to have data on its main components and methods of treatment and prevention of these conditions. Information about this will be presented in the following chapters of this review.

1.2. Insulin resistance as a factor cardiovascular risk

The epidemiological situation with regard to coronary heart disease [CHD] in different regions of the world and in individual populations is very ambiguous. More than 1 million Americans have experienced new cases of CHD or exacerbations of this disease [qualified as myocardial infarction or fatal CHD]. Moreover, 650,000 of them had newly diagnosed coronary artery disease, and 350,000 had an exacerbation of chronic coronary artery disease. About 250,000 patients died at the pre-hospital stage. Most of them had ventricular fibrillation.

The value of the standardized indicator of CHD prevalence in different cities differed significantly. Thus, the highest value of this indicator was observed in Baku, Kiev and Moscow [19.5%, 16.4% and 14.5%], and the lowest was in Nalchik [6.9%]. In Tashkent, the prevalence of CHD was 9.3%. Exertional angina pectoris is most common among the examined contingents [4.5%], somewhat less often [3.8%] there are "possible" ischemic changes on the ECG. Previous myocardial infarction and painless forms of CHD are even less common [in 1.3% and 1.5%, respectively], and a possible history of myocardial infarction [not confirmed by ECG changes] was determined in 1.0%.

In addition to such generally recognized risk factors as high blood pressure, hyperlipidemia, obesity, diabetes mellitus, etc., the factors contributing to an increase in sudden death also include painless myocardial ischemia [56] and untimely establishment [or non-establishment] of diagnosis [99]. In France, a 20-year study of the causes of death of the population was carried out, which showed a decrease in mortality from cardiovascular diseases [CVD] by more than 30% [119]. In this regard, the issue of determining the range of risk factors for mortality from CHD and the development of adequate methods for the prevention of this disease is of particular importance. Summary data from studies conducted in three regions of France, two regions of Italy, two regions of Sweden, Barcelona, Belfast and Glasgow covered the population aged 35-64 years [150]. The authors concluded that the

mortality rate of the population is influenced by both geographical location and lifestyle, diet and other factors. At the same time, it has been shown that one of the most important factors in the increase in mortality from CHD is a very low coverage of both patients with CHD and patients with high blood pressure.

Large population studies conducted by the Center of Cardiology of the Ministry of Health of the Republic of Uzbekistan indicate the importance and fairly high effectiveness of preventive measures for cardiovascular diseases [69, 70, 71]. Preventive programs implemented in production teams made it possible to increase the effectiveness of drug control of hypertension by 7 times, reduce the frequency of hypertension by 10%, and quit smoking up to 25% of men [70]. Multifactorial prophylaxis has generally been shown to be effective among both men and women [69]. However, it should be noted that the effectiveness of AH and smoking prevention was more pronounced among men than among women. Among men aged 30–59 years in Samarkand, the incidence of coronary artery disease in normal BP was 3.4%, in borderline hypertension – 7.5%, and in hypertension – 16.7%, respectively [31].

Studies in Tomsk were conducted among 647 patients with CHD with an average age of 53.1±and 2.36 years, and it was shown that HDL-C has a stabilizing effect on atherosclerotic plaque and has a positive effect on the course of CHD, as well as to a certain extent prevents the development of MI [39]. Dyslipoproteinemia in some cases can be a manifestation of a general hereditary syndrome. In patients with a hereditary burden of cardiovascular diseases, hypertension was significantly more common among patients with dyslipoproteinemia than in patients with normolipidemia [20.2% and 12.5%, respectively]. At the same time, the authors support the opinion that excess fat consumption contributes to an increase in blood cholesterol, and this, in turn, leads to an increase in the risk of developing CHD.

A certain importance in the development of CHD is given to excess body weight [BMI]. Most researchers note that the frequency of BMI among people engaged in mental work is higher than among people engaged in physical labor.

According to an epidemiological study in Finland [226], BMI is more common among people with low physical activity than with normal physical activity. At the same time, the risk of death from CHD among people with BMI and low physical activity is much higher than the risk of death from CHD among people with normal body weight and sufficient physical activity.

Patients with CHD suffering from BMI are significantly more likely to have increased anxiety, psychosocial maladaptation, a higher incidence of cardialgia, and less tolerance to isometric load. Among people with BMI suffering from CHD, the correlation coefficient between body fat mass and anxiety level is 0.53 ± 0.09 ($p < 0.001$). 60.6% of angina patients have a BMI [21]. Patients with CHD with BMI have a low tolerance to physical activity and less efficiency of the cardiovascular system [20]. It should be noted that impaired central and peripheral hemodynamics is considered one of the important risk factors for death from cardiovascular diseases [1].

The importance of tobacco smoking in the development of CHD is so great that many researchers attach great influence to passive smoking. Although the relationship between secondhand smoke and CHD has not yet been fully understood, there are reports that secondhand smoke contributes to the development of CHD [208]. It should be noted that it is possible to objectively assess the importance of alcohol in the formation of CHD only on the basis of a multivariate analysis. However, alcohol plays an important role in mortality from other, non-cardiovascular diseases.

Studies conducted in various scientific centers indicate that the same RF, as well as their combinations, have different prognostic significance in relation to the development of CHD and the prognosis in this disease. Therefore, the need for further, in-depth research in the field of RF studies becomes obvious.

The high importance of DM in the formation of CHD and mortality from it is indicated by the results of many population studies [64, 132, 134, 138, 175, 182, 192, 213]. A 20-year prospective study conducted in the UK included 2,779 people [242].

Overall, 31.1% of those under observation developed coronary artery disease. Among patients with diabetes, the frequency of new cases of CHD was significantly higher and amounted to 57%. In Finland, the prevalence of CHD among patients with newly diagnosed type II diabetes was studied [219]. It turned out that among patients in whom DM was detected for the first time, the incidence of CHD was 3 times higher than in the control group, i.e. among patients without DM.

The Oxford study was conducted over a period of 10 years and included 3055 men suffering from type II diabetes, whose average age was 52 years [223]. During this period, 335 people developed coronary artery disease. The significance of such indicators as high- and low-density lipoprotein cholesterol, triglycerides, SBP, smoking and fasting glucose levels was analyzed. A pronounced relationship between RF CHD and DM has been established. The greatest association was established with SBP and low-density lipoprotein cholesterol, i.e. with those RFs that play an important role in the development of CHD. At the same time, it should be noted that there are indications in the literature that there is no direct relationship between DM and CHD [65]. Such a view of this problem is explained by the fact that the etiopathogenetic aspects of DM and CHD have much in common. The authors believe that in some cases patients with CHD develop DM, and in other cases, patients with DM develop CHD.

A 9-year prospective follow-up of patients with diabetes showed that DM is a very important RF of death from CHD [199]. This study found that the mortality rate from CHD per 1000 person-years of observation was 28.4 among patients with DM, and 10.2 among people without DM. At the same time, the total mortality from cardiovascular diseases in patients with DM was 39.6 per 1000 person-years of follow-up, and among people without DM – 15.5. It should be noted that mortality from other, non-cardiovascular diseases was 16.6 and 13.5, respectively.

The course of MI in patients with diabetes is characterized by a large number of complications and high mortality. The severity of MI is to a certain extent related to the severity of DM, and the mortality rate in MI patients in DM patients reaches 54% [9]. In patients with DM, the risk of recurrent MI is significantly

higher, and the survival rate is significantly lower than in patients without DM [193]. The presence of DM increases the likelihood of rupture of the left ventricular wall in MI [191]. Along with the higher incidence of chronic painless forms of CHD, painless cases of MI are also more common in patients with diabetes [136, 236].

It should be noted that not all authors share the opinion that the incidence of pain-free forms of CHD is higher among patients with diabetes. As a result of a study based on a retrospective analysis of the prognostic significance of the occurrence of painless myocardial ischaemia during treadmill exercise, the authors concluded that the incidence of painless myocardial ischaemia does not depend on the presence of diabetes [153].

Higher mortality from CHD in patients with diabetes is to a certain extent associated with such a factor as ethnicity [139, 147, 164]. A comparative analysis of mortality from acute MI in South Asia showed that out of 149 Asians and 313 whites admitted to the clinic with acute MI, significantly more whites than Asians remained alive [139]. It should be noted that among Asians admitted to the hospital, the incidence of diabetes was 38%, and among whites - 11%. However, a study conducted among 150 Europeans and 77 Africans suffering from non-insulin-independent diabetes showed that Africans have a lower risk of developing cardiovascular disease than whites [147].

Various RF CHDs are significantly more common among patients with diabetes than among people without diabetes [156, 206, 211]. Patients with CHD [63] suffering from DM have a higher concentration of blood triglycerides and lower high-density lipoprotein cholesterol than CHD patients without DM (2.51 and 2.07 mmol/L, 0.93 and 1.19 mmol/L, respectively). At the same time, the atherogenicity coefficient in CHD patients with DM was 1.4 times higher than in patients without DM [6.43 and 4.60, respectively].

A prospective follow-up of 1342 men in Trinidad revealed 178 deaths, of which 38% were CVD, with 12% having cerebrovascular disease. With an increase in the level of systolic BP, the risk of all-cause mortality from CVD and cerebral stroke

increased. With a SBP level above 180 mmHg. mortality from CVD increased by 4 times [187].

A 7-year study of mortality among men aged 50-59 years in Moscow revealed that hypertension is an important risk factor for death from CHD [104].

When comparing RFs such as hypertension, overweight, smoking, and impaired tolerance to carbohydrates, it turned out that hypertension was the most unfavorable factor, since mortality from coronary artery disease among patients with elevated blood pressure was 7 times higher than in normal blood pressure, which was significantly higher than in other RFs.

In the presence of hypertension caused by SBP, the risk of death from CVD increases by 5 times, and in the presence of DBP due to DBP, the risk of death increases by 3 times. This study showed that the risk of myocardial infarction and cerebral stroke increases with an increase in blood pressure levels, and the risk of cerebral stroke increases more intensively [104]. It should be noted its growth not only among the urban, but also among the rural population. A study of the mortality structure in Tashkent showed that CVD is the cause of death in men aged 20-59 years in 33.1% of cases (CHD - 23.87%, HA - 7.16%, other CVDs - 2.06%) [41].

The increase in the rates of total mortality from 9.6 to 24.1 cases per 1000 people per year as diastolic BP increases is shown by the data of B.Kh. Makhmudov [50]. According to his data, mortality from CVD in the group of examined hypertension was 5 times higher, in the group of borderline hypertension - 1.8 times higher than in the group with normal BP. Prospective observations of the male population of Bishkek have shown that the overall mortality from CVD and other causes increases significantly as SBP increases [52].

In 1995, for the first time since 1986, a decrease in mortality was registered in Russia, and its decrease was noted in 70 regions of the country [19], which was the result of a significant reduction in mortality from diseases of the circulatory system and unnatural causes of death - accidents, poisoning and injuries. However, it is noted that the maternal mortality rate remains high and is not decreasing. The maternal

mortality rate in Russia is 5-10 times higher than in developed Western European countries.

According to data [113], cardiovascular diseases are one of the main causes of mortality in the population of Moscow, accounting for 57% of the total mortality, which exceeds similar indicators in Russia as a whole. A study of the mortality structure in Tashkent revealed that CVD is the cause of death in 37.5% of cases [44, 51]. According to data [113], the female population has an increase in mortality from CVD in all age groups starting from 30-39 years. Cardiovascular diseases also occupy the first place in the structure of extragenital pathology, which is one of the main causes of death in pregnant women [31].

Based on the data presented in this section, it can be concluded that hypertension is of great importance in the formation of coronary artery disease, cerebral stroke and mortality from them. Timely detection, treatment and prevention of hypertension significantly reduces the risk of death from CVD. At present, a lot of work is being done in Uzbekistan to improve the health of women of childbearing age, which is crucial in the formation of a healthy generation.

From the information given in the previous chapter, it follows that according to the data of most studies, the importance of DM as a risk factor for CHD can be considered proven. At the same time, there is no consensus in the literature regarding the importance of NTG as a RF for the development of CHD and mortality from it. Data from an epidemiological study in China, which included 29,960 people with NTG, indicate that the prevalence of CHD is associated with the presence of NTG. The incidence of CHD in patients with DM is 9.32%, and among individuals with NTG it is 6.25% [240]. A prospective study that lasted 9.5 years among 7,735 middle-aged Britons showed that NTG is not only RF of CHD, but also an independent RF of this disease [121].

According to a number of studies, the risk of developing arterial sclerosis significantly increases in NTG [152, 162, 202]. A long-term prospective follow-up lasting 26 years in Framingham [USA] included 1672 men and 2264 women [162]. After 26 years, 210 men and 199 women developed coronary artery disease. Among

individuals with NTG, along with coronary vessel involvement, peripheral vascular lesions [primarily the femoral artery] were also affected. The authors concluded that in conditions of hyperglycemia among persons with peripheral vascular lesions, there is a high risk of developing coronary artery disease. Apparently, the combination of lesions of the coronary and peripheral arteries causes hemodynamic disorders and the formation of a hypokinetic type of blood circulation [11].

There are reports in the literature that NTG significantly affects the severity and clinical course of CHD [36,98]. Among people with NTG suffering from CHD, repeated, frequent hospitalizations, tachycardias, and ischemic changes in the ECG are much more common [36]. Over time, the glycemic level can change both upwards and downwards, and in other cases, glycemic levels stabilize. prevalence of CHD and basal insulinemia levels among individuals with different dynamics of NTG [98]. It turned out that the development and severity of CHD are closely related not only to the presence of NTG, but also to the dynamics of hyperglycemic states. Thus, among individuals with initial NTG, with normalization of glycemia level, the incidence of CHD is 25%, and with stabilization of NTG, the incidence of CHD reaches 76.5%. At the same time, the level of basal insulinemia increases in accordance with the progression of hyperglycemia. Among individuals in whom hyperglycemia normalized, the level of basal insulinemia was 18.27±0.92 μU/mL, when NTG became overt DM, the insulin content was more than 2 times higher [39.08±2.1 μU/mL], and when NTG stabilized, basal insulinemia was the highest – 44.56±3.32 μU/mL. During the entire follow-up period, 864 people developed CHD and 384 people died from this disease.

Along with the works that show the important role of NTG in the formation of CHD and mortality from it, there is information in the literature denying the role of NTG as RF CHD. A multivariate analysis that took into account age, sex, education, hypertension, height-weight index, and smoking led the authors to conclude that, in contrast to DM, NTG is not RF CHD. One of the largest works devoted to the study of the importance of NTG in the formation of CHD and

mortality in this disease is a cooperative study conducted by The International Collaborative Group in 14 scientific centers in 11 countries [181]. Studies were conducted in Australia, England, Denmark (2 populations: males 40 and 50 years old), Ireland, the USA [2 populations: employees of the gas company and the Western Electric Company), Italy, Switzerland, Scotland, Finland (2 populations: policemen and unorganized population), France, and Japan [120, 161, 168, 169, 181, 215, 217, 220, 221, 228, 239]. Such indicators as the prevalence of CHD, the presence of ischemic changes in the ECG, MI cases and mortality from CHD among individuals with NTG and different blood glucose levels were taken into account. The results were very mixed. Studies among policemen in Finland, employees in Italy, and workers in Japan have shown that CHD is significantly more common among people with NTG than among people with normal glucose tolerance. A positive relationship between ischemic changes on ECG and the presence of NTG in the populations of Australia, Italy, and the unorganized population of Finland and France was revealed. A higher mortality from CHD was found among people with NTG in the population of the Gas Company of the USA, France and policemen in Finland. At the same time, among those surveyed in England, Denmark, Switzerland and Scotland, no relationship was found between the presence of NTG and the prevalence of CHD.

As follows from these data, the results of studies of different centers differ significantly. These discrepancies can be explained by the fact that different methods of population selection were used in the studies, age groups and follow-up periods differed significantly, not in all studies the study of glucose tolerance covered the state of glycemia at 1 and 2 hours after glucose loading. For example, in Denmark, the population of policemen is represented by people aged 40 years, and in Italy, the population aged 35-59 years was surveyed. A prospective study in Finland among an unorganized population lasted 4 years, in the same country the study of mortality among policemen was carried out for 10 years, and in the United States among employees of the Western Electric Company the duration of observation was 15 years. The significance of hyperglycemia for the formation of CHD was judged by

the level of glucose: in Italy - on an empty stomach, in Australia - 1 hour after glucose loading, in the USA - 2 hours after glucose loading.

Thus, the discrepancies in the results of the cooperative study conducted by The International Collaborative Group in 14 scientific centers in 11 countries and in a number of other population-based studies on the relationship between the prevalence of CHD and mortality from it with NTG, are largely due to differences in methodological approaches to both sampling and methods for detecting NTG, as well as different follow-up periods.

At the same time, the results of studies on the significance of NTG as RF CHD can also be influenced by other factors, as well as their combinations [34, 123, 126, 142, 148]. For example, a 9-year prospective study conducted in Chicago among 11,220 men and 8,030 women who were aged 35-64 years at the beginning of the study showed that the association of DM and NTG with the development of CHD is more pronounced in women than in men [216]. Apparently, this phenomenon was due to the fact that in this population, the age of women was slightly higher than that of men. At the same time, among the women examined, the levels of glycemia, systolic blood pressure, body mass index, cholesterol level, pulse rate, and prevalence of diabetes were higher than among men. A population-based study in California conducted among 1847 people over a period of 11.9 years also showed that various RFs of CHD are more common among women than among men [197]. At the same time, the prevalence of RF was higher in the presence of NTG.

The results of a number of population studies indicate that when several RFs are combined, the prevalence of CHD increases. At the same time, it has been shown that some RFs can contribute to the formation of other risk factors. In this regard, the question of the relationship between NTG and other RF CHDs is of some interest. In a prospective study conducted in Italy and lasting 11.5 years, 1376 people aged 40-59 years were followed [148]. During this follow-up period, systolic BP increased by 7.6 mmHg among people with NTG. higher than among people with normoglycemia, and diastolic blood pressure is 3.3 mm Hg. The existence of a

relationship between the frequency of hypertension and the presence of NTG is also indicated by a study in Philadelphia conducted among black Americans [154].

A study of 437 people over the age of 15 in Central Australia found a direct correlation between glucose levels on the one hand and the prevalence of hypercholesterolemia, hypertriglyceridemia, hypertension, and BMI on the other [116]. Another scientific study conducted in Western Australia among men and women aged 25-64 years examined the association between the presence of NTG and RF levels of CHD [229]. It is shown that individual RFs are related to NTG in different ways. For example, hyperglycemia was associated with BMI in both men and women. Systolic BP was significantly higher in NTG than in normoglycemia in both men and women. Elevated triglyceride levels were observed in NTG only among women. However, there were no differences between the concentrations of total cholesterol and high-density lipoproteins among men and women depending on the presence of NTG. In general, it was found that in both men and women with hyperglycemia, RF CHD was more pronounced than in normoglycemia.

Studies in the United States have shown that among obese individuals, there is an increased release of insulin in response to glucose load [123]. However, the authors do not specify what comes first in this regard: whether the presence of obesity leads to an increased release of insulin or hyperinsulinemia contributes to the development of obesity. According to the Framingham study, the role of DM and NTG as RF CHD increases significantly when they are combined with other RFs [144]. Observation of the population of 3595 people for 16 years allowed the authors to establish that DM and NTG lead to a significant increase in fibrinogen and triglycerides in the blood, as well as an increase in blood pressure and body weight. The combination of these factors contributes to an increase in the risk of CHD formation.

The problem of hyperglycemia also requires increased attention because in some cases, NTG progresses and turns into overt DM. The significance of the problem is also due to the fact that the prevalence of DM and NTG is quite high and it continues to increase [12, 29, 102, 103, 106, 109, 149, 189]. According to

epidemiological studies, the prevalence of DM and NTG differs significantly in different populations. At the same time, the prevalence of DM ranged from 0.46% at the age of 20-29 years to 4.58% at the age of 60-69 years. By January 1, 1995, the prevalence of DM among the population of one of the central districts of Moscow had increased to 7.53%, i.e. increased almost 3.3 times [24].

In the city of Nalchik, over a 20-year period, the frequency of DM increased by 2 times [29]. In rural areas of the Vinnytsia region, in an epidemiological study among people of working age, the true incidence of DM turned out to be 3 times higher than the official statistics [53]. In the Kamchatka Region, the prevalence of DM among newcomers over the age of 15 was 2.67%, and among the indigenous population, DM was not detected [12]. NTG among the immigrant population occurred in 1.9% of men and 2.39% of women. In Micronesia [149], high prevalence of NTG was found among the Nauru population over 20 years of age [24.6% among men and 18.3% among women].

In Uzbekistan, as early as 1985-1990, a study of the prevalence of DM in the regions of the republic was carried out [106]. At the same time, 5000 people were examined in each region. The prevalence of DM was 1.9% and NTG was 3.6% to 4.0%. This study shows that the true incidence of DM significantly exceeds the official statistics. The results of another population study conducted in Tashkent [48] indicate a significant increase in the incidence of DM and NTG. Between 1980 and 1988, the prevalence of DM among men aged 40-59 increased from 3.9% to 6.92%, and NTG from 29.3% to 38.93%.

According to the American Heart Association, more than 10 million Americans suffer from diagnosed diabetes [145]. The number of new cases of DM is 798,000 per year. The prevalence of DM among black men is higher than among white men.

Thus, summarizing the literature data, it can be concluded that CHD is one of the most significant problems of modern medicine. This is determined by the wide prevalence of CHD and the high mortality associated with this disease. In most countries of the world, including Uzbekistan, the number of patients with CHD

continues to grow. The formation of CHD, its course and outcomes are influenced by various risk factors for this disease.

The role of a number of RFs in the development of CHD (such as hypertension, obesity, age, etc.) is beyond doubt. One of the most significant RFs of CHD is DM. However, the literature on the role of NTG as RF CHD differs significantly. Meanwhile, in some cases, NTG can precede the development of DM and, in a certain sense, it can be considered as a state of "pre-disease" in relation to DM. Hyperglycemia, including latent hyperglycemia, often proceeds with hyperinsulinemia, which is considered one of the components of the "metabolic" syndrome that plays an important role in the formation of cardiovascular diseases, including coronary artery disease.

Differences in the literature, often contradictory, on the role of NTG in the formation of CHD may be associated with rather significant differences in the methodology of research. Along with a fairly large number of one-time and long-term prospective studies, there is a lack of work on the dynamics of CHD development among patients with NTG in "end-to-end" populations.

Based on the above, further study of the role of NTG in the formation of CHD and the outcomes in this disease is of particular interest.

Based on the literature data, it can be concluded that the significance of DM as a risk factor for hypertension can be considered proven. However, with regard to the significance of NTG as a RF for the development of hypertension and mortality from it, the opinions of the authors differ. According to a number of studies, the risk of developing arterial sclerosis significantly increases in NTG [152, 162, 202]. A long-term prospective follow-up lasting 26 years in Framingham [USA] included 1672 men and 2264 women [162]. After 26 years, 210 men and 199 women developed coronary artery disease. Among individuals with NTG, along with coronary vessel involvement, peripheral vascular lesions [primarily the femoral artery] were also affected. The authors concluded that in the setting of hyperglycemia, there is a high risk of developing cardiovascular diseases among people with peripheral vascular lesions. Apparently, the combination of lesions of the

coronary and peripheral arteries causes hemodynamic disorders and the formation of a hypokinetic type of blood circulation [11].

Data from an epidemiological study in China involving 29,960 people with NTG indicate that the prevalence of CHD and AH is associated with the presence of NTG. The incidence of coronary artery disease and hypertension in patients with diabetes is 9.32% and 37.4%, and among individuals with NTG it is 6.25% and 29.88%, respectively [240].

A prospective study that lasted 9.5 years among 7,735 middle-aged Britons showed that NTG is not only RF of CHD, but also an independent RF of this disease [121].

Over time, the glycemia level can change both upwards and downwards, and in other cases, the glycemic level stabilizes. In Tashkent, the prevalence of CHD and basal insulinemia levels were studied among individuals with different dynamics of the course of NTG [98]. It turned out that the development and severity of CHD are closely related not only to the presence of NTG, but also to the but also with the dynamics of hyperglycemic states. Thus, among individuals with initial NTG, with normalization of glycemia level, the incidence of CHD is 25%, and with stabilization of NTG, the incidence of CHD reaches 76.5%. At the same time, the level of basal insulinemia increases in accordance with the progression of hyperglycemia. Among patients in whom hyperglycemia normalized, the level of basal insulinemia was 18.27±0.92 μU/ml, when NTG transitioned to overt DM, the insulin content was more than 2 times higher [39.08±2.1 μU/ml], and when NTG stabilized, basal insulinemia turned out to be the highest – 44.56±3.32 μU/ml.

Along with the works that show the important role of NTG in the formation of cardiovascular diseases and mortality from them, there is evidence in the literature that denies the role of NTG as RF of cardiovascular diseases. A multivariate analysis that took into account age, sex, education, hypertension, height-weight index, and smoking led the authors to conclude that, in contrast to DM, NTG is not a RF of cardiovascular disease. The results of a number of population studies

indicate that when several RFs are combined, the prevalence of CVD increases. At the same time, it has been shown that some RFs can contribute to the formation of other risk factors. In this regard, the question of the relationship between NTG and other RF CHDs is of some interest.

In a prospective study conducted in Italy and lasting 11.5 years, 1376 people aged 40-59 years were followed [148]. During this follow-up period, systolic BP increased by 7.6 mmHg among people with NTG. higher than among people with normoglycemia, and diastolic blood pressure is 3.3 mm Hg. The existence of a relationship between the frequency of hypertension and the presence of NTG is also indicated by a study in Philadelphia conducted among black Americans [154].

Another scientific study conducted in Western Australia among men and women aged 25-64 years examined the association between the presence of NTG and RF levels of CHD [229]. It is shown that individual RFs are related to NTG in different ways. For example, hyperglycemia was associated with BMI in both men and women. Systolic BP was significantly higher in NTG than in normoglycemia in both men and women. Elevated triglyceride levels were observed in NTG only among women. However, there were no differences between the concentrations of total cholesterol and high-density lipoproteins among men and women depending on the presence of NTG. In general, it was found that in both men and women with hyperglycemia, RF CHD was more pronounced than in normoglycemia.

Studies in the United States have shown that among obese individuals, there is an increased release of insulin in response to glucose load [123]. However, the authors do not specify what comes first in this regard: whether the presence of obesity leads to an increased release of insulin or hyperinsulinemia contributes to the development of obesity.

The data presented in this review indicate that hypertension is one of the most common non-communicable diseases. Along with the high prognostic value of AH in the development of cerebrovascular diseases and mortality from them, AH plays an important role in the formation of CHD. At the same time, modern prevention and treatment of hypertension cannot be sufficiently effective if medical

intervention aimed only at reducing hypertension is limited to drugs. According to modern views, the effectiveness of the prevention and treatment of hypertension is largely determined by the timely detection and elimination of various RFs of this disease. However, the prevalence of individual RFs for cardiovascular disease and their contribution to disease development vary significantly across regions and populations. In this regard, the study of RF AG in each specific region is of particular importance.

The role of DM as a factor contributing to the development of hypertension is currently beyond doubt. However, there are ambiguous data in the literature regarding NTG as a factor in the formation of cardiovascular diseases and mortality from them. Meanwhile, in some cases, NTG can progress and turn into DM. It should also be noted that DM is one of the most rapidly spreading diseases. In terms of growth rates, DM ranks first among non-communicable diseases.

Based on the above, the study of the significance of NTG as a risk factor for the formation of hypertension and mortality from this disease is of particular interest.

1.3. Risk factors for metabolic syndrome among persons of different sexes.

Epidemiological studies of the last 25 years have shown that hypertension begins to form at a young age [13,73,93]. It has also been established that BP indicators at a young age determine the level of BP in subsequent years [55,75].

Cross-stage and prospective epidemiological studies conducted in our country and abroad made it possible to objectively assess the patterns of the spread of hypertension, as well as to identify factors associated with the risk of its occurrence. One of the first epidemiological studies to study the prevalence of CVD, including hypertension, was started in 1949 in Freminheim [162,163], followed by intercenter

studies in 7 countries of the world, a joint international study conducted in Moscow and St. Petersburg [34, 45,112].

Epidemiological studies have established a wide prevalence of hypertension among certain populations [68,107,108]. At the same time, the frequency of hypertension differed significantly depending on the examined population. Several studies have been conducted to study the prevalence of hypertension and its relationship with CHD among women in the CIS countries. The incidence of hypertension among the unorganized population of women aged 20-69 years was studied in Moscow and St. Petersburg, Kiev, and Almaty. According to the data obtained, the prevalence of AH among women in Moscow was 24.5% [42, 78,90], the incidence of isolated SAH was 9.6%, and the incidence of isolated DAG was 15.0%. Among the population of women in St. Petersburg, the incidence of hypertension was 28.7%. It was also found that the incidence of DAH prevails in younger groups, and the incidence of SAH in older age groups[109].Among the population of women in Astana, the incidence of hypertension was 13.4% [2], and in Kyiv, among women 60-69 years old, the incidence of AD was 20.0% [79,88].

When studying the prevalence of AH among the unorganized female population of different nationalities aged 20-59 years in Tashkent, it was found that DAG prevails over SAH in women of all age groups, and an increase in the prevalence of SAH and DAH with age was noted. This study showed that the prevalence of total AH [SAH and DAH] increases with age from 1.2% at 20-29 years of age to 15.5% at the age of 50-59 years [59].

In women aged 35-54 years working in one of the enterprises of Cheboksary, AG was detected in 21.7% [72]. As a result of a 5-year epidemiological study and observation of women workers in the textile industry of this city, it was established that the prevalence of hypertension in women significantly increases with age from 2.4% at 30-34 years to 12.2% at 45-50 years. Differences in the prevalence of hypertension depending on the menstrual cycle have also been studied.

Among the population of women aged 40-49 in Urgench, the prevalence of hypertension was 17.6% [101]. A study of the prevalence of hypertension among the

male population aged 20-69 years in Tashkent revealed that hypertension in this age range occurs with a frequency of 17.13% [102].The frequency of hypertension among the working-age population of the Tashkent region was 14.4%, including 12.6% of men and 15.7% of women[49].

A study of the epidemiology of hypertension in Central Asia [52] revealed that the incidence of hypertension in the adult population [20-69 years old] of Kazakhstan was 24.3%. At the same time, the prevalence of hypertension among men was higher than among women, amounting to 26.9% and 22.8%, respectively. PAG was detected in 9.9% of men and 7.8% of women, and its frequency increases with age. The study of the dynamics of the prevalence of hypertension among the male population from 1985 to 1995 revealed that the frequency of both SAH and DAH significantly increased in all age groups [23]. An analysis of the dynamics of the prevalence of hypertension over a 10-year period in Moscow [the MONIKA program] revealed a clear decrease in the prevalence of hypertension in both men and women [64]. One of the reasons for this is the decrease in the prevalence of overweight observed in recent years. Studying the dynamics of the prevalence of the main RFs of CHD in the population of 30-54 years of age in Tallinn [24], it was found that over 10 years there was a decrease in the frequency of hypertension from 28.1% to 19.5%.

Numerous epidemiological studies indicate variability in the distribution of hypertension among different populations [10,25]. In the United States, 35 million people of both sexes [15-25% of the adult population] have hypertension. To this should be added another 25 million adults whose blood pressure is at the borderline level [131,160]. In the province of North Karelia [Finland], the diastolic pressure is 95 mmHg. It is noted in 34% of men and women aged 25-59 years. Every year, 1% of the middle-aged adult population there are new cases of hypertension [119,138].

In a sample survey of the population living in five regions of Germany, the incidence of hypertension among women aged 25-59 years was 21.1%. According to a sample survey of the population of Athens [Greece], the prevalence of AH in women over 18 years of age was 9.1%, the incidence of AH was 8.6% [140], in China among women 18 years of age the incidence of AH was 7.7% [135]. The

prevalence of hypertension among white women aged 25–74 years in the United States is 16.3%, and among black women of the same age is 26.2% [157]. In Briesihelm, among women over 14 years of age, hypertension was detected in 33.8% of cases, and PAH in 25.7% [179].

In the Framingham study, when studying the relationship between hypertension and other CVDs, it was found that in people with hypertension [men and women], the risk of developing CHD increased by 2-3 times, and cerebral stroke by 7 times. People with PAH have a 50% higher risk of developing a cerebral stroke and a 30% higher risk of developing a myocardial infarction than with normal blood pressure. It has been found that persistently elevated diastolic blood pressure leads to an increase in the incidence of coronary artery disease by 75% in men and by 54% in women [163]. Screening during Kiel Week found that the number of people with normal blood pressure decreased from 98% to 63% with age [124]. According to the combined results of five large population-based studies in the United States [165], it was found that the risk of developing MI or sudden death is associated with the baseline level of DBP. So, with DBP of 95-104 mmHg. the frequency of MI increases by 2 times, with DBP equal to or greater than 105 mmHg - 4 times than with normal DBP.

Analysis of the results of a survey of 4 populations - Yanomamo and Zingu Indians from Brazil, rural population of Kenya and Papua New Guinea showed that the average systolic BP levels in these populations are 103 mm Hg. [in residents of other regions - 120 mm Hg], diastolic blood pressure - 63 mm Hg. [for residents of other regions - 74 mmHg.]. AH occurs in only 5% of rural Kenyans and is virtually absent in 3 other countries.

A number of epidemiological studies have analyzed the prevalence of CVD RF, including hypertension with educational attainment [59,214]. In 25-64-year-old men and women in Australia, with an increase in the level of education, there is a significant decrease in blood pressure [178]; for men and women in Tromska [Norway], there is an inverse relationship between SBP and educational attainment. At the same time, in women, there is an inverse relationship between DBP indicators

and the level of education [213]. Large population-based studies within the framework of the prevention program [Germany, USA] have established a relationship between the level of education, occupation, marital status, number of children, and the development of CHD and RF in women.

In addition to the wide spread of hypertension among the population, its high stability under long-term observation, the so-called phenomenon of three halves is noteworthy: 1/2; 1/2; 1/2. This means that about half of those with hypertension do not know about it, which is confirmed by many studies [12, 68, 69].Of those who know that they have hypertension, only half take antihypertensive drugs. And only half of those taking antihypertensive drugs have normal blood pressure. According to some data, only 8% of patients with hypertension receive adequate therapy with antihypertensive drugs. [52].

According to some researchers, women are more informative about their AH and treatment coverage [205]. Thus, hypertension is one of the most common pathologies. AH begins to form at a young age and its frequency increases with age. A high prevalence of hypertension is characteristic of both male and female populations. AH is closely associated with a number of social, demographic, and other risk factors [51, 61, 82]. Patients' awareness of their disease is low, treatment coverage of these patients is insufficient, and a very small number of patients receive adequate therapy. At the same time, in the Central Asian region, the issues of epidemiology and prevention of hypertension among women of childbearing age and pregnant women have not been sufficiently studied. In connection with the above, it seems appropriate to study the state of blood pressure, the prevalence of hypertension and the state of detection of hypertension among the female population, including pregnant women.

Prevention of cardiovascular diseases, including hypertension, is based on the modern concept of risk factors [48,63,117]. Risk factors are environmental, behavioral, and biological values that are associated with a higher than average probability of developing disease [54]. The most significant factors for the development of arterial hypertension include the following factors: nervous and

mental overstrain, impaired socio-psychological adaptation, heredity burdened by arterial hypertension and cardiovascular diseases, excess body weight, increased consumption of table salt, alcohol consumption, smoking, and physical inactivity [3, 10,13,41,77,104, 126,143].

At the same time, an increase in total cholesterol and triglycerides has an adverse effect on the formation and prognosis of hypertension [14,102,145, 217]. In general, new cases of cardiovascular disease are formed with a moderate combination of several risk factors [32,170,176,221]. However, even a modest reduction in the mean level of several risk factors can lead to a significant decrease in incidence. Among individuals with hypertension, one or both parents are more likely to have a family history of hypertension [9,36].

The role of the genetic factor is most significant in persons under 40 years of age. A particularly unfavorable prognostic value in relation to the development of AH is the presence in patients with PAG of a hereditary hereditary AH on the maternal side in combination with excess body weight [BMI] and hypo-cholesterolemia [55]. Some clinical studies have shown that patients with hypertension and those at risk of developing essential hypertension differ from those with normal BP without essential hypertension in their family history in terms of physiological responses to stressful psychological stimuli [210].Genetic factors play an important role in regulating the synthesis, excretion, and metabolism of catecholamines during stress stimulation. Hereditary forms of hypertension have a more unfavorable course, occur at a younger age, and are characterized by a high level and high frequency of the main risk factors [34].

Hypertension is the most common chronic non-infectious pathology, for which conditions and lifestyle are of paramount importance [37,71,175]. Negative emotions in the history of patients with hypertension are noted 5 times more often than in people with normal blood pressure. A study of 508 patients with hypertension showed that in 231 of them [61%] work is associated with nervous and mental stress, in 66 [17%] there were conflict situations at work, in 37 [10%] working conditions are associated with risk [8].

A questionnaire survey found that among those suffering from hypertension, the number of people who attach importance to conflict situations increases with age, and women in all age groups are more likely than men to associate their disease with negative emotions [17]. Epidemiological studies conducted both in our country and abroad have shown that the prevalence of BMI in different regions varies significantly. Thus, among the unorganized populations of women aged 20–69 years, the prevalence of BMI was as follows: in Moscow it was 11.1% with a Quetelet index of > 34 [90], in St. Petersburg it was 28.7% with a Quetelet index of > 29 [44], in Almaty with a Quetelet index of > 29 [2], among women 35-64 years of age in Kaunas, the BMI frequency was 53.6% with a Quetelet index of > 30 [114], among the population of women 40-59 years old in Urgench, Khorezm region, the BMI frequency was 10.1%, with the Quetelet index > 31[101].

Studies in Tashkent have found that the average values of the Quetelet index differ in women with different BP levels, increasing from 27.0 in normal blood pressure to 31.1 in hypertension [80]. In recent years, there has been a decrease in the frequency of BMI in the population of the city of Moscow [24, 64]. A similar picture was observed among women in the city of Tallinn.If in 1984 BMI was found among 33.5% of women, then by 1994 this figure was 19.2% with the same IQ values [24].

In Northern Ireland, in Belfast, among women aged 25-64 years, BMI was detected in 47.3% of cases with a Quetelet index of > 27 [144]. In Germany, among the population of women aged 25–59, the BMI was 15.5% [134]. In the United States, among women aged 25–74 years, the BMI incidence at IC > 27.3 was 27.6% for white women and 49.5% for black women. In a study of a large population of South Africans aged 15-64 years aged 15-64 years, BMI among women was detected in 38.8% of cases. The frequency of overweight is currently increasing among pregnant women [in 8.1 - 15.5% of cases]. Moreover, the formation of BMI begins at reproductive age, and not only in the climacteric period. According to data [74], grade I obesity occurs in 54.47% of pregnant women, stage II obesity in 34.14%, and grade III obesity in 11.38%. During the examination of 1000 pregnant women, obesity was diagnosed in 16.8% of them [105].

According to [169], hypertension is often associated with insulin resistance, DLP, and BMI, and their combination is considered highly atherogenic. According to the reports of the European Society for Atherosclerosis, the highest risk of atherosclerosis is the TCH level of 5.2 mmol/L and the TG level of 2.3 mmol/L. According to studies conducted in men aged 20-69 years, the prevalence of hypertension increases in the presence of HCS, hypo-CH and HTG compared to the contingent of patients without these factors: 44.84% in the presence and 21.2% in the absence of HCH. 42.5% in the presence and 23.3% in the absence of hypo-cholesterol, 51.4% in the presence and 22.3% in the absence of HTG[90].

The prevalence of DLP as a risk factor for CHD was studied among the unorganized population of women aged 20-69 in Moscow, St. Petersburg, Alma-Ata and women aged 35-64 in Kaunas. At the same time, the following standard criteria were taken as DLP: HCH - cholesterol level > 260 mg%, HTG - TG level > 200 mg%, hypoalphacholesterolemia - cholesterol level > 34 mg%. It has been shown that among women in Moscow, the incidence of HCS was 11.8%, HTG was 5.5%, and hypoalphacholesterolemia was 3.5% [44]. Among women in St. Petersburg, the incidence of HCH was 14%, HTG - 4.5%, hypoalphacholesterolemia - 1.7% [110]. Among women in Almaty, the incidence of HCS, HTG, and hypoalphacholesterolemia was 12.2%, 3.1%, and 3.2%, respectively, and a total of 17.4% of cases were diagnosed with DLP [2]. The prevalence of HCS among women in Kaunas was 24.6%, HTG - 7.9%, hyperalphacholesterolemia - 2.4% [114]. In a representative sample of 15-18-year-old women in Tomsk, HCS occurred with a frequency of 9.7%, HTG - 7.1%, hypoalphacholesterolemia - 4.7%, and total DLP - 21.5% [51].

In Urgench, among the unorganized male and female population of 40-59 years old, the incidence of DLP was: HCS - 9.8%, HTG - 9.9%, hypoalphacholesterolemia - 9.2%[101]. In Tashkent, HCS, HTG and hypoalphacholesterolemia occur in 9.7%, 4.3% and 12.6% of women aged 20-59 years, respectively. Moreover, starting from the age group of 30-39 years, there is a significant increase in these indicators [59].

In his studies, Stamler J.[208] showed that among individuals with a baseline plasma cholesterol content of more than 260 mg% in the next 4 years, CHD occurs in 90% of those examined[203]. As a result of an epidemiological study in Framingham, it was found that women aged 30-60 years have an increased risk of developing CHD with an increase in serum cholesterol [at CH levels from 3.88 to 6.72 mm/l, it increased in women by 1.5 times].Prospective studies in the same population showed that in men with HCS, CHD develops CHD over the next 10 years in 27% of cases. It has also been established that the level of TCH is closely related to the occurrence of CHD in persons under 50 years of age, after 50 years of age this relationship is not detected in women, and in men it noticeably weakens[].

An epidemiological study in Germany found a high incidence of HCS [cholesterol level > 250], among women aged 20–29 years the incidence of HCR was 8.0%, 30–39 years old – 16%, 40–49 years old – 22%, and 50–59 years old – 60% [198]. In the United States, among women aged 25-74 years, the incidence of HCS was 23.4% in white women and 22.3% in black women [157]. Among young Africans [39 men and 12 women] who had AMI, a high incidence of HCH was found: 51.3% among men and 37.2% among women [193]. A study of the dynamics of the frequency of dyslipoproteinemia among Moscow residents shows a decrease in the prevalence of hyperlipidemia: according to studies in Moscow, hypercholesterolemia was found in 69.1% of men and 71.3% in women, HTG in men 10.1% and in women 3.6%, and 10 years later, by 1994, hypercholesterolemia was found in 61.4% of men and 52.1% in women, hypertriglyceridemia in 4.5% of men [23].

At present, the study of the effect of contraceptives on the occurrence of hypertension is very relevant. According to the WHO expert committee [7], prospective controlled trials have found that oral progestinoestrogenic contraceptives containing 50 mg of estrogen or more cause an increase in SBP and, to a lesser extent, DBP in most women. In some cases, there are cases of malignant AH when taking contraceptives [184]. Among women using contraceptives, the incidence of hypertension is 5-18% [180].

In women aged 30-40 years, the risk of developing coronary artery disease, cerebral stroke, venous thromboembolism increases when taking hormonal contraceptives, and in the presence of hypertension, HCH, family history, and smoking, this risk increases even more [139,191, 224]. Some researchers, when examining women using hormonal contraceptives, found that oral contraceptives contribute to impaired estrogen metabolism [199]. Women taking oral contraceptives also have a frequent development of hypertension [18]. This is due to the fact that estrogens in a stressful situation, including during physical activity, can play the role of a "protective mechanism" that regulates blood pressure and prevents its excessive increase. In women who use hormonal contraceptives for a long time, hypertension is observed in 5% of cases [223].

In Germany, hormonal contraceptives are used by 20-25% of women of childbearing age. Among this population, the risk of death from CVD is several times higher than in women who do not take hormonal contraceptives [136]. In most cases, discontinuation of oral contraceptives leads to a decrease in blood pressure [7,168].

When studying blood pressure levels during a two-year intake of oral contraceptives with a low estrogen content, no significant changes in systolic and diastolic pressure were found [180].

The study of the effect of hormonal contraceptives on BP levels in women with pregnancy-induced hypertension showed that in women with pregnancy-induced high blood pressure, taking hormonal contraceptives for 6 months led to a slight increase in systolic BP and a significant increase in diastolic BP by 4.6 mmHg. [184].

In addition to traditional risk factors for hypertension, obstetric and gynecological history has been studied at the population level in recent years [5,99]. This study found that SBP and DBP levels were independent of the onset of menstrual function, the regularity of sexual activity, the presence and number of pregnancies, births and abortions. In patients with hypertension, BP increased significantly more often during pregnancy than in women without hypertension, and BP increased more often in the second half of pregnancy than in the first half of pregnancy. The incidence of SAH in women who had abortions was slightly higher

[12.24%] than in women who did not have them [10.18%]. In the course of prospective follow-up of women with a baseline age of 20-54 years, the main AH RFs and factors of obstetric and gynecological history and reproductive function were studied, where it was found that the latter affect the occurrence of AH 2.5 times more often than the main risk factors [22].

Thus, as a result of numerous epidemiological studies, the prevalence of the main hypertension risk factors and BP levels among the female population was studied. The different prevalence of hypertension and the significance of its risk factors have been established depending on climatic and geographical conditions, ethnicity, as well as age and other factors. A fairly high prevalence of overweight and dyslipoproteinemia in pregnant women was noted, as well as the influence of some obstetric and gynecological history and pregnancy data on the state and prevalence of hypertension.

One of the most important areas of health care is the solution of the problem of family planning. Therefore, in order to create scientifically based measures for the prevention of hypertension among women of childbearing age, it is very important to study the factors of hypertension formation among women of childbearing age.

Increased blood pressure during pregnancy can be a sign of a number of diseases: hypertension, renal artery obstruction, chronic glomerulonephritis or pyelonephritis, Cushing's syndrome, late toxicosis of pregnancy, and a number of other diseases [149,132,220]. It is difficult to indicate the true frequency of detection of each of the above-mentioned diseases during pregnancy, which is due to changes in blood pressure at different stages of pregnancy, the complexity of the differential diagnosis of hypertension, late toxicosis and various diseases accompanied by hypertension, the impossibility of using a number of research methods during pregnancy (X-ray, radionuclide, and others) [43, 67].

During pregnancy, there are profound changes in the cardiovascular system that affect blood pressure [29]. There is a tendency to a slight decrease in diastolic pressure, less often [and to a lesser extent] systolic pressure. In the I-II trimesters of pregnancy, a more pronounced decrease in blood pressure is noted, but in the third

trimester it returns to normal levels [30]. The decrease in BP levels during pregnancy can be explained by a decrease in the pressor response to angiotensin. A high level of prostaglandin in the blood plasma of pregnant women also prevents a pressor reaction to angiotensin [158].

Taking into account these processes, it is not possible to accurately determine the specific pressure indicator at which these changes go beyond the norm. Therefore, many different levels of diastolic pressure have been proposed as a criterion for abnormal blood pressure, ranging from 80 to 95 mmHg. [26]. Exceeding this level should be evaluated as hypertension. To assess the severity of arterial hypertension, diastolic pressure indicators should be considered more important[46].A decrease in the systolic-diastolic coefficient is considered prognostically unfavorable.

According to the study of the prevalence of AH in first-time pregnant women in Burma, Thailand, Vietnam and China, it was found that the number of women who had DBP>89 mmHg at any time during pregnancy. in China it was 33%, in Thailand - 26%, in Burma - 7%, in Vietnam - 5%. The same large differences were noted with respect to SBP of 130 mmHg. st. and higher [153]. In one of the studies, the diastolic pressure value of > 95 mm Hg was chosen as a criterion, since this value significantly increases perinatal mortality [151]. In another study, diastolic pressure > 85 mmHg was chosen as the criterion. or more, because this value of diastolic pressure in combination with proteinuria correlates with increased perinatal mortality [155, 158].

With the improvement of new methods of examination, combined forms of arterial hypertension are increasingly revealed (for example, vasorenal pathology and chronic pyelonephritis, chronic pyelonephritis against the background of congenital polycystic disease, etc.) [6].

In pregnant women, various forms of arterial hypertension are often combined with nephropathy, in which hypertension takes a malignant course. According to some authors[16], the main pathomorphological manifestation of preeclamptic nephropathy is glomerular endotheliosis (acute and reversible damage).

The above data indicate the important role of hypertension during pregnancy and its outcomes. At the same time, the issues of cause-and-effect relationships

between hypertension and the course of pregnancy need to be resolved. To develop methods for preventing pregnancy complications in women suffering from hypertension, it is necessary to study the relationship between the state of blood pressure, the presence of hypertension and some obstetric history.

1.4. Some Issues of Metabolic Syndrome Prevention

The study of the prognostic significance of hypertension in relation to CHD in a prospective study showed that the incidence of new cases was significantly lower among individuals with initially normal BP values than among those with hypertension at the start of the study [77]. This study revealed a direct proportional relationship between hypertension levels and mortality from coronary artery disease. Among patients with hypertension, mortality from coronary artery disease was 7 times higher than among patients with initially normal BP values.

Data from a 20-year prospective study in England involving 2779 people indicate that at a systolic BP level of > 151.2 mmHg. the risk of developing CHD increases significantly. Among individuals whose BP values were higher than this value at the start of the study, new cases of CHD accounted for 31.8%, and with lower BP values, 21.4% [233]. At the same time, this study showed that in hypertension the relative risk of cerebral vascular injury is higher than the relative risk of coronary vessel injury [relative risk index 1.035 and 1.013, respectively].

An analysis of the materials of the annual reports of medical and preventive institutions of Dagestan for 10 years showed a significant increase in cardiovascular diseases [28]. During the follow-up period, the frequency of new registered cases of CHD increased by 30.2%, hypertension by 37.1%, myocardial infarction by 87%, angina pectoris by 45%, cerebrovascular disease by 27.8%. In the structure of mortality of the population, cardiovascular diseases accounted for 50%.

One of the factors that worsen the quality of life and to a certain extent affects the prognosis in hypertension is pre-stroke cerebrovascular disorders. According to the results of the study of the frequency, structure, and period of

appearance of these disorders obtained on the basis of clinical data, neurophysiology, rheoencephalography, echoencephaloscopy, and electroencephalography, signs of brain damage in the form of pre-stroke cerebrovascular disorders appear as early as the second stage of hypertension [103].

Along with the effective treatment of various diseases, the prevention of morbidity is also one of the main priority areas for the development of health care. Numerous studies on the prevention of [primarily multifactorial] cardiovascular diseases, including hypertension, have shown their fairly high efficacy [39, 50, 52, 68, 72, 73, 78, 88, 91]. The sixth report of the U.S. Joint National Committee for the Prevention, Detection, Evaluation and Treatment of High Blood Pressure indicates that over the course of 18 years, the number of patients who are informed about the presence of high blood pressure has increased from 51% to 68%. Treatment coverage increased from 31% to 55%, and the number of effectively treated patients increased from 10% to 29%. As a result of these changes, there was a decrease in AH-related mortality: by 60% from stroke and by 53% from myocardial infarction [63]. At the same time, modern views on the prevention of hypertension have undergone significant changes. The current level of knowledge in the field of hypertension allows us to conclude that the approach to the treatment and prevention of hypertension cannot be limited to reducing blood pressure, since this does not provide effective prevention of various complications of arterial hypertension [45]. Complete prevention of hypertension can be carried out by taking into account and controlling hyperlipidemia, hyperinsulinemia, impaired glucose tolerance, obesity, and impaired mineral-electrolyte metabolism [74]. Based on this, the WHO Expert Committee on the Control of Hypertension recommends further research on RF elevated BP and the possibility of their prevention [75].

Multifactorial prevention of cardiovascular diseases, carried out for 10 years in organized groups, made it possible to reduce both the prevalence and intensity of a number of CVD RFs. At the same time, the prevalence of CVD decreased [29]. Along with this, a decrease in the number of days of temporary disability (by 43.3%) and a 2.5-fold decrease in cases of primary disability have been

achieved. From 1958 to 1968, the number of deaths from CHD in Belgium doubled. Then, from 1969 to 1977, mortality among men decreased by 8.8%. The authors explain the decrease in mortality from CHD by preventive measures to control RF. In particular, the indicators of the average BP level during the period of prevention decreased from 142/88 to 135/84 mmHg. [175].

Studies on the prevention of cardiovascular diseases in the United States have shown that not only drug, but also non-drug control of hypertension can be quite effective. Intensive gymnastic programs carried out for 6 months made it possible to achieve a decrease in glucose, lipid, and blood pressure levels among individuals with BMI [164]. Analysis of the results of prevention programs in Novosibirsk indicates that measures for the prevention of cardiovascular diseases and their RF contribute to a significant reduction in the incidence of MI. At the same time, the cessation of preventive measures leads to a new increase in cardiovascular diseases and mortality from MI [20].

A 10-year preventive intervention in Tallinn reduced the incidence of hypertension in men from 43.9% to 22.7%, in women from 28.1% to 19.5%. Along with this, there is a decrease in the incidence of RF such as hyperlipidemia and BMI. The authors associate such favorable changes with significant changes in the diet of the population. However, the expected reduction in mortality from cardiovascular diseases did not occur. There was a lack of dynamics of mortality of the population. Apparently, this is due to the growth of other RFs. Thus, the frequency of smoking during this period increased in men from 51.4% to 58.1%, and among women from 18.9% to 27.4% [1].

Large scientific programs implemented in Tashkent for the prevention of cardiovascular diseases indicate significant reserves in this area [30, 56, 59, 60]. The results of 5 years of multifactorial primary and secondary prevention of CHD in Tashkent showed that the overall mortality in the active prevention group was 19.7% lower than in the comparison group. Mortality from cardiovascular diseases and CHD in the active prevention group was also lower than in the comparison group [by 29% and 53.9%, respectively]. As a result of preventive measures, it was possible to

achieve a significant decrease in systolic and diastolic BP levels [86]. The analysis of the dynamics of the prevalence of hypertension during preventive intervention among 1590 men aged 40-59 years showed that the incidence of hypertension decreased from 19.5% to 10.5% over 5 years in the active prevention group. At the same time, the coverage of people receiving drug treatment and effectively treated patients has increased [65].

Studies on multifactorial prevention of cardiovascular and other non-communicable diseases in organized teams have significantly improved the health of employees [30, 56]. The effectiveness of drug control of hypertension increased by 7 times. The prevalence of hypertension decreased from 16.2% to 6.6%. It should be noted that the most significant results in reducing the incidence of hypertension were achieved in the age group of 30-49 years, which opens up significant prospects for the prevention of cardiovascular complications and mortality in this category of patients [56]. At the same time, the implementation of an integrated program for the prevention of non-communicable diseases among the employees of the State Joint-Stock Company "Uzbekneftegazstroy" made it possible to reduce the prevalence of chronic non-communicable lung diseases from 61.8% to 10.6% in men and from 6.3% to 4.2% [30].

Current trends in the prevalence of cardiovascular diseases, including hypertension, are characterized by an increase in the incidence of these diseases in some countries and a decrease in others [6, 54, 63, 76, 116, 122, 194]. In industrialized countries, the incidence of hypertension among the adult population is 18-20% [9]. AH has become an urgent problem for countries with economies in transition [42]. In developing countries, there is a significant variability in the frequency of hypertension and blood pressure [162]. There is a significant "rejuvenation" of hypertension. Studies conducted in the North of Russia in Novy Urengoy among children aged 7–15 years have shown that the incidence of hypertension is 14.1% in boys and 11.6% in girls already at school age [19].

Blood pressure is characterized by significant fluctuations both during the day [circadian fluctuations] and in different seasons of the year [22,51]. A significant

number of cases of hypertension are latent [18]. Therefore, mass preventive examinations of the population for the detection of hypertension, treatment, and prevention of cases of high blood pressure have acquired special importance [30, 59, 149, 178, 221, 232].

An epidemiological study in Western Siberia conducted among 10,677 people aged 20-65 years showed that hypertension (according to the criteria of ≥ 160/95 mm Hg) occurs in 27.8% of the population [48]. Among them, only 41% knew that they had high blood pressure. At the same time, only 29% received antihypertensive therapy. The mean age of the patients was 41 years. Among men over 60 years of age, hypertension was found in 39.8%.

Studies in Lithuania among the male population of Salantai and Merkinė rural areas over the age of 15 revealed hypertension in every third resident (32.4%). Moreover, among people who considered themselves absolutely healthy, the frequency of hypertension ranged from 28.6% to 32.3%, and among people who considered that they were not completely healthy or sick, hypertension occurred in 33.2% in Salantai and 37.5% in Merkina. Among people with hypertension, only one in four knew that they had high blood pressure [84]. At the same time, among the rural population of the Khorezm region of Uzbekistan aged 40-59 years, the incidence of hypertension was significantly lower [8.8%]. At the same time, in the urban population of this region in the city of Urgench, 20.3% had AH [99].

The results of a large-scale cooperative study conducted in Moscow, Kiev, Tallinn, Almaty, Bishkek, Yakutsk, and Norilsk among men aged 20-54 years made it possible to establish a fairly high variability of the frequency of hypertension in these cities, as well as the relationship of hypertension with the type of work. For example, in Moscow, the prevalence of hypertension among manual and mental workers practically did not differ [18.8% and 18.6%, respectively], while in Kiev these differences were statistically significant [14.6% and 10.7%, respectively, $p < 0.05$]. These data indicate a certain importance of both the nature of labor activity and regional features in the prevalence of hypertension. The authors believe that the lack

of connection between AH and the type of labor activity is explained by the fact that in the modern world many labor-intensive production processes are automated [108].

In the Central Asian region, there is a fairly high prevalence of hypertension [58, 61]. The incidence of hypertension among the adult population in Kazakhstan is 34.3%. Moreover, the prevalence of hypertension under the age of 20 is 10 times lower than among people 60-69 years old. In Bishkek, among men aged 40-59, hypertension occurs in 25.3%. There is also an increase in the frequency of hypertension with age. Among people of working age in the Leninabad region of Tajikistan, AH is found in 22%. In the Tashkent population of men aged 40-59 years, hypertension occurs in 26.6%.

In the environmental disaster zone of the Aral Sea region, the incidence of hypertension among the population aged 16-60 years is 11.1%. Moreover, hypertension is more common in men [13.1%] than in women [9.1%]. This study showed a close relationship between AH and BP with threshold sensitivity to table salt [5]. According to another epidemiological study conducted in the Aral Sea region, dietary habits, anemia, and diseases of the digestive system may be risk factors for hypertension [34].

To create effective programs for the treatment and prevention of hypertension, it is necessary to have information about various RFs involved in the formation of elevated blood pressure, the development of cerebral stroke, coronary artery disease and MI, as well as the associated mortality of the population. At present, there is information in the literature about the role of a number of such RFs.

One of the most important RFs for the development of hypertension is considered to be neuropsychic overstrain [9, 50, 63, 178]. At the same time, it is pointed out that reducing the negative impact of nervous stress by protecting a person from negative emotions is very doubtful [50]. It seems more appropriate to lead an active lifestyle, exercise and sports.

Excess body weight makes a certain contribution to the formation of high blood pressure [231]. According to a number of epidemiological studies on the association of BMI with hypertension, the presence of obesity is not one of the main

RFs of hypertension [223]. At the same time, it is noted that BMI is closely related to factors such as hypercholesterolemia and diabetes mellitus, which can contribute to an increase in blood pressure. It has been shown that BP indicators are closely correlated with body weight. Even in individuals without BMI but with visceral fat deposition, the incidence of hypertension is higher than in individuals without visceral fat deposition [187]. Data from a population-based study in the United States indicate that BMI is one of the RF AH [190]. AH among people with BMI was 2.3 times more common than in people of normal weight.

The results of a population-based study conducted among 3201 people aged 20-59 indicate a link between lipid metabolism disorders and hypertension [97]. Among patients with hypertension, the incidence of dyslipidemia was 54.8%, and in patients with normal BP it was 41%. Moreover, hypertension was more common in both hypercholesterolemia and hypoalphacholesterolemia.

According to a population study conducted in Tashkent among 3237 men aged 20-59 years, the incidence of hypercholesterolemia among people with normal blood pressure is 8.5%, in people with borderline hypertension – 12.1%, and in hypertension – 19.7%. The prevalence of hypertriglyceridemia was 5.8%, 10.1%, and 17.5% in the corresponding groups, and 16.0%, 11.8%, and 19.0%, respectively, for hypoalphacholesterolemia [83]. The relationship between hypertension and hypertriglyceridemia is also indicated by the data of a study on the proportion of RFs such as BMI, hyperglycemia, and hyperlipidemia [172] and a population-based study of the epidemiology of triglyceridemia [120].

Tobacco smoking is of particular importance in the development of hypertension [151, 166]. Smoking one cigarette leads to an increase in blood pressure by 9-10 mm Hg. and a 40% increase in heart rate [151]. Moreover, an increase in blood pressure after smoking cigarettes is observed both in people with hypertension and among people with normal blood pressure. Studies in the United States conducted among 5164 middle-aged people revealed a direct relationship between the content of nicotine in the blood and the levels of systolic and diastolic blood pressure [166].

Based on clinical and population studies conducted over the past three decades, it has been established that every fifth case of hypertension has an alcoholic etiology. An increase in blood pressure levels when drinking alcohol does not depend on age, body weight, gender, smoking, exercise and salt intake. This information allowed the authors to conclude that excessive alcohol consumption is an important RF AH [23]. The important role of alcohol abuse in the formation of high blood pressure is indicated by the data of other studies [149]. However, a report by the U.S. Joint National Committee for the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure indicates that moderate alcohol consumption [up to 30 ml of ethanol per day] is not associated with the risk of hypertension [63].

Various studies indicate the important role of increased consumption of table salt on the development of hypertension [5, 179]. A combined analysis of 14 population studies showed that a shift in natriuresis by 100 mmol leads to an increase in SBP by 3.7 mmHg. and DBP by 2.0 mmHg. An interpopulation international study conducted in 32 countries gave strong reasons to believe that a lifetime reduction in salt intake by 100 mmol per day would reduce the level of BP increase in the population by 9 mmHg by the age of 55, which would contribute to a 16% reduction in mortality from CHD [32].

There is evidence in the literature that hereditary burden is a risk factor for hypertension. Genotypes of predisposition to hypertension have been established [10]. At the same time, the familial form of hypertension was established in 33.6% of cases. This study showed that during 7 years of follow-up of people aged 20-49 years, new cases of hypertension were detected among people with hereditary hypertension 4 times more often than among non-hereditary patients [10, 13, 24, 57, 115].

A very important factor in the progression of high blood pressure levels is the lack of awareness of patients about the presence of hypertension. According to various authors, up to 50% of people with hypertension do not know that they have high blood pressure [8, 16, 33, 35, 150, 208, 240]. It is alarming that about 70% of them are people aged 31-40 years [208]. Among men aged 40-59 in Minsk, only

9.7% of hypertension patients receive antihypertensive therapy [35]. In Chisinau, 10.4% of the population aged 20-55 years believe that increased consumption of table salt does not contribute to an increase in blood pressure, 1.2% believe that salt lowers blood pressure, and 61.3% do not have a definite opinion on this issue [8].

According to population studies, the prevalence of hypertension among men is higher than among women [43, 82, 85, 169]. At the same time, it should be noted that the development of hypertension among women has its own characteristics. The formation of high blood pressure in women is influenced by such factors as frequent pregnancies and their pathology, disorders in the hormonal system, and uncontrolled use of hormonal contraceptives [85, 135, 169]. Although many aspects of the pathogenesis of increased blood pressure in pregnancy are not yet clear, nevertheless, at present, importance is attached to a decrease in uteroplacental perfusion and a change in the metabolism of prostaglandins [171]. It should also be noted that among women, the diastolic form of hypertension is 9 times more common than systolic hypertension [82].

Along with the above-mentioned RF AG, various researchers also attach importance to such factors as ethnicity, mental state, metafactors, working conditions, and living in areas contaminated with radionuclides [3, 17, 79, 90, 104, 137, 152, 154, 214].

CHAPTER II

CHARACTERISTICS OF CLINICAL MATERIAL AND RESEARCH METHODS

2.1. Object and subject of research.

Object of research. The materials of the thesis contain the results of two population studies conducted with an interval of 15 years. This was necessary in

order to study the dynamics of the main components of metabolic syndrome. The first study was carried out on the material of a representative sample of 797 people from the unorganized population aged 15 to 69 years. The study was conducted in polyclinics and clinics of Bukhara among 555 women and 242 men. 15 years after the first study, 703 patients in Bukhara were examined, of which 350 people underwent a complete examination under the study program. The study program included the study of the main components of MS. The examination included clinical, instrumental, laboratory and statistical methods. developed for population research and approved by the Ethics Committee under the Ministry of Health of the Republic of Uzbekistan. (U.K. Kayumov, No2/36-1020 28.02.2019).

Subject of research. The prevalence of such NCDs as obesity and BMI, DM and impaired glucose tolerance, arterial hypertension, coronary heart disease, anemia, chronic pyelonephritis was studied. Among the persons who were diagnosed with NCDs during the screening, an analysis was carried out (according to medical documents and anamnesis) of diseases previously detected in medical institutions. coagulogram, creatinine, complete blood and urine analysis, abdominal obesity, blood pressure, blood lipids, Quetelet index, waist circumference, waist to hip circumference, as well as the ability to use a digital program for remote communication with the patient.

2.2. Methods of selection of the contingent for examination.

The study was carried out in polyclinics in Bukhara. The object of the survey was a representative sample from the unorganized population aged 20 to 69 years. A card was filled out for each person, including the surname, name, patronymic, year of birth, address. All cards were numbered according to random number tables (Owen, 1967) and a representative sample was formed from them. Persons who left the survey area due to relocation or death, as well as those registered, but practically living outside the district, were replaced from the reserve by chance.

Involvement in the study was carried out through personal contact in the form of home visits and delivery of an invitation letter. Persons who refused to be examined were not subject to replacement. A total of 797 people were examined in the first study, and 703 in the second study

Verification of the addresses of the persons selected for the survey was carried out at the Central Address Bureau of Bukhara. The selected persons were invited to the survey by means of invitation letters, which were sent by mail. If the invited person did not respond to the first letter, additional reminder letters were sent in the amount of up to 4 letters, followed by personal contact (in the form of a telephone conversation or home visit). The invited person refused to be examined, he was excluded from the invitation lists. Excluded persons were not replaced by another person.

2.3. Methods of medical examination.

The following methods were used in the work: epidemiological, survey, biochemical and instrumental.

Epidemiological methods included a population-based approach to the study, selection of a representative sample, achieving sufficient population response, and the use of standardized and unified methods recommended by WHO for population studies.

Survey methods of research:

- WHO standard questionnaire for the detection of angina pectoris and possible myocardial infarction;

- questionnaire for detecting latent hyperglycemia (Kayumov U.K., 1983, 1991); questionnaire for detecting chronic pyelonephritis (Kayumov U.K. et al., 2000);

- Survey on awareness of the presence of other EGH (AH, CHD, obesity, BMI, diabetes mellitus, NTG, hyperlipidemia) and their prognostic significance.

Biochemical research methods:

- the state of glucose tolerance was studied using a standard glucose tolerance test (TSH) with fasting glycemia, as well as 1 and 2 hours after the examinee took 75 grams of glucose. The glucose content in capillary blood was determined using the GlucoDr automatic glucoanalyzer (South Korea). The criteria of the generally accepted classification of diabetes mellitus (WHO, 1999) were used in the assessment of glycemia and the detection of cases of diabetes mellitus and NTG. The following cases are taken as NTG: fasting hyperglycemia (fasting glucose level >5.6 mmol/L and <6.1 mmol/L at glycemic levels 2 hours after glucose loading <7.8 mmol/L; hyperglycemia 2 hours after glucose loading (glucose level >7.8 mmol/L and <11.1 mmol/L at normal fasting glycemia Taking into account that a violation of the sympathoadrenal phase of the glycemic curve is also an indicator of a violation of carbohydrate metabolism, in addition to the WHO criteria, cases of NTG associated with hyperglycemia were identified 1 hour after glucose loading (glucose level >8.88 mmol/l). The group with diabetes mellitus includes cases of fasting hyperglycemia >6.1 mmol/l and 2 hours after glucose loading >11.1 mmol/l.

- Average levels of triglycerides (TG), total cholesterol (CH), α-cholesterol (HDL), β-lipoproteins (LDL, β-LIP) were studied. Criteria for hyperlipidemia: hypercholesterolemia (GC) with a >6.1 mmol/L cholesterol level, hypertriglyceridemia (HTG) with a T>G level of 1.7 mmol/L, hyperbetalipoproteinemia (GβLIP) with a β-LIP level >3.0 mmol/L.; hypo α-alphacholesterolemia with HDL levels of <1.0 mmol/L in men and <1.2 mmol/L in women

Instrumental research methods:

Instrumental methods: conducting an ECG examination at rest in 12 generally accepted leads; the analysis of the state of blood pressure (BP) was based on the mean data of two BP measurements. Hypertension was detected according to the WHO classification (WHO, 1999) according to the following criteria (AQD.Hg.): systolic blood pressure (SBP) equal/greater than 140 and (or) diastolic blood pressure (DBP) equal/greater than 90. At the same time, the following categories of BP were distinguished (in mmHg): optimal BP (SBP less than 120; DBP more than 80);

normal BP (SBP less than 130; DBP less than 85); high normal BP (SBP 130-139; DBP 85-89); 1st degree of AH (SBD 140-159; DBP 90-99); Grade 2 AH (SBD 160-179; DBP 100-109); Grade 3 AH (SBP >180; DBP >110). At the same time, if the examined person taking antihypertensive drugs had normal blood pressure values, he was also included in the group of patients with hypertension.

The body weight of the examined individuals was assessed according to the Quetelet index (weight(kg)/height(m)^2) and at a level of ≥25, overweight (BMI) was detected, and at a level of more than 30, obesity was diagnosed (International Group on Obesity, 1997). Abdominal obesity was taken as waist circumference ≥84 cm.

Biochemical research. The average levels of triglycerides (TG), total cholesterol (CH) and beta-lipoproteins (β-LIP) were studied. Criteria for hyperlipidemia: hypercholesterolemia (GC) with a >6.1 mmol/L cholesterol level, hypertriglyceridemia (HTG) with a T>G level of 1.7 mmol/L, hyperbetalipoproteinemia (GβLIP) with a β-LIP level >55 opt.u.

The state of glucose tolerance was carried out according to the results of the standard glucose tolerance test (TSH). Fasting glycemic levels, as well as one and two hours after the patient took 75 grams, were examined. Glucose. Criteria used (mmol/l): normal glucose tolerance: fasting <6.1 and glycemia <7.8 after 2 hours; fasting hyperglycemia ≤6.1 but <7.0 and glycemia after 2 hours <7.0; NTG - fasting glycemia <7.0 and glycemia after 2 hours ≤7.8, but <11.1; diabetes mellitus: fasting glycemia ≤7.0 and glycemia after 2 hours >11.1. Impaired activity of the sympathoadrenal phase of the glycemic curve was judged by the level of glycemia one hour after sugar load (glycemia one hour after glucose load ≤8.8). With a glycemic level above 7.8, but <11.1, pathology of the second phase of the glycemic curve was recorded. Glycosylated hemoglobin (HbA1c) was studied in venous blood using the colorimetric method. HbA1c levels below 5.7% were considered normal, values between 5.7% and 6.4% were assessed as NTG, and with HbA1c levels above 6.4%, diabetes mellitus was diagnosed.

The state of insulin resistance (insulin resistance) was detected using the HA-IR index according to the formula: fasting insulin (μU/mL) x fasting blood glucose

(mmol/L)/22.5. Insulin resistance was diagnosed with HA-IR index values of more than 2.7 units.

In order to assess the effectiveness of preventive measures, individual qualitative and quantitative adjustments of the daily caloric intake and physical activity were carried out. At the same time, aerobic loads in patients were performed on the basis of these parameters. The main meals received a certain point: breakfast – 4 points, lunch – 2, dinner – 0. Lunch – 2 points, and dinner – only 1. In the first group (control), 52 patients had risk factors for the development of metabolic syndrome, which were generally prevented. The patients of the second group (the main group) consisted of 50 patients who, in addition to traditional preventive work, used a special algorithm for increasing the level of physical activity and adjusting the level of physical activity according to costs and energy expenditures

Statistical processing was carried out using MedCalc (https://www.medcalc.org) software, developed specifically for biomedical research. Intensive and average values, average indicators of quantitative variables, as well as their standard deviations (M; +δ) were studied, in addition, correlation analysis (correlation coefficient - r) was used. To assess the statistical significance of the identified differences in the studied indicators, the Student's test (t) was used.

2.4. The author's contribution to this part of the work is considered as the main one. She independently drew up a study protocol, conducted a survey, statistical processing of the data obtained and analysis of the results obtained. The author took part in reading the ECG, coding the ECG according to the Minnesota Code, participated in the collection of mortality data.

2.5. Statistical processing.

Statistical processing of the data was carried out on a personal computer using the standard MedCalc application package. Absolute and relative indicators were taken into account, including the average values of quantitative indicators and their standard deviations (M; +δ). The relationship between the quantitative indicators of various characteristics was studied using correlation analysis (correlation coefficient -

r). When assessing the reliability of the differences in the studied indicators, the Student's test (t) was used.

2.6. Development of a digital program for the prevention of metabolic syndrome.

A digital cardiovascular risk calculation program that takes into account the main components of metabolic syndrome is developed taking into account the individual weighted level of the components of metabolic syndrome.

The program allows the patient to be monitored by the doctor and the patient self-control of his health by monitoring the components of the MS and determining the level of risk.

The program can run on a computer, tablet, and smartphone, and data can be exchanged via the Internet.

CHAPTER III. CHARACTERISTICS OF HEMODYNAMIC AND ANTHROPOMETRIC CHARACTERISTICS OF METABOLIC SYNDROME

§3.1. Average levels of blood pressure, body weight and obesity in different age groups.

Arterial hypertension is one of the leading components of metabolic syndrome. In this regard, the average values of this indicator among people of different ages outside the organized population of the city of Bukhara were studied (Table 3.1.1). According to the findings, blood pressure levels increase as they increase

Table 3.1.1.

Systolic blood pressure indicators in different age groups

Group Age Number	20-29 years old	30-39 years old	40-49 years old	50-59 years old	60-69 years old	70-79 years old
N	15	54	99	237	219	64

Average	132,800	148,241	147,899	154,692	153,256	151,062
95% CI	117,260 to 148,340	from 142,422 to 154,060	from 143,521 to 152,277	151,965 to 157,419	150,289 to 156,222	from 145,893 to 156,232
Median	122,000	146,000	144,000	156,000	156,000	152,000
Dispersion	787,4571	454,5259	481,9285	454,0700	496,2004	428,2817
SD	28,0617	21,3196	21,9529	21,3089	22,2756	20,6950
RSD	0,2113	0,1438	0,1484	0,1378	0,1453	0,1370
SEM	7,2455	2,9012	2,2063	1,3842	1,5052	2,5869
5—95 P	94,000 to 192,250	113,400 to 184,800	117,350 to 192,000	120,700 to 192,000	116,000 to 192,000	from 122,000 to 189,000
10—90 P	112,000 to 181,000	121,800 to 180,400	120,000 to 179,000	125,000 to 187,400	from 124,400 to 182,000	125,000 to 179,000

age of patients. However, the growth of this indicator is noted up to 60 years. After that, there is a decrease in the level of blood pressure in subsequent age groups. This situation can be explained by the fact that the main accumulation of an increase in blood pressure occurs in those years when the population is, who is of a capable age and works intensively. According to most epidemiological studies, the highest mortality from cardiovascular diseases is observed in the age group of 40-60 years. Apparently, in this population, the following picture takes place. Therefore, in people over 60 years of age, the average blood pressure values are slightly lower. This may occur due to the intensive withdrawal from the population of persons of younger age, but with higher pressure. At the same time, it should also be noted that elderly people are more serious about medical recommendations and comply with the necessary therapeutic and preventive measures. Based on the data obtained, it can be concluded that preventive measures in relation to blood pressure as components of a friendly home should be started at a young age. This is indicated by the results obtained. In particular, among the examined persons already at the age of 30-39 years, there are indicators with a historical blood pressure of more than 140 mm Hg. In other words,

yes, the average systolic pressure of the streets of this group belongs to arterial hypertension of the 1st degree. It is also natural that people in the following age decades, namely 44-49 years, 50-59 years old, should also be included in the groups of preventive intervention.

Next, diastolic blood pressure indicators in the studied population were analyzed (Table 3.1.2). It turned out that diastolic blood pressure indicators are also quite high at the age of 30-39 years. However, the next age group does not see an increase in further growth of this indicator. The average level of diastolic blood pressure begins to increase not at the age of 40-49 years, but at the age of 50-59 years. Further, at the age of 60-69 years, diastolic blood pressure does not increase. However, in the older age group, there is a slight decrease in average diastolic blood pressure levels among those over 70 years of age.

Table 3.1.2.

Diastolic BP indicators in different age groups

Group Age Number	20-29 years old	30-39 years old	40-49 years old	50-59 years old	60-69 years old	70-79 years old
N	15	54	99	237	219	64
Average	83,067	94,167	92,788	95,599	95,292	93,938
95% CI	76,566 to 89,567	91,277 to 97,057	90,792 to 94,784	94,333 to 96,866	93,845 to 96,739	91,488 to 96,387
Median	84,000	96,000	94,000	98,000	96,000	94,000
Dispersion	137,7810	112,1038	100,1280	97,9615	118,0243	96,1548
SD	11,7380	10,5879	10,0064	9,8976	10,8639	9,8059
RSD	0,1413	0,1124	0,1078	0,1035	0,1140	0,1044
SEM	3,0307	1,4408	1,0057	0,6429	0,7341	1,2257
5—95 P	from 63,250 to 104,500	74,200 to 107,600	from 70,900 to 105,000	78,000 to 110,300	from 74,450 to 111,000	79,700 to 108,300
10—90 P	70,000 to 94,000	77,800 to 106,000	78,000 to 104,000	82,000 to 106,000	78,400 to 106,000	83,000 to 106,000

Thus, the picture of the dynamics of average diastolic blood pressure levels in different age groups indicates that the trends characteristic of systolic blood pressure are also preserved here. At the same time, there are certain differences. In particular, this can include some reductions in average blood pressure levels in the age group of 60-69 years.

When analyzing the average diastolic blood pressure, it is necessary to remember that with age, the number of kidney diseases increases, as well as kidney damage due to diabetes mellitus.

The main indicators of hemodynamics also include heart rate. This indicator can be markers of a number of diseases, including both cardiovascular diseases and others, in particular, endocrine diseases, diseases of the sympatho-adrenal system and some others. In this regard, the average heart rate in people of different ages was studied (Table 1). 3.1.3.).

Table 3.1.3.

Heart rate rates in different age groups

Group Age Number	20-29 years old	30-39 years old	40-49 years old	50-59 years old	60-69 years old	70-79 years old
N	15	54	99	237	218	64
Average	77,000	82,167	79,768	79,819	81,317	78,391
95% CI	from 73,393 to 80,607	79,517 to 84,816	77,760 to 81,775	from 78,843 to 80,794	80,311 to 82,322	from 76,016 to 80,766
Median	74,000	82,500	78,000	79,000	81,000	77,000
Dispersion	42,4286	94,2170	101,3026	58,1237	56,7242	90,4005
SD	6,5137	9,7065	10,0649	7,6239	7,5315	9,5079
RSD	0,08459	0,1181	0,1262	0,09552	0,09262	0,1213
SEM	1,6818	1,3209	1,0116	0,4952	0,5101	1,1885
5—95 P	70,000 to 88,750	from 65,400 to 100,000	70,000 to 89,550	67,000 to 90,000	70,800 to 92,800	from 64,000 to 93,000
10—90 P	70,000 to 88,000	68,000 to 94,000	72,000 to 88,600	70,000 to 88,000	73,000 to 90,000	65,000 to 89,000

At first glance, the findings do not indicate any significant differences in heart rate with age. At the same time, it should be noted that the highest rates of heart rate were found in the age groups of 30-39 years and at the age of 60-69 years. This situation can be explained by the fact that the age group of 30-39 years is represented by people who are at a responsible stage of their lives, when increased demands are placed on their body as a result of intense physical or nervous and mental activity. On the other hand, some increases in the number of heart contractions in the 60-69 age group may indicate that this group is a consequence of the accumulation of risk factors and cardiovascular diseases, heart failure is formed, which is accompanied by tachycardia.

Another key component of metabolic syndrome is abdominal obesity. The results of the study indicate that there are high average levels of this indicator in the surveyed population (Table 1). 3.1.4.).

Table 3.1.4.

Waist circumference indicators in different age groups

Group Age Number	20-29 years old	30-39 years old	40-49 years old	50-59 years old	60-69 years old	70-79 years old
N	14	53	98	234	209	63
Average	100,764	106,643	104,505	103,309	104,749	105,724
95% CI	93,890 - 107,638	102,691 - 110,596	102,025 - 106,985	101,628- 104,989	102,780- 106,718	102,158- 109,289
Median	105,350	105,500	103,750	102,400	103,800	102,100
Dispersion	141,7332	205,6433	152,9700	170,1576	208,4578	200,4306
SD	11,9052	14,3403	12,3681	13,0444	14,4381	14,1573
RSD	0,1181	0,1345	0,1183	0,1263	0,1378	0,1339
SEM	3,1818	1,9698	1,2494	0,8527	0,9987	1,7837
5—95 P	80,720 - 117,340	86,835- 129,600	85,380 - 122,380	85,080 - 127,240	86,160- 129,645	87,905- 135,460

10—90 P	81,490 - 113,280	90,860 - 123,700	89,900 - 116,940	87,600 - 119,000	86,700 - 122,260	90,100- 129,780

In general, the expected data were obtained. The lowest waist circumference was observed at the age of 20-29 years, and the highest waist circumference occurred at the age of over 70 years. It should be noted that in all the groups studied, the average waist circumference was higher than the normal values, established as the norm by the International Diabetes Federation.

The results obtained indicate an unfavorable situation among the examined group with regard to obesity. Waist circumference is an indicator of abdominal obesity. Abdominal obesity is one of the main risk factors for cardiovascular diseases. The excess of this indicator in all age groups may indirectly indicate that the population of the city of Bukhara is characterized by hypodynamia and excessive nutrition.

§3.2. Awareness of patients with MS about the role of the main components of this syndrome, their referral to doctors and compliance with recommendations

Health and illness are a state of established equilibrium. Modern methods of treatment should be aimed at changing the patient's attitude to the state of his health. Disturbed self-esteem, including the assessment of one's own health, makes its own adjustments to the catamnesis. Therefore, in order to assess the possibilities of increasing the effectiveness of informational influence on the attitude to health, a study was conducted among 698 patients, during which the number of visits to doctors, the implementation of medical recommendations and the awareness of patients about the importance of MS and its main components were studied.

It should be emphasized that the data given in this part of the thesis cover patients with complete and incomplete metabolic syndrome. Therefore, they cannot be used to estimate the prevalence of the studied components of MS at the population level.

According to the data obtained (see Table 3.2.1), there is a certain relationship between the number of patients visiting doctors and cases of hypertension, BMI and obesity. Only 30.5% of the examined patients always consult doctors when they feel unwell. 62.2% apply only when they feel very unwell, and 2% of patients do not apply even if they feel unwell. 4.7% of the surveyed persons consider themselves healthy and therefore did not seek medical help, and 0.6% found it difficult to answer this question.

Table 3.2.1.

Incidence of arterial hypertension among individuals with different visits to doctors.

Going to the doctor	**AH is**	**AG No**	**Altogether**
Always	16477,0% RT30,6% CT23,5% GT	4923,0% RT30,2% CT7,0% GT	213 (30,5%)
Only if you feel very unwell	32975,8% RT61,4% CT47,1% GT	10524,2% RT64,8% CT15,0% GT	434 (62,2%)
I don't apply, even when I'm sick	642,9% RT1,1% CT0,9% GT	857,1% RT4,9% CT1,1% GT	14 (2,0%)
Did not get sick	33100,0% RT6,2% CT4,7% GT	00,0% RT0,0% CT0,0% GT	33 (4,7%)
Difficult to answer	4100,0% RT0,7% CT0,6% GT	00,0% RT0,0% CT0,0% GT	4 (0,6%)
Total	**536 (76,8%)**	**162 (23,2%)**	**698**
Chi-square			20,469
DF			4
Significance level			P = 0,0004

Note: RT is the horizontal frequency; CT is the vertical frequency of the indicator; GT is the frequency of the indicator relative to the total number of patients examined.

Attention should be paid to the fact that 77% of the patients who always turn to doctors suffer from arterial hypertension. At the same time, out of all patients suffering from hypertension (536 people), only 30.6% always turn to doctors. Among patients who go to doctors only when they feel very unwell, 75.8% of patients with hypertension were identified. At the same time, among the total number of

hypertensive patients, 61.4% go to doctors only when their health deteriorates significantly. An interesting fact has been established: all (100%) of those who have never consulted a doctor suffered from hypertension.

An analysis of the association between medical visits, BMI and obesity (see Table 3.2.2) revealed similar trends.

Table 3.2.2.

Incidence of BMI and obesity among individuals with different visits to doctors.

Going to the doctor	Norm	BMI	Obesity
Always	55 25,8% RT 35,7% CT	78 36,6% RT * 30,7% CT	80 37,6% RT * 27,6% CT
Only if you feel very unwell	96 22,1% RT 62,3% CT	163 37,6% RT * 64,2% CT	175 40,3% RT * 60,3% CT
I don't apply, even when I'm sick	3 21,4% RT 1,9% CT	6 42,9% RT 2,4% CT	5 35,7% RT 1,7% CT
Did not get sick	0 0,0% RT 0,0% CT	7 21,2% RT 2,8% CT	26 78,8% RT 9,0% CT
Difficult to answer	0 0,0% RT 0,0% CT	0 0,0% RT 0,0% CT	4 100,0% RT 1,4% CT
Total	154 (22,1%)	254 (36,4%)	290 (41,5%)
Chi-square			28,794
DF			8
Significance level			P = 0,0003

Note: RT is the horizontal frequency; CT is the vertical frequency of the indicator; *- means reliable relative to the normal weight group.

Among those who went to doctors only when they felt very unwell, only 22.1% were of normal weight. The rest had BMI (376%) and obesity (40.3%). Patients who did not go to doctors, despite the deterioration of their health, suffered from BMI in 42.9% and obesity in 35.7%. It should be noted that among those who consider themselves healthy, 78.8% were obese and 21.2% of them were found to have BMI.

Further, the issue of patients' awareness of the degree of cardiovascular risk emanating from hypertension was studied. It has been established that (see Table 3.2.3). The data obtained are somewhat unexpected. Among people suffering from arterial hypertension, 3/4 consider hypertension to be an important factor in cardiovascular diseases and their complications.

Table 3.2.3.

Incidence of AH in patients with different assessments cardiovascular risk from hypertension

Evaluation	**AH is**	**AG No**	**Altogether**
Significantly increases	27377,6% *	7922,4%	352 (51,0%)
Does not increase much	15778,9% *	4221,1%	199 (28,8%)
Does not increase	6988,5%	911,5%	78 (11,3%)
The risk of mortality depends primarily on other causes	3963,9% *	2236,1%	61 (8,8%)
Total	538(78,0%)	152(22,0%)	690
Chi-square			12,129
DF			3
Significance level			P = 0,0070

Note: *- indicates significant differences between groups with hypertension

At the same time, almost the same number of people who consider hypertension to be a "not very important" risk factor (78.9%) suffer from this disease. The incidence of hypertension is even higher among people who do not consider hypertension to be a risk factor (88.5%).

A study of public awareness of the association of BMI and obesity with CVD complications, in particular myocardial infarction and cerebral stroke, also revealed an unfavorable situation (see Figure 3.2.4). It turned out that only 26.2% of normal-weight respondents considered BMI and obesity to be an important risk factor for CVD.

Table 3.2.4

The incidence of BMI and obesity in patients who assess the cardiovascular risk from hypertension

Evaluation	Norm	BMI	Obesity	Altogether
Significantly increases	6626,2%	7228,6%	11445,2% *	252 (36,5%)
Does not increase much	3624,7%	5537,7%	5537,7%	146 (21,2%)
Does not increase	2516,2%	6240,3% *	6743,5% *	154 (22,3%)
The risk of mortality depends primarily on other causes	2719,7%	6547,4% *	4532,8% *	137 (19,9%)
Total	154 (22,3%)	255 (37,0%)	281 (40,7%)	690
Chi-square				20,052
DF				8
Significance level				P = 0,0101

Note: *- indicates significant differences between the normal weight group

However, among those who believe that BMI and obesity increase this risk, 75.4% suffer from these diseases. BMI and obesity are even more common among patients who believe that increased body weight is not a risk factor for CCP (40.3% and 43.5%, respectively).In patients who believe that "the risk of mortality depends primarily on other causes", the BMI incidence was 47.4%, and obesity was 32.8%.

Thus, the presented data showed that among the examined groups there is a significant underestimation of arterial hypertension, as well as overweight and obesity as risk factors for cardiovascular diseases. The high incidence of arterial hypertension and overweight among the category of patients who consider increased weight to be an insignificant risk factor, and in other cases who are not a risk factor for cardiovascular diseases, indicates an urgent need to raise public awareness of risk factors.

At the same time, an urgent issue today is to increase patients' adherence to doctors and follow medical recommendations. It is necessary to develop modern methods of working with patients aimed at increasing the number of patients who turn to doctors. At the same time, preventive programs should be developed aimed at reducing the incidence and levels of the main components of metabolic syndrome.

CHAPTER IV. CHARACTERISTICS OF CARBOHYDRATE AND LIPID METABOLISM IN THE UNORGANIZED POPULATION OF BUKHARA CITY.

§4.1. Average indicators of carbohydrate and lipid metabolism in different age groups

The main components of metabolic syndrome also include impaired carbohydrate and fat metabolism. In this regard, the average characteristics of glycemic indicators, channel of served hemoglobin, immunoreactive insulin and NOMA index in the studied population were studied. Fasting glycemia values are presented in Table 4.1.1.

Table 4.1.1.

Fasting glycemic values in different age groups

Group Age Number	20-29 years old	30-39 years old	40-49 years old	50-59 years old	60-69 years old	70-79 years old
N	14	53	99	234	207	63
Average	5,907	5,545	5,643	5,349	5,438	4,889
95% CI	4,174 to 7,641	4,875 to 6,216	5,076 to 6,209	from 5,056 to	from 5,112 to	4,528 to 5,250
Median	4,700	4,600	4,700	4,700	4,700	4,400
Dispersion	9,0130	5,9255	8,0620	5,1972	5,6739	2,0534
SD	3,0022	2,4342	2,8394	2,2797	2,3820	1,4330
RSD	0,5082	0,4390	0,5032	0,4262	0,4380	0,2931
SEM	0,8024	0,3344	0,2854	0,1490	0,1656	0,1805
5—95 P	from 4,040 to	4,100 to 9,170	4,200 to 13,215	4,100 to 8,980	4,100 to 12,330	4,100 to 8,210
10—90 P	4,180 to 12,410	4,200 to 8,920	4,200 to 8,180	4,200 to 8,000	4,200 to 8,300	4,100 to 5,780

Somewhat unexpected data have been obtained. Fasting glycemic levels were expected to increase with age. However, according to the data obtained, the average weights of fasting glycemia

reflect a downward trend. Moreover, the revealed differences between the fasting level of glycemia among people under 20-29 years of age and the oldest age group of 70 years and over turned out to be statistically significant. At the same time, the level of fasting glycemia in other age groups did not have significant differences.

Next, glycemic levels in patients after glucose loading were considered. In clinical studies, it is customary to study the level of fasting glycemia and 2 hours after glucose loading. In our study, along with the indicated points, the chemical curve is large, and the level of glycemia was also studied 1 hour after glucose loading (Table 1). 4.1.2.).

Table 4.1.2.

Glycemic values at 1 hour after glucose loading in different age groups

Group Age Number	20-29 years old	30-39 years old	40-49 years old	50-59 years old	60-69 years old	70-79 years old
N	12	47	86	202	180	57
Average	8,575	8,598	9,295	9,039	8,873	8,974
95% CI	7,370 to 9,780	8,046 to 9,149	from 8,897 to 9,693	8,772 to 9,306	8,616 to 9,129	8,392 to 9,555
Median	9,200	8,600	9,450	9,150	8,900	9,100
Dispersion	3,5948	3,5272	3,4440	3,6991	3,0385	4,8070
SD	1,8960	1,8781	1,8558	1,9233	1,7431	2,1925
RSD	0,2211	0,2184	0,1996	0,2128	0,1965	0,2443
SEM	0,5473	0,2739	0,2001	0,1353	0,1299	0,2904

This indicator was studied in order to assess the sympatho-adrenal phase of the glycemic curve. This phase reflects the body's ability to saturate the blood with

glucose after meals. It also shows the ability of glucose to be absorbed by the intestine, and the comma at the same time reflects the state of gluconegenesis. These indicators are very important, as they allow you to assess the state of glucose absorption in the intestine, as well as the formation of glucose from proteins. It has been shown that the level of glycemia 1 hour after glucose loading increases with age. Moreover, the most significant increase in glucose levels in the first phase of the glycemic curve is observed after 40 years. In the future, after 50 years, this figure decreases.

Next, data on mean glycemic levels 2 hours after glucose loading were analyzed (Table 1). 4.1.3.).

Table 4.1.3.

Glycemic values at 2 hours after glucose loading in different age groups

Age	20-29 years old	30-39 years old	40-49 years old	50-59 years old	60-69 years old	70-79 years old
N	12	47	85	205	179	56
Average	5,300	5,530	5,496	5,391	5,361	5,254
95% CI	4,842 to 5,758	from 5,057 to 6,003	from 5,262 to 5,731	5,266 to 5,515	from 5,204 to 5,519	from 5,002 to 5,506
Median	5,050	5,100	5,300	5,200	5,100	5,000
Dispersion	0,5200	2,5934	1,1789	0,8199	1,1461	0,8851
SD	0,7211	1,6104	1,0858	0,9055	1,0706	0,9408
RSD	0,1361	0,2912	0,1975	0,1680	0,1997	0,1791
SEM	0,2082	0,2349	0,1178	0,06324	0,08002	0,1257
5—95 P	4,420 to 6,290	4,500 to 11,200	4,575 to 7,250	4,400 to 7,100	4,400 to 7,100	4,400 to 6,960
10—90 P	4,540 to 6,230	4,600 to 6,760	4,600 to 6,400	4,600 to 6,200	4,500 to 6,200	4,410 to 6,190

This indicator is of great importance for assessing carbohydrate metabolism. This is due to the fact that the level of glycemia 2 hours after glucose loading reflects the vagoinsular vase of the glycemic curve and characterizes the ability of the body to utilize the glucose that has entered it.

The findings indicate that blood glucose levels after a 2-hour sugar load do not differ significantly across age groups.

The study of the level of glycemia you have surveyed populations do not give us good grounds to draw far-reaching conclusions and conclusions. Therefore, in order to clarify some issues related to carbohydrate metabolism, such indicators as glycosylated hemoglobin a were further studied (Table 1). 4.1.4.).

Table 4.1.4.

Glycosylated hemoglobin values in different age groups

Group Age Number	20-29 years old	30-39 years old	40-49 years old	50-59 years old	60-69 years old	70-79 years old
N	12	52	94	225	195	60
Average	6,483	6,334	5,963	5,832	5,648	5,462
95% CI	4,348 to 8,618	5,718 to 6,950	5,507 to 6,420	5,556 to 6,108	from 5,372 to	4,986 to 5,938
Median	5,500	6,100	5,500	5,400	5,000	4,500
Dispersion	11,2906	4,8990	4,9716	4,4276	3,8323	3,3909
SD	3,3601	2,2134	2,2297	2,1042	1,9576	1,8414
RSD	0,5183	0,3494	0,3739	0,3608	0,3466	0,3371
SEM	0,9700	0,3069	0,2300	0,1403	0,1402	0,2377
5—95 P	from 3,910 to 14,630	4,000 to 10,350	4,000 to 10,780	4,000 to 10,600	4,000 to 10,500	4,000 to 10,050

According to the data obtained, the average levels of glycosylated hemoglobin decrease with increasing age. These findings may indicate that insulin resistance decreases with age. These data are somewhat surprising, since there is enough evidence in the literature that insulin resistance increases with age.

Therefore, in order to clarify this issue, the indicators of immunoreactive insulin were considered (Table 1). 4.1.5.).

Table 4.1.5.

Immunoreactive insulin indicators in different age groups

Group Age Number	20-29 years old	30-39 years old	40-49 years old	50-59 years old	60-69 years old	70-79 years old
N	15	54	97	233	211	64
Average	11,087	11,239	10,705	11,446	10,917	10,111
95% CI	7,963 to 14,211	9,883 to 12,595	9,761 to 11,649	from 10,701 to 12,191	from 10,244 to 11,590	9,170 to 11,052
Median	9,700	9,350	9,300	9,000	9,000	8,800
Dispersion	31,8241	24,6892	21,9336	33,3231	24,5853	14,2032
SD	5,6413	4,9688	4,6833	5,7726	4,9584	3,7687
RSD	0,5088	0,4421	0,4375	0,5043	0,4542	0,3727
SEM	1,4566	0,6762	0,4755	0,3782	0,3413	0,4711
5—95 P	from 6,500 to 25,725	7,160 to 22,180	6,135 to 18,965	6,115 to 22,105	6,100 to 19,895	5,900 to 18,330
10—90 P	15	54	97	233	211	64

The mean immunoreactivity of his insulin maintained the same trend as in relation to the above glycemic values.

Thus, in this study, ambiguous data were obtained regarding the indicators of carbohydrate metabolism. It is difficult to explain that the indicators obtained in this study differ from the literature data. At the same time, most of the presented results indicate that there is a certain relationship between the characteristics of various indicators of carbohydrate metabolism. In particular, it should be noted that the highest levels of glycemia, immunoreactive insulin, as well as glycosylated hemoglobin occurred in younger people. At present, it is not possible to give a clear explanation of the trends identified. At the same time, it can be assumed that the

established difference, the features of the dynamics of the studied indicators in the age aspect may represent the features of this population. Speaking of features, we mean a wide range of factors, including both dietary and lifestyle features.

Another, very important explanation for this picture is the small number of observations in the groups under consideration. Therefore, in order to clarify this issue, it is necessary to analyze the above indicators by increasing the number of observations in the analyzed groups.

Next, the lipid levels in the surveyed population were analyzed according to the selected age groups. These results are presented in Tables 4.1.6., 4.1.7., 4.1.8. and 4.1.9.

According to the results obtained, it can be stated that the situation with lipid levels to a certain extent repeats the pattern of carbohydrate metabolism indicators in accordance with age groups

Table 4.1.6.

Total cholesterol indicators in different age groups

Age	20-29 years old	30-39 years old	40-49 years old	50-59 years old	60-69 years old	70-79 years old
N	15	54	99	236	217	62
Average	211,600	225,241	223,899	225,475	224,972	224,500
95% CI	199,338 to 223,862	220,343 to 230,139	220,429 to 227,369	222,934 to 228,016	222,736 to 227,209	219,744 to 229,256
Median	214,000	227,500	225,000	225,000	225,000	223,000
Dispersion	490,2571	321,9976	302,6428	392,5908	279,4437	350,7131
SD	22,1418	17,9443	17,3966	19,8139	16,7166	18,7273
RSD	0,1046	0,07967	0,07770	0,08788	0,07430	0,08342
SEM	5,7170	2,4419	1,7484	1,2898	1,1348	2,3784
5—95 P	185,000 255,000	192,600 250,000	194,500 247,550	189,000 256,400	195,400 253,000	187,800 251,600

Table 4.1.7.

Triglyceride values in different age groups

Age	20-29 years old	30-39 years old	40-49 years old	50-59 years old	60-69 years old	70-79 years old
N	15	54	99	237	219	64
Average	179,933	164,667	172,707	162,013	163,726	159,781
95% CI	from 150,859 to 209,007	from 150,497 to 178,837	from 161,685 to 183,729	from 155,998 to 168,028	from 157,013 to 170,439	from 148,986 to 170,577
Median	180,000	163,000	172,000	158,000	164,000	158,000
Dispersion	2756,3524	2695,1321	3053,8011	2209,2329	2540,6218	1867,8562
SD	52,5010	51,9147	55,2612	47,0025	50,4046	43,2187
RSD	0,2918	0,3153	0,3200	0,2901	0,3079	0,2705
SEM	13,5557	7,0647	5,5540	3,0531	3,4060	5,4023
5—95 P	97,750 to 264,500	92,000 to 231,200	91,000 to 246,100	91,000 to 240,000	91,000 to 245,550	96,400 to 221,800

Table 4.1.8.

Indicators of low-density cholesterol in different age groups

Age	20-29 years old	30-39 years old	40-49 years old	50-59 years old	60-69 years old	70-79 years old
N	15	54	99	235	216	64
Average	155,467	156,044	162,859	160,535	160,356	162,230
95% CI	138,603 to 172,330	146,253 to 165,835	158,268 to 167,450	157,100 to 163,970	157,399 to 163,314	154,691 to 169,768
Median	150,000	165,000	161,000	165,000	160,000	167,000
Dispersion	927,2667	1286,7599	529,8778	714,5122	486,3235	910,7923
SD	30,4511	35,8714	23,0191	26,7304	22,0527	30,1793
RSD	0,1959	0,2299	0,1413	0,1665	0,1375	0,1860
SEM	7,8624	4,8815	2,3135	1,7437	1,5005	3,7724
5—95 P	96,750 to 201,250	93,200 to 190,000	128,050 to 193,850	110,000 to 190,000	124,300 to 190,000	120,500 to 191,200

Table 4.1.9.

Indicators of a-cholesterol in different age groups

Age	20-29 years old	30-39 years old	40-49 years old	50-59 years old	60-69 years old	70-79 years old
N	15	54	98	234	213	62
Average	43,467	53,574	47,735	50,915	51,502	52,065
95% CI	from 34,834 to 52,099	46,047 to 61,101	from 45,036 to 50,434	48,377 to 53,452	48,909 to 54,095	46,360 to 57,769
Median	38,000	43,500	44,500	45,000	45,000	45,000
Dispersion	242,9810	760,4378	181,2485	388,0184	368,5531	504,5859
SD	15,5878	27,5760	13,4629	19,6982	19,1977	22,4630
RSD	0,3586	0,5147	0,2820	0,3869	0,3728	0,4314
SEM	4,0248	3,7526	1,3600	1,2877	1,3154	2,8528
5—95 P	26,000 to 81,250	from 32,000 to 103,000	from 32,000 to 75,000	from 32,000 to 89,000	from 32,000 to 93,000	from 32,000 to 93,000

At the same time, it should be noted that the indicators of total cholesterol, as well as low-density lipoprotein cholesterol, correspond to similar trends in the world literature. In particular, the level of these lipids increases with age.

These data may indicate the need for screening studies aimed at early detection of carbohydrate metabolism disorders and dyslipidemia.

§4.2. Referral to doctors and awareness of patients with carbohydrate and lipid metabolism disorders about their role as risk factors for CVD

The above data indicate that there is an increased level of the main components of metabolic syndrome in the studied population. At the same time, ambiguous trends in the dynamics of these indicators in different age groups were revealed. The modern concept of preventive medicine is based on the theory of so-called risk factors. Such factors include both modifiable and non-modifiable factors. Great prospects in the primary and secondary prevention of metabolic syndrome are

opening up with developments aimed at early diagnosis and correction of such risk factors.

However, the efforts of doctors may not always be sufficient to identify, prevent, and treat metabolic syndrome. This is largely due to the patient's attitude to the state of his own health, turning to doctors and, accordingly, following medical recommendations. In this regard, the main components of metabolic syndrome were studied in this work, depending on the attitude of patients to the state of their own health and the ability to consult doctors.

According to the data obtained (see Figure 4.2.1.), among those who critically evaluated the role of hyperglycemia in the formation of CCP and mortality from them, normal glycemia levels were observed in only 23.2% of the examined individuals. Alarmingly, every third person in this group was diagnosed with NTG and 7.1% was diagnosed with diabetes mellitus for the first time.

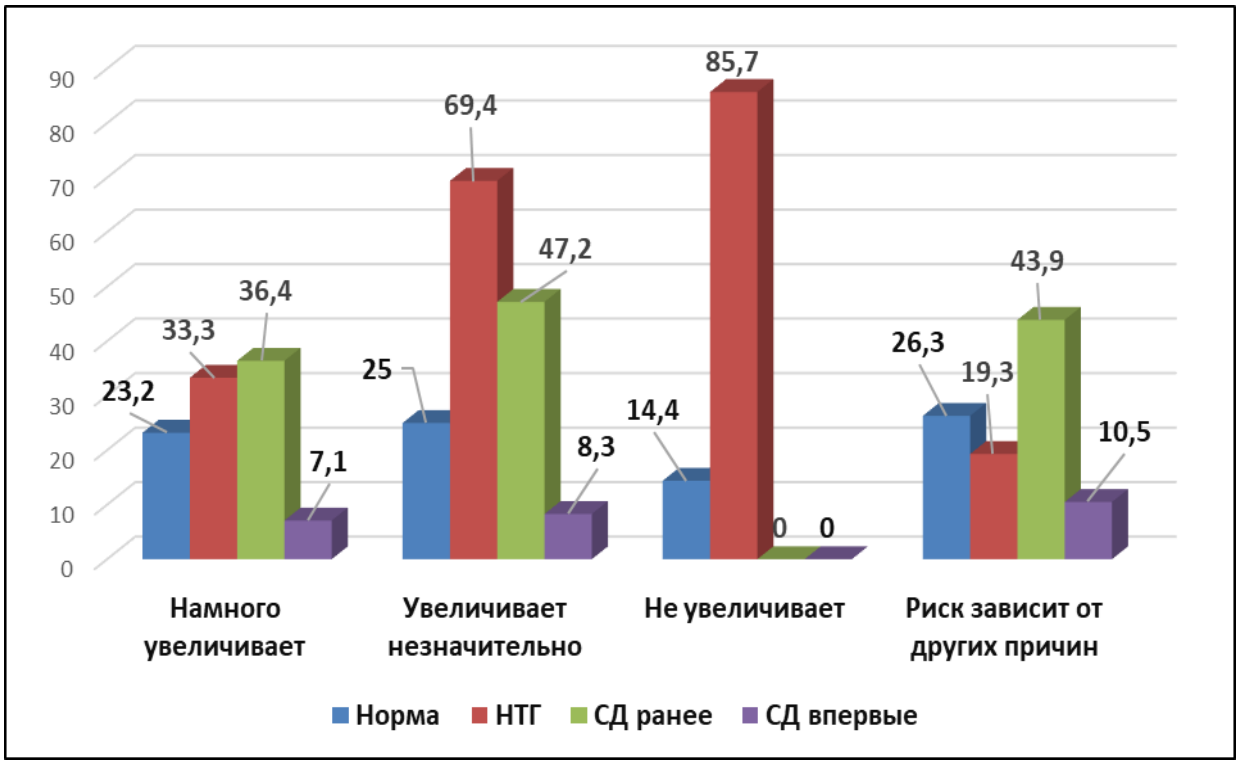


Figure 4.1. Frequency of occurrence of NTG, previously identified DM and DM identified for the first time with different awareness of their role in the CVD development (in %).

Among those who assigned a minor role to hyperglycemia (who answered "Increases slightly"), the incidence of NTG, DM detected earlier, and DM detected

for the first time was significantly higher (69.4%, 47.2%, and 8.3%, respectively). NTG was even more common in the group of people who did not recognize the role of hyperglycemia as a risk factor for CVD (85.7%), and among those indicating other causes, the number of NTG cases was lower (19.3%), but cases of newly diagnosed diabetes mellitus were more common (10.5%).

In order to study the importance of patients' attitude to medical recommendations in the development of hyperglycemia, the relationship between the number of visits to doctors in patients with DM and NTG was studied. It has been established that more than half of patients always turn to doctors when they feel unwell. At the same time, 16% of patients with previously diagnosed diabetes were among them. At the same time, a fairly large number of individuals with impaired glucose tolerance and newly diagnosed diabetes mellitus were identified among them (see Table 4.2.1).

Table 4.2.1.

Incidence of NTG and diabetes mellitus among individuals with different visits to doctors.

Going to the doctor	**Norm**	**NTG**	**DM was detected earlier**	**DM detected for the first time**
Always Addresses	92 43,2% RT 21,7% CT 13,2% GT	60 28,1% RT 36,3% CT 7,0% GT	34 16,0% RT 43,6% CT 4,9% GT	27 12,7% RT 58,7% CT 3,9% GT
He applies only when he feels very unwell	291 67,1% RT 68,6% CT 41,7% GT	86 19,8% RT 60,7% CT 11,7% GT	44 10,1% RT 56,4% CT 6,3% GT	13 3,0% RT 28,3% CT 1,9% GT
He does not apply, even when he is sick	6 42,9% RT 1,4% CT 0,9% GT	4 28,6% RT 3,0% CT 0,6% GT	0 0,0% RT 0,0% CT 0,0% GT	4 28,6% RT 8,7% CT 0,6% GT
He was not sick, so he did not apply	31 93,9% RT 7,3% CT 4,4% GT	0 0,0% RT 0,0% CT 0,0% GT	0 0,0% RT 0,0% CT 0,0% GT	2 6,1% RT 4,3% CT 0,3% GT
Total	424 (60,7%)	150 (19,3%)	78 (11,2%)	46 (6,6%)
Chi-square				88,810
DF				20
Significance level				P < 0,0001

Note: RT is the horizontal frequency; CT is the vertical frequency of the indicator; *- means reliable relative to the normal weight group.

The fact that almost every fourth person in this group had impaired glucose tolerance is quite understandable, since this type of hyperglycemia proceeds covertly. At the same time, it is surprising that 12.7% of those who always go to the doctor were diagnosed with diabetes mellitus for the first time. This information indicates an unfavorable situation with regard to the detection of DM. It should be noted that among patients who do not go to doctors despite feeling unwell, diabetes mellitus is detected in 28.6% of cases. At the same time, among those who did not consult a doctor, as they consider themselves healthy, 6.1% suffered from previously undiagnosed diabetes. The above data indicate that the inadequate attitude of patients to the state of their health and ignoring visits to a doctor is an important risk factor for both latent and overt hyperglycemia.

To study the relationship between dyslipidemia and different visits to doctors, the frequency of hypertriglyceridemia (HTG) was analyzed in patients who assessed the risk of this condition differently (see Table 4.2.2). HTG is one of the criteria for MS, since its increase is characteristic of insulin resistance.

Table 4.2.2.

The incidence of hypertriglyceridemia in patients is different assessing the cardiovascular risk arising from dyslipidemia

Evaluation	**There is a Tretyakov Gallery**	**No Tretyakov Gallery**	**Altogether**
Significantly increases	13161,5%	8238,5% *	213 (30,5%)
Does not increase much	26460,8%	17039,2% *	434 (62,2%)
Does not increase	14100,0%	00,0%	14 (2,0%)
The risk of mortality depends primarily on other causes	2163,6%	1236,4% *	33 (4,7%)
Total	432 (61,9%)	266 (38,1%)	698
Chi-square			9,124
DF			4

Significance level	P = 0,0581

Note: *- indicates significant differences between groups with Tretyakov Gallery

According to the findings, among individuals who recognized the important role of dyslipidemia in the development of CCP, 61.5% had TGT. Such a number in this group can be explained by the fact that it included patients who were registered at the dispensary for CVD. However, it is alarming that among those who attach little importance to dyslipidemia and among those who completely ignore the negative significance of dyslipidemia in the development of CVD, cases of dyslipedemia were much more common (60.8% and 100%), respectively.

Thus, it should be recognized that among the examined group there is a significant underestimation of the role of dyslipidemia in the development of cardiovascular diseases. This, in turn, indicates that in this population it is possible to predict a significant increase in cardiovascular diseases in the coming years. Therefore, it seems important and expedient to develop and implement new programs for the prevention of cardiovascular diseases, covering the issues of public awareness of the role of risk factors, as well as increasing patients' adherence to communication with a doctor.

CHAPTER V. RESULTS OF PREVENTIVE INTERVENTION ACCORDING TO THE PRINCIPLES OF MULTIFACTORIAL PREVENTION

§5.1. Assessment of the main components of metabolic syndrome and implementation of preventive measures.

An interesting situation has developed in modern health care: despite the great work carried out by medical institutions, the prevalence of many diseases, related disability and mortality of the population maintains a steady upward trend. It should be noted that along with the great medical work carried out by medical institutions, the pharmaceutical industry also makes a great contribution to the fight against diseases. Every year, more and more new drugs are developed, their effectiveness and safety are improved, new treatment regimens are developed, as well as methods of drug administration. It should also be noted that very great progress has been made in the diagnosis of diseases. Modern diagnostic methods and tools make it possible to carry out a sufficiently deep and high-quality diagnosis even with non-invasive diagnostic intervention.

Despite such great, one might say colossal efforts, the morbidity and mortality from many diseases are not decreasing. In this regard, the question quite rightly arises: are the perfect drugs of the most modern methods of treatment enough to fight, successfully fight, effectively fight modern diseases? Medical statistics based on modern epidemiological studies indicate that the measures listed above are not enough.

In such a situation, the question of the role of preventive medicine quite rightly arises. The idea that it is easier to prevent a disease than to treat it is well known and often widely declared. However, today, despite the fact that the programs in the laws on health care in most countries of the world declare the preventive orientation of health care, nevertheless, this direction is still at the earliest stages of its development. Unfortunately, there are widespread ideas about prevention more in

terms of hygienic measures, and superficial or, to put it differently, the simplest methods of disease prevention. Meanwhile, modern prevention should cover all stages of the formation of the progression and complication of diseases, in this regard, early detection, prevention and treatment of risk factors for various diseases acquires a special role.

This approach is especially important when it comes to metabolic syndrome. This is due to the fact that metabolic syndrome is a symptom complex of several very important, as well as complex diseases, which today represent an epidemic, and in relation to diabetes mellitus and arterial hypertension, we can talk about a pandemic of these diseases.

A feature of metabolic syndrome is that its components occur in the form of comorbid diseases. Suffice it to say that such conditions as insulin resistance and obesity are interdependent. To date, there is no clear answer to the question of which of these conditions is primary. At the same time, each of these conditions, and even more so in combination with each other, they represent a category of high risk for the development of various diseases and, first of all, cardiovascular diseases.

So what risk factors should you pay attention to when implementing programs to prevent metabolic syndrome? The answer to this question lies on the surface. If we monitor the increase in the incidence of metabolic syndrome and the modern realities of everyday life, nutrition, intensity of work and some other factors, it becomes obvious that they develop in parallel. And this means that in the prevention of metabolic syndrome, the key point is to change the lifestyle in the modern sense of the term. First of all, this is the fight against hypodynamia, excess weight, not only the nature of nutrition, but also its qualitative composition. It is well known that modern food contains too many easily digestible carbohydrates, fats, and commas, at the same time, these products lack vitamins, minerals, as well as essential amino acids and molecules of substances that are not produced in the body. Particular attention should be paid to such an aspect of prevention as taking into account the balance between incoming and energy and its consumption. In other words, to bring

the caloric content of the patient's daily diet, the state of balance with its expenditure due to physical and other expenditures of the body.

In general, the main strategies of preventive intervention for the prevention and treatment of metabolic syndrome can be distinguished. First of all, it is necessary to highlight different approaches to individual groups of the population: in particular, this is population prevention, that is, prevention carried out at the level of the unorganized population, which covers environmental issues in the quality of food, working conditions and other aspects that are the prerogative of the state. The next group for preventive intervention is patients, that is, among this category of people, prevention should be group and should be carried out by medical institutions, as well as at enterprises with the help of existing medical units, as well as, in their absence, with the help of a general medical network. And finally, individual prevention is a group of patients who have already manifested forms of diseases and often with complicated forms of diseases among them individual measures of secondary and tertiary prevention are carried out to prevent the progression of the disease and its complications.

In accordance with modern ideas, risk factors are divided into those factors that can be changed, which can be influenced, these are the so-called modifiable risk factors, as well as risk factors, which are called non-modifiable, that is, those factors that modern medicine cannot influence. Modifiable risk factors include a wide range of different pathological conditions such as overweight, dyslipidemia, bad habits in the form of smoking and alcohol abuse, peculiarities of the psyche and behavior of patients and many other factors. It modifiable risk factors include such as age, gender, heredity, that is, these are factors that we cannot have a significant impact on, but we can take them into account when diagnosing diseases, carrying out preventive and therapeutic measures.

In our study , in order to implement preventive measures against metabolic syndrome, patients were recommended, first of all, to lead a healthy lifestyle, including the fight against hypodynamia, as well as dietary measures aimed at balancing the daily Color, as well as the use of foods low in animal fats, calories, and

easily digestible carbohydrates. For this purpose, the patients were recommended a hypocholesterol diet, which included reducing the amount of animal fats, reducing salt intake, reducing carbohydrates in the diet, as well as fatty meats, especially fatty lamb. Our study did not examine pork reduction due to the fact that the monitored population did not consume pork due to national customs.

At the same time, all patients were recommended a diet with a sufficient content of vegetables, fruits, grain products, as well as the use of sunflower oil, corn oil or olive oil. At the same time, patients were recommended regular consumption of meat, fish and poultry. Patients were also advised to limit the consumption of flour products, fried dishes, smoked and sausage products, as well as bread. Patients were recommended to eat foods containing vitamins and trace elements, in particular (seaweed, raisins, beets, lactic acid products, apricots, zucchini, pumpkin, buckwheat).

Important recommendations should also include the frequency of meals, four or five meals a day were recommended. At the same time, it was pointed out to the sick patient that each meal should contain a reduced number of calories, a reduced amount of salt, a sufficient amount of fluids and, without fail, physical activity in the form of walking after meals.

The effectiveness of preventive measures was monitored by monitoring some of the main indicators of metabolic syndrome. In particular, at the start of the study, weight growth, waist circumference were measured in the patients and on their basis the body mass index, the so-called kettle index, and abdominal obesity were also detected .

Classification of body weight is carried out according to the following criteria:

A BMI of up to 24.9 is a normal body weight;

25–29.9 – overweight;

30–34.9 – obesity of the first degree;

35–39.9 – obesity of the second degree;

40 or more – obesity of the III degree.

Abdominal obesity was detected according to the criteria of the International Diabetes Federation (IDF, 2005), according to which a waist circumference of 94 centimeters or more in men and more than 82 cm in women was assessed as abdominal obesity. At the same time, such an indicator as the ratio of waist circumference to hip circumference in men more than 1.0 and in women more than 0.85 was also taken into account, which is a more accurate indicator of the central type of obesity.

To control BP, target BP levels were set not higher than 130/85 mm Hg. Patients were advised to increase physical activity to at least 150 minutes per week (walking, swimming, cycling), physical activity (30 minutes per day, 5 times per week), or 75 minutes per week of vigorous physical activity or a combination of walking and vigorous physical activity.

Lipid levels were monitored according to the following criteria: achieving the target level of low-density lipoprotein cholesterol (LDL-C) <1.8 mmol/L or reducing this indicator by 50% (in cases where at the beginning of the study the T was 1.8-3.5 mmol/L, ESC, 2016). High-risk patients were advised to have a target LDL-C level lower than 2.6 mmol/L or a 50% decrease, provided that the initial level of LDL-C was 2.6–5.1 mmol/L. For other patients, the target LDL-C level was <3.0 mmol/L.

Other preventive measures recommend stopping smoking, limiting alcohol intake, avoiding stressful situations and controlling glycemia levels.

Premature aging of the body, prevention of the formation of diseases and their risk factors can be achieved by changing the established, irrational lifestyle. Moreover, this process can be started at any age. Particular importance should be attached to the early detection and correction of risk factors, because they lead to diseases. It is also important to note that in the prevention and treatment of risk factors and diseases, it is often necessary to combine drug methods with non-drug methods.

A total of 110 patients were selected to study the possibilities of preventing metabolic syndrome by influencing its main components. Among them, 60 were men and 50 were women. The distribution of patients by sex is presented in Table 5.1.1.

Table 5.1.1.

Distribution of patients by sex and age

Group	Age		Altogether
	20-80 years old	20-80 years old	
	man	woman	
I	30	25	55
II	30	25	55
On the	60 (54,5%)	50 (45,5%)	110

Within the framework of this study, the dynamics of average levels of risk factors was studied. Analysis of risk factors revealed different dynamics of these indicators (Table 5.1.2). In addition to lowering blood pressure (BP), there was a decrease in postprandial glycemia 2 hours after glucose loading, as well as a decrease in glucose levels 1 hour after glucose loading. It should be noted that the mean SBP and DBP values have decreased significantly. However, there were no significant differences between the growth rate of SBP compared to the growth rate of DBP.

There was a slight increase in nonglycaemia and a decrease in KI, but the differences found were not statistically significant. After 2 hours of glucose loading, glycemic levels increased by 14.42 mg%, whereas 1 hour after glucose loading there was a decrease of 17.52 mg%. As shown above, the BMI frequency has decreased significantly. However, this did not indicate a significant decrease in the level of the Quetelet index. To find out the reasons for this fact, the dynamics of CI levels in groups with normal and increased body weight were studied. It was found that the mean IC level decreased from 0.259 to 0.241 ($r<0.05$) as body weight increased.

The nature of the dynamics of the average lipid level generally corresponds to the dynamics of the prevalence of hyperlipidemia. Along with an increase in mean triglycerides and V-lipoproteins, a decrease in mean cholesterol values was observed.

Table 5.1.2

Blood pressure, Kettle index and glycemia

Degree	n = 110	
	Group I	Group II
GARDEN	121,63	114.37
DAD	92,13	77,87
Quetelet index	0,259	0,241
Fasting glucose	6,28	56,72
Glycemia after 1 hour	8,86	7,14
Glycemia after 2 hours	7.04	61,96
Cholesterol	77,14	32,86
Triglycerides	82,36	27,64
B-lipoproteins	85,51	24.49

The results show that as the population ages, levels of hypertension and blood pressure increase. However, an increase in systolic and diastolic blood pressure has been observed.

The prevalence of hyperglycemic conditions increases with age.

It has been established that with age there is an increase in the frequency of diabetes and pathology of the 2nd phase of the sugar curve. At the same time, there is a decrease in the frequency of phase 1.

The decrease in the prevalence of BMI with age does not sufficiently reflect changes in the height and weight characteristics of the population. Therefore, it is advisable to study the dynamics of the height and weight index in normal and increased body weight groups.

The increase in the frequency and level of CTO with age indicates the expediency of purposeful, active detection of these CWs in order to carry out timely

preventive measures. An increase in various quantitative combinations of the considered HOs occurs in each subsequent age group. However, an increase in the combination of OCs is often observed between the age groups of 30-39 and 40-49 years.

In the future, with age, as the frequency of XO combinations increases, it is no longer noticeable. It is noteworthy that at the age of 20-29 years, the MS state was not observed. With increasing age, with a decrease in the number of unstudied OCs (which is understandable), one or another factor that exists decreases. Thus, the presence of age and OC confirms the presence of a certain correlation between their number and combinations. In addition, the relationships between CWs were studied (Table 5.1.3).

Table 5.1.3

Correlation coefficients between the dynamics of blood pressure, the Quetelet index and glycemia

	GARDEN	DAD	Quetelet index	CHOLESTEROL	TG	B-lipo	Fasting	After 1 hour
DAD	0,77 *	-						
Quetelet index	0,35 **	0,45 *						
XS	0,1 *	0,03	0,01					
TG	0,2 *	0,09	0,11 *	0,45 *				
B-lipoproteins	0,12 *	0,06	0,08	0,61 *	0,34 *			
Fasting glycemia	0,13 *	0,12 *	0,21 *	0,2 *	0,35 *	0,18 *		
After 1 hour	0,18 *	0,14 *	0,22 *	0,05	0,22 *	0,1 *	0,41 *	
After 2 hours	0,25 *	0,21 *	0,29 *	0,16 *	0,52 *	0,11 *	0,43 *	0,42 *

According to the data obtained, there is an uncertain correlation between individual CWs. As it turned out, in general, the level of almost all coefficients is reliable (except for the correlation coefficients of the Quetelet index with cholesterol and B-lipoproteins).

Thus, the prevalence of the considered components of MS in the study population is significantly higher, and the prevalence of MS and its components increases with age. The most intensive growth of MS and its components is observed after 40 years, the dynamics of the distribution of individual components of MS is uncertain. In addition to cholesterol and B-lipoprotein levels, there is a correlation between body weight parameters and the studied XOs.

Recommendations for diet therapy:

To date, there are many studies that have convincingly proven the possibility of reducing the risk of various diseases, including cardiovascular diseases, by following a healthy lifestyle, normalizing work and life, as well as applying the principles of rational nutrition to the diet. According to the WHO, a person's health is largely determined by his lifestyle.

Thus, it was shown that the state of health of a person depends only on 10% of the level of difference in health care. At the same time, factors such as heredity, as well as external influences, in particular environmental, economic, and so on, each of them account for 20%. The improper lifestyle of the disease accounts for more than 50% of the total risk of developing various diseases.

It should be emphasized that the fact that such characteristics as physical activity, diet, daily routine, as well as the ratio of calories received with food and x expenditure should be in a certain correspondence with age, the nature of work and some features of the ecology in which this or that individual lives.

Such an interpretation of the above ideas about a healthy lifestyle is largely determined by the fact that aging is a natural process that is subject to the legitimate biology. As a result, there is a slowdown in a number of physiological and biochemical reactions in the body, a decrease in resistance to external factors, as well as weakness in all body systems. In addition, changes in the jaw and teeth with age make it difficult to chew food, and some people develop a tendency to various diseases of several organs and systems at the same time. Therefore, all this should be taken into account when choosing products and preparing food.

Therefore, their diet and composition are somewhat different from the diet of young people. All this confirms the need to follow the words of the founder of medicine, Hippocrates, who said: "Let the food you eat serve as medicine, and let your medicine consist of food." As mentioned above, from a medical point of view, it is advisable to eat 4 times a day and at the same time every day. Maintaining this arrangement allows for better absorption of nutrients. Increasing the amount and quantity of food taken reduces the excitability of the digestive center and reduces appetite.

From a medical point of view, it is advisable to eat 4 times a day and at the same time every day. Following this schedule allows for better absorption of nutrients. Increasing the amount and quantity of food taken reduces the excitability of the digestive center and reduces appetite. With 4 meals a day, about 600-700 kcal should be enough for the first breakfast, 300-400 kcal for the second breakfast, 900-1000 kcal for lunch, 600-700 kcal for dinner. Food consumed by people over 50 years old should not exceed 2500-2600 calories, and the amount of fat and sugar should be sharply limited.

We would like to emphasize that dinner should be consumed at least 2-3 hours before bedtime. Meat and fish dishes (including fatty ones) should be consumed mainly in the morning and during the day. It is advisable to limit the amount of salt in lunch, eat more dairy products. Because they do not change the physiological activity of the body during sleep. On the contrary, salty and meat foods have a negative effect on the cardiovascular and respiratory systems, leading not to a decrease in blood pressure, heart rate and respiratory rate, but, on the contrary, to an increase in them.

It should be borne in mind that the food consumed should contain a sufficient amount of fiber, vitamins, essential amino acids, minerals and electrolytes. It is possible to provide a sufficient amount of such substances if vegetables and fruits are consumed raw or processed at a low temperature. At the same time, it is advisable to use cheese and cottage cheese made as from skim milk.

Tea without bitterness, fruit juices, herbal tinctures are recommended for consumption. In a word, nutrition should be varied - vague, and they have a positive

effect on the human body, stop or slow down the processes leading to aging and diseases.

Different countries and peoples have their own culinary traditions and national dishes. While Uzbeks greet guests with big pilaf, Kazakhs with five fingers, and Uyghurs with lagman, residents of eastern countries prefer spicy seafood and rice dishes. But at the same time, research is regularly conducted in the world to create diets that have a positive effect on human health, and this process continues to this day.

One of the most well-known and reputable schools in the field of healthy nutrition development is the Harvard School of Public Health. Specialists of this school have developed a healthy eating scheme, presented in the form of a pyramid. The WHO adopted this scheme as the basis for the formation of a healthy diet. proposed by the author, in which rational nutrition is depicted in the form of a scheme (see Figure 5.1.1). The pyramid is designed taking into account factors such as physical activity and weight control. At the same time, the pyramid is built in such a way that, as you go to higher steps of the pyramid, food products are included, which are recommended to a lesser extent than those products that are located on the

lower steps of the pyramid.

Rice. 5.1.1. Healthy eating scheme recommended by the Harvard School of Public Health.

Accordingly, according to the steps of the pyramid, you can distinguish a step where vegetables and fruits in raw form, flight, bread, potatoes, legumes are listed. In the next step, meat and dairy products are listed, as well as eggs and butter. At the very top of the pyramid are confectionery, salt and sugar.

The elderly should eat at a suitable time and at regular intervals, and the intervals should not be too long. The amount of food consumed should be limited. Compliance with the regulations prevents the normal absorption of nutrients and the high activity of the involved body systems. It is advisable for the elderly to eat 4 times a day, and their energy value should be as follows: breakfast - 25%; second breakfast - 15 - 20%; lunch - 30 - 35%; dinner – 20 – 25%.

At the same time, the following three basic principles should be observed in the diet:

- maintaining the balance of energy received with food and spent in the process of life;
- when eating, monitor the balance of nutrients, vitamins and minerals (proteins – 15%, fats – 30%, carbohydrates – 55%);
- Eat 4-5 times a day;

At the same time, you should eat at a certain time, do not eat before bedtime, and the interval between breakfast and dinner should not exceed 10 hours.

Sample menu for metabolic syndrome

Breakfast: oatmeal, protein omelette, tea.
Second breakfast: Cottage cheese with sour cream
Lunch: Weak lean vegetable soup, mashed potatoes, c, boiled chicken, tea with lemon
Second lunch: Apple compote

Dinner: mashed potatoes
In the evening: kefir

Rational dietary nutrition

Prevent weight gain, normalize excess body weight.

Potassium, magnesium (raisins, apricot kernels) and preservatives should be consumed.

Regular consumption of foods rich in protein and amino acids (cottage cheese, meat, fish).

Sufficient consumption of vegetables and fruits (eggplants, beans, melons).

Fats containing unsaturated fatty acids (vegetable oils).

Do not exceed salt intake of 4-5 grams per day.

Fluid intake should not exceed 1.5 liters.

Exclude spicy foods, salty, fatty, flour and confectionery.

Restriction: fatty meat, various fatty foods or fats.

Foods allowed for diabetics are also useful for healthy people.

Exclude alcohol, juices, lemonades from the diet.

Reduce the amount of sweets and cream when drinking tea and coffee.

Choice of sugar-free products.

Replace sweets with healthy foods, such as banana dessert instead of ice cream.

7-Day Diet for Metabolic Syndrome

All meals are grouped by calorie content and carbohydrate content. When assessing the calorie content of food, it is customary to evaluate it by points. Currently, there are many different schemes and tables in the literature, which provide calculations of points based on the calorie content of food. An important approach to the formation of a daily diet is to bring the general collage of consumed products to the standards that are recommended for a particular patient. This approach is based on the following principle: products are selected in such a way that their total calorie intake does not exceed the sum of points that limit the diet of a

particular patient. This allows you to replace some products with others, taking into account the preferences of the patient. However, it is recommended to choose foods with a lower calorie count. This allows you to form a daily diet using a variety of foods.

General nutritional recommendations should be followed: the break between meals should not exceed 3 hours, the volume of the product at a time should be about 250 ml of a glass, the last snack should be taken no later than 3 hours before bedtime. Fatty, fried, spicy and salty, except for semi-finished products, sugar and bread. It is necessary to drink a sufficient amount of fluid - a glass of water on an empty stomach, at least 2 - 2.5 liters per day.

The course of diet therapy consists of 2 stages.

First stage. The goal of the first stage is the active consumption of fats. Usually it lasts up to 2 weeks. A very strict menu sharply restricts carbohydrates, so it is quite difficult to follow such a diet. However, it is necessary and effective. At this stage, it is allowed to eat products without carbohydrates.

Day 1:

Breakfast: omelet made from two eggs with the addition of milk.

Lunch: broth made from white lean fish, fresh vegetables in raw form.

Dinner: salad made from tomatoes, cucumbers, bell peppers, you can add lean boiled fish.

Day 2:

Breakfast: low-fat cottage cheese.

Lunch: cucumbers, tomatoes, bell peppers, lean boiled fish.

Dinner: green peas, boiled chicken breast.

Day 3:

Breakfast: skim milk (1 cup), bread (whole grain) and eggs.

Lunch: sour cream and mushroom soup with milk

Dinner: roast turkey, steamed broccoli.

Day 4:

Breakfast: an omelet made from two eggs with the addition of milk.

Lunch: white fat-free fish soup.

Dinner: boiled chicken breast, green peas.

Day 5

Breakfast: low-fat cottage cheese.

Lunch: roast turkey, steamed broccoli.

Dinner: skim milk (1 cup), eggs, bread (whole wheat).

Day 6

Breakfast: an omelet made from two eggs with the addition of milk.

Lunch: cucumbers, tomatoes, bell peppers, lean boiled fish.

Dinner: vegetable soup with tomatoes, a couple of cucumbers.

Day 7:

Breakfast: skim milk (1 cup), eggs, bread (whole grain).

Lunch: green peas, boiled chicken breast.

Dinner: milk soup (creamy) with mushrooms.

Recommendations for the first stage

Food should be taken by dividing it into five meals. It is allowed to consume low-fat dairy products and/or vegetables between meals.

Second stage

The purpose of the second stage is to normalize the processes of calorie intake and consumption. During this period, the weight loss process stabilizes. There is a process of adaptation of the body to the assimilation of a new diet and energy expenditure. Weight loss will occur more slowly than in the first stage, but this process will occur steadily. The duration of the second stage is from half a month to several months.

Recommendations for the second stage

At this stage, it is necessary to maintain the established points: breakfast should be 4 points, lunch 2 points, dinner - 0 points.

As a result of such diet therapy, the following results were obtained. 55 patients in the first group (control group) had risk factors for the development of metabolic syndrome, for which conventional prevention was carried out.

Patients of the second group (the main group) also consisted of 55 patients who used a special algorithm of dietary therapy with traditional preventive work and underwent dispensary observation.

Of the 55 patients in the control group, 31, or 56.4%, did not show positive changes. In 24 patients of the control group, i.e. 43.6%, they observed a healthy lifestyle.

A special algorithm of diet therapy with traditional preventive work was observed in 51 out of 55 patients of the study group, i.e. 92.7%. The prevalence of MS components decreased when used. In 4 patients, i.e., 7.3%, the change was not obvious, i.e., these patients did not change their usual way of life, and they retained the harmful influence of risk factors.

Medical Efficacy

The introduction of a special algorithm of diet therapy into the health care system has established itself as an effective method of diagnosis, control and early correction of risk factors for metabolic syndrome in the population. The use of this system in practical health care will increase the effectiveness of treatment and preventive measures, reduce the cost of treating metabolic syndrome.

Social efficiency

In the course of research on the study of risk factors for metabolic syndrome, it was found that the effectiveness of health improvement due to the introduction of a special algorithm of diet therapy and prevention in the republic increases the effectiveness of traditional prevention. By introducing a special algorithm of diet therapy, it is possible to carry out accurate, early prevention and rational pharmacoprophylaxis among the general population. This can significantly reduce the harmful effects of metabolic syndrome risk factors, improve health and quality of life. The metabolic syndrome screening algorithm is useful in the practice of family physicians in primary health care settings. This, in turn, helps specialists such as

internists, cardiologists and endocrinologists to put into practice early diagnostic procedures, as well as increase the efficiency of medical examinations.

Cost-effectiveness

Economic efficiency was calculated on the basis of the application of the proposed guidelines in clinical practice. Examples compared in cost-benefit analysis are more or less, but not equivalent, in contrast to cost minimization analysis. In this regard, it is important to assess the feasibility of the analysis depending on the level of reliability of the data provided.

Cost-effectiveness ratio as a result of cost-benefit analysis. This ratio was calculated using the following formula (Phillips S., Thompson G., 1999).

$X/S = (X 2 – X 1): (S 2 – S 1) x 100$, therefore

X/S - "cost/effectiveness",

X 1 and X 2 are the total values of the first and second interventions,

S1 and S2 - the effectiveness of the first and second interventions, respectively, in relation to the desired and undesirable outcomes,

100 is the calculated coefficient.

An analysis of the economic efficiency of the recommended methodological recommendation for the introduction of special algorithms of diet therapy among the population showed that the results of its application will have the following results:

$X / S = (X 2 - X 1): (S 2 - S 1) x 100 = (106500 - 94000) : (90–80) \_ X 100 = 1\ 250\ 000$ soums per year.

(92.7-56.4) + 92.7-7.3 = 121.7 - when using diet therapy

(92.7-56.4) + 43.6-56.4 = 23.5 - if diet therapy is not used

Thus, the economic effect of reducing the prevalence of metabolic syndrome components due to diet therapy is 5 times higher, and the use of the method of applying a special algorithm of diet therapy in monitoring risk factors for metabolic syndrome among the population made it possible to save budget funds. is allocated to practical health care.

Based on the data obtained, it can be concluded that 31 out of 55 patients in the

control group, i.e., 56.4%, did not show positive changes. In 24 patients of the control group, i.e., 43.6%, a healthy lifestyle was observed. A special algorithm of diet therapy with traditional preventive work was observed in 51 out of 55 patients, i.e., in 92.7% of patients in the study group. 3. In 4 patients, i.e. 7.3%, the change was not obvious, i.e. these patients did not change their usual lifestyle and they retained the harmful effects of risk factors.

Results of studying the effectiveness of obesity prevention.

Metabolic syndrome **is** a concept that combines a number of risk factors for cardiovascular disease, including obesity and overweight. As diagnostic criteria for metabolic syndrome, the patient must have three or more risk factors.

According to the literature, the prevalence of metabolic syndrome ranges from 5-6% to 38.7%. Men with metabolic syndrome have a fatal risk of coronary heart disease 4 times higher. The risk of cerebrovascular disease and the risk of death from all causes is doubled.
The prevalence of metabolic syndrome is 22-25% in overweight people and 50-60% in obese people. According to population studies, the number of patients with metabolic syndrome is expected to increase in the coming years, and this is mainly due to obese people.

There is clear evidence that the prevalence of metabolic syndrome is age-dependent, with a prevalence rate of 7% among those aged 20–29 years and as high as 40% among the elderly.

One of the necessary epidemiological trends is that the total number of people with metabolic syndrome is increasing. Accordingly, damage to the heart, blood vessels and kidneys is increasing. In addition to hemodynamic disorders, metabolic and humoral factors also play a key role in the occurrence of these lesions. recognized as an epidemic, eating foods that store a lot of carbohydrates and reducing physical activity is considered.

At present, there is no general understanding of the primary causes of metabolic disorders. At the same time, tissue insulin resistance and compensatory hyperinsulinemia lead to impaired glucose tolerance and activation of mechanisms

that form metabolic syndrome. In recent decades, much attention has been paid to metabolic syndrome (MS) based on insulin resistance. The main goal of identifying patients with metabolic syndrome is to use a variety of preventive methods to reduce risk factors. Currently, these programs are conducted in two areas: screening and prevention of CT type 2 and cardiovascular diseases.

Reduced physical activity leads to obesity and insulin resistance, which is a secondary environmental factor after eating large amounts of food. Hypodynamia starts the process of slowing down lipolysis, as well as suppressing the absorption of triglycerides in both muscle and adipose tissue, which in turn leads to insulin resistance.

The study was conducted in a sample of the unorganized population living in the Jondor, Peshko and Romitan districts of the Bukhara region. In the course of the study, the components of metabolic syndrome were identified in 102 patients with components of metabolic syndrome, and their effectiveness was determined using a special algorithm.

The following research methods were used: blood sugar, insulin, glucosylated hemoglobin, Kettlet index, creatinine, clinical blood and urine tests, blood pressure, blood lipids, and body composition. All patients were compared by age, gender, prior treatment and approach to the disease. The study did not include persons in the period of exacerbation of diseases of the gastrointestinal tract, persons with severe diseases of the cardiovascular system and endocrine system.

The composition and order of nutrition of patients were calculated, including: the daily caloric intake was calculated by studying individual energy expenditures.

Patients were given recommendations to reduce fats. High-fat foods have been replaced by low-calorie, low-fat foods. Weight loss from 2 to 4 kilograms per month in patients is considered harmless.

Patients were trained and the doctor ensured full cooperation with the patient. Each patient had a diary organized.

Increasing physical activity was also highlighted as a key part of the program. Aerobic exercise has been recommended to optimize physical activity. This

exercise consists of a continuous rhythmic workout that engages a large muscle group over a long period of time.

Aerobic exercises were used: walking, swimming, running, cycling, tennis, basketball, fitness. When choosing exercises, individual interests, capabilities and individual state of the body were taken into account. Aerobic stress was controlled by controlling the maximal heart rate (MFR)/maximum heart rate ratio to normal exercise values. In the studied age group, this was done as follows: MYuQS = 220-(patient age). According to the indicators, motor activity is low (30-50% of the MUCS), moderate activity (50-70% of the MUCS), intense motor activity (>70% of the MUCS). If the participant was able to speak comfortably during the exercise, the load was considered moderate. In order to prevent adverse reactions, the intensity and duration of physical activity in sedentary patients were gradually increased from 10-15 minutes per day (for example, when walking) to 40-60 minutes.

§5.2. Results of preventive intervention.

In the course of the study, the individuals selected for testing were divided into two groups: the main group and the control group. The main group of patients was 50 people. The control group consisted of 52 patients, including 30 (57.7%) men and 22 (42.3%) women (Fig. 5.2.1). All those selected were involved in preventive measures and the results were analyzed.

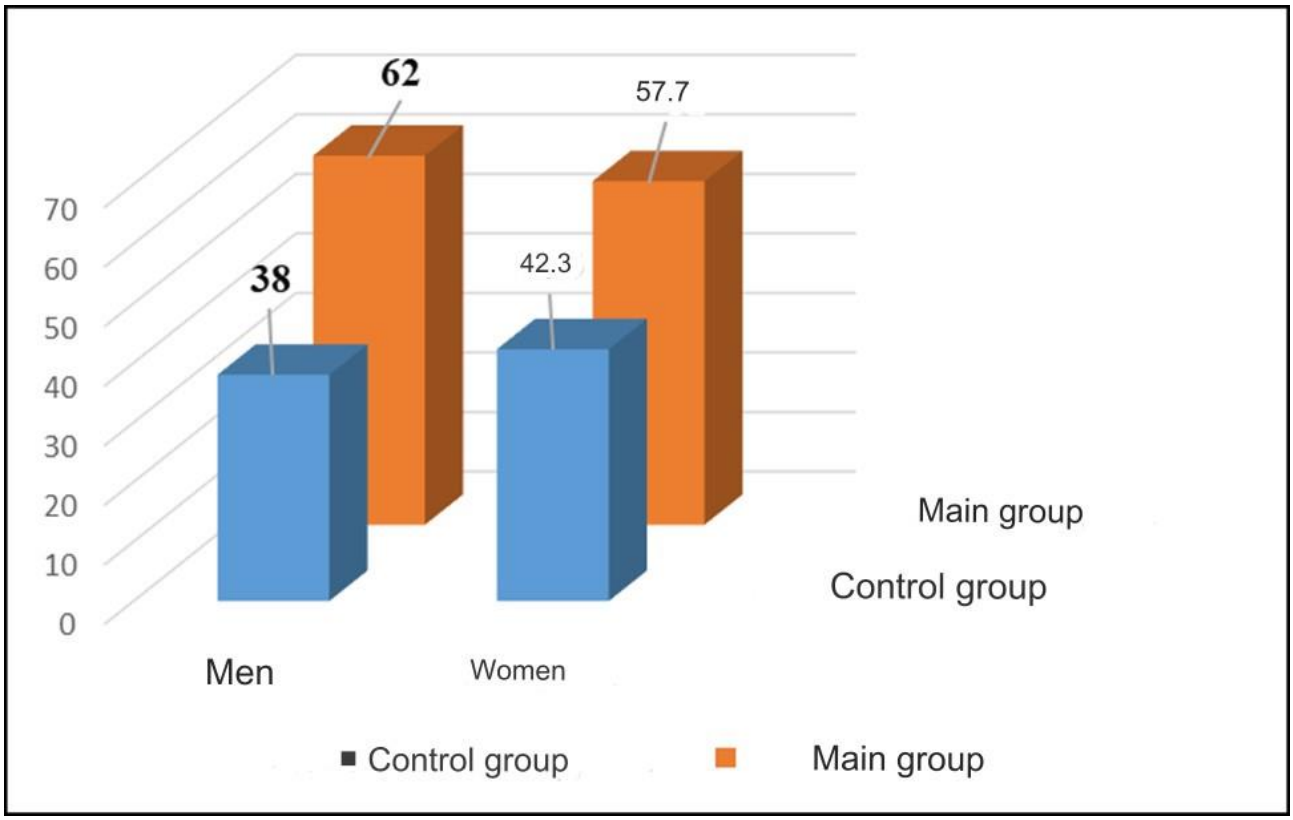


Figure 5.2.1. Distribution of the surveyed population by age and sex.

Table 5.2.1.

Distribution of patients by sex and age.

Group	Splitting groups				Altogether
	Core Group n = 50		Control group n = 52		
	man	woman	man	woman	
n	31	19	30	22	102
On the whole	50 (100 %)		52 (100 %)		102

During the examinations, the basic exchange rate was calculated in representatives of the main group, and the level of motor activity in patients was analyzed. After that, representatives of this group adjusted energy expenditure in accordance with the level of physical activity and normalized the diet. In the control

group, the usual treatment was continued. Representatives of this group had their daily diet regulated, and only they did not adjust the ratio of calories to the level of their physical activity and did not work to increase physical activity. (Table 5.2.2.)

Table 5.2.2.

Distribution of patients by method of prevention (n = 102)

Patient groups	Treatment method
Group I Control group Patients with risk factors (n = 52)	Using Traditional Methods to Control the Components of Metabolic Syndrome
Group II Core group Patients with risk factors (n = 50)	Rationing of the daily diet, adjustment to the level of physical activity and an individual program have been developed

The presence of metabolic syndrome components in the study group was analyzed. Blood pressure, BMI, T2DM, NTG, hypercholesterolemia, hypertriglyceridemia, and hyperlipidemia were analyzed in the following age groups and these data are presented below (Table 5.2.3).

Table 5.2.3.

Incidence of metabolic syndrome components in the group

Components of the syndrome or risk factor	**Indicators n = 102**
AG	17,01
BMI	18,12
SD	3,47
Fasting NTG	33,94
NTG after 1 hour	19,02
NTG after 2 hours	8,51
NTG after 1 and 2 hours	6,41

GX	16,21
Tretyakov Gallery	21,69
Hyper b-lipoproteinemia	19,07
Total risk factors	64,02

The results showed relative homogeneity in the distribution of risk factors in patients, with only a more general case of impaired glucose tolerance observed, so glycemic levels after the 1-hour postprandial and 2-hour postprandial periods were also analyzed. The analysis showed that body mass index, especially BMI, significantly decreased. According to the literature, this condition is observed in connection with a change in lifestyle.

Various changes in the manifestation of hyperlipidemia were observed in patients. Among those examined in the study, a large number of individuals with NTG, GC and hyperbeta-lipoproteinemia were found. The characteristic of lipid levels generally corresponds to the dynamics of the prevalence of hyperlipidemia.

The results showed that as the population ages, BP increases and hypertension increases. After analyzing the prevalence of risk factors, individual adjustments were made to the daily diet in patients and the level of physical activity. In addition, aerobic exercise in patients was performed based on these parameters. The main meals received a certain score: breakfast – 4 points, lunch – 2, dinner – 0. Lunch – 2 points, and dinner – only 1.

In the first group (control), 52 patients had MS components that received conventional prophylaxis. The patients of the second group (the main group) consisted of 50 patients who, in addition to traditional preventive work, used a special algorithm for increasing the level of physical activity and the level of physical activity in terms of costs and energy expenditure assessment (Fig. 5.2.2).

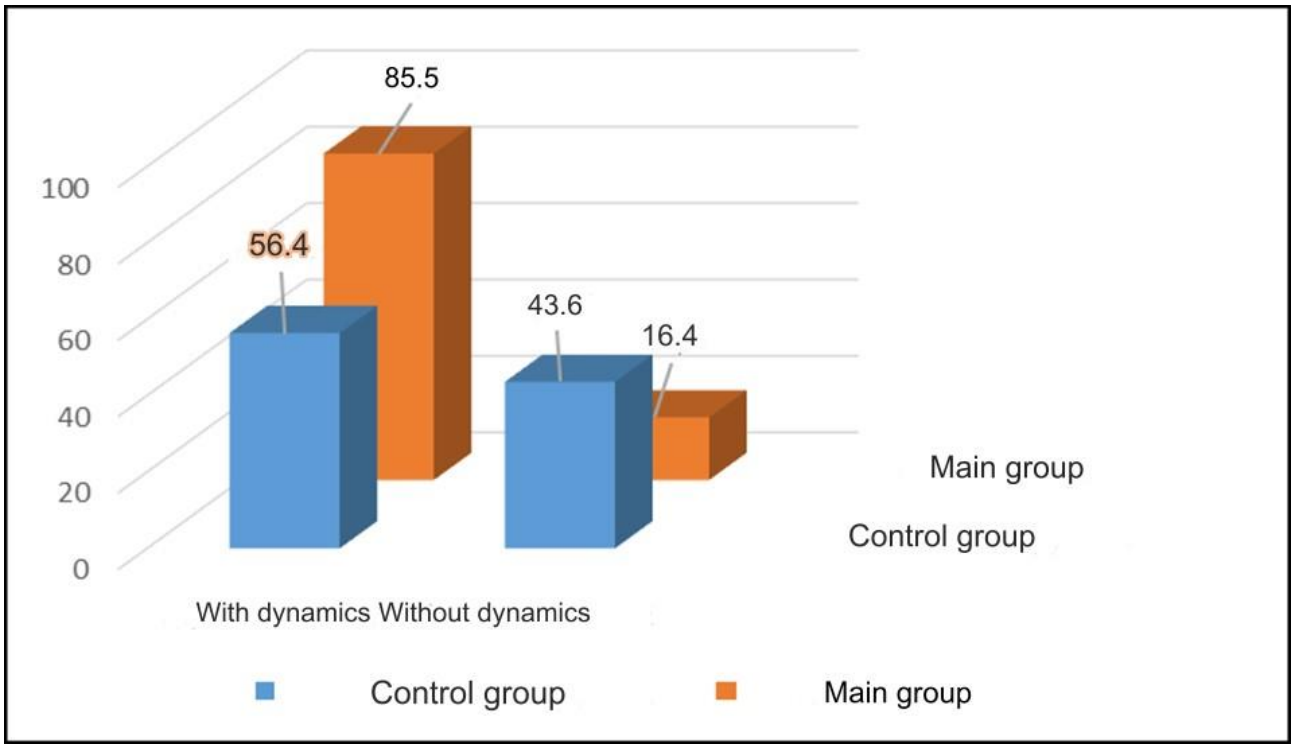
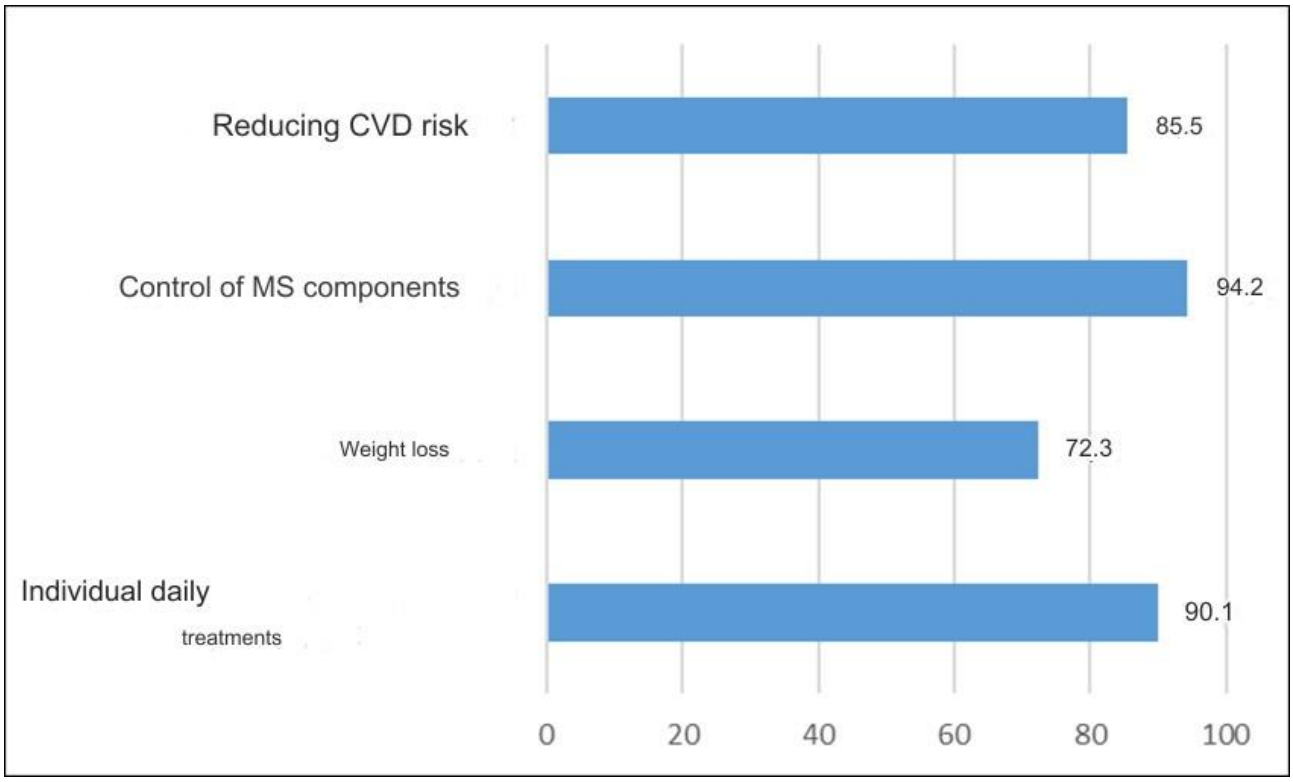


Figure 5.2.2. Assessment of the effectiveness of therapeutic measures (%).

In the control group, the results were distributed as follows: 31 out of 55, or 56.4%, did not show positive changes. In 24 patients of the control group, i.e. 43.6%, they observed a healthy lifestyle.

In 47 out of 55 patients of the study group, i.e., 85.5%, motor activity was corrected taking into account energy expenditures along with traditional preventive measures according to a special algorithm. In the process of prevention, the prevalence of MS components decreased. In 8 patients, i.e., 14.5%, the change was not obvious, i.e., these patients did not change their usual lifestyle, and they retained the adverse effects of risk factors (see Figure 5.2.3.



Rice. 5.2.3. Results obtained in the course of the study (%).

The results obtained allow us to draw the following conclusion:

A significant decrease in cardiovascular risk was noted in 85.5% of patients. In 94.2% of patients in the study group, it was possible to improve control over the components of metabolic syndrome by adjusting physical activity to the daily diet. In 72.3% of the patients included in the study, the organization of a healthy diet was achieved in accordance with the established norms of food composition, which led to a gradual and gradual decrease in BMI. In the study, 90.1% of patients achieved individual daily support. As a result, effective monitoring of patients' diet was ensured.

Optimization of the level of motor activity in patients, observance of a healthy lifestyle by individual selection of motor activity with the study of the level of activity.

Medical efficacy. The introduction into physical medicine of a method aimed at increasing physical activity in patients with components of metabolic syndrome has proven to be an effective method for the diagnosis, control and early

rejection of risk factors in the composition and order of nutrition and the level of physical activity among the population.

Social efficiency. Studies have shown that the use of algorithms for increasing physical activity in the republic, as well as around the world, the analysis and prevention of risk factors through the introduction of components of metabolic syndrome and diagnosed is several times more effective than traditional prevention. Thanks to the implementation of the system, it is possible to achieve rational nutrition of the population as a whole, adopting correct and early prevention and physical activity as a regular lifestyle. The system will also improve cooperation between health care organizations, health care institutions and local governments. As a result, the population will get rid of the harmful effects of metabolic syndrome ahead of time, improve their health and quality of life.

Cost-effectiveness. Efficacy is calculated based on the application of the proposed guidelines in clinical practice. Examples compared in cost-benefit analysis are more or less, but not equivalent, in contrast to cost minimization analysis.

In this regard, it is important to assess the feasibility of the analysis depending on the level of reliability of the data provided.

Cost-effectiveness ratio as a result of cost-benefit analysis. This ratio was calculated according to the following formula (Phillips S., Thompson G., 1999).

$$X/S = (X\,2 – X\,1): (S\,2 – S\,1) \times 100, \text{ therefore}$$

X/S - "cost/effectiveness",

X 1 and X 2 are the total values of the first and second interventions, S 1 and S2 are the efficacy of the first and second interventions, respectively, depending on the desired and undesirable results,

100 is the calculated coefficient.

The application of algorithms to increase physical activity, the analysis of risk factors and the implementation of prophylaxis by administration to those who have components of metabolic syndrome and those who have been diagnosed is several times more effective than traditional prevention. The system will also

improve cooperation between health care organizations, health care institutions and local governments. As a result, the population will get rid of the harmful effects of metabolic syndrome ahead of time, improve their health and quality of life. The analysis of the economic efficiency of the proposed methodological recommendation in practice showed that the results of use will have the following results

X / S = (X 2 - X 1): (S 2 - S 1) x 100 = (103200 - 92000) : (90-80) _ X 100 = 1 120 000 soums per year.

Thanks to the implementation of the system, it is possible to achieve rational nutrition of the population as a whole, adopting correct and early prevention and physical activity as a regular lifestyle.

Thus, the introduction of methods that promote increased physical activity while monitoring risk factors for metabolic syndrome in the population and adjusting the daily diet for energy expenditure made it possible to improve health indicators and save budget funds for practical health care.

The results obtained allow us to conclude the following: Among the unorganized population, components of metabolic syndrome, including obesity, prevail in high rates. Preventive technologies used in modern medicine are not fully effective in eliminating obesity and BMI. Active involvement of modern achievements of preventive medicine in domestic medicine makes it possible to fully prevent obesity and BMI. In the organized and unorganized contingent of patients with components of metabolic syndrome, taking into account the energy expenditure of fats, carbohydrates, proteins, taking into account the composition of the daily diet increases the chances of effective prevention in patients. The calculation of the basal metabolism in patients and the adjustment of the diet taking into account the coefficient of physical activity increases the effectiveness of preventive activities. Physical activity should be increased based on recommendations that take into account the individual characteristics of patients.

This study considered the medical aspects of the problem of MS associated with the improvement of diagnostics based on a new approach to risk assessment. The difference of the new approach is that the previous methods were based on the

presence or absence of one or another risk factor. Such an approach, of course, makes it possible to identify the significance, as well as the contribution of each of the studied risk factors to the formation of a particular disease.

At the same time, with this approach, such important aspects as the degree of severity of these risk factors remain outside the doctor's field of vision. In particular, if we take real hypertension as a risk factor, then it is impossible not to notice that the contribution of arterial hypertension of the 1st degree is significantly different from the contribution of hypertension of the 3rd degree. The same analogies can be drawn in terms of the degree of severity of excess body weight. So, it is important to distinguish such categories of overweight as obesity, which can be both 1st, 2nd and 3rd degrees. At the same time, excess body weight is also understood when the patient does not yet have manifest obesity, but has an increased body weight. For example, the kettle index may be 25, which already indicates excess body weight, and at the same time, the patient may have a body mass index of 29. And these are quite significant differences.

From the point of view of complex analysis, based on the results of observations, it is possible to assess the effectiveness of various methods of treatment of metabolic syndrome in order to study the health status of patients with the presence or absence of individual components of metabolic syndrome. It is important to monitor and adjust measures aimed at increasing physical activity, as well as changing dietary patterns and improving anthropometric indicators necessary to prevent the development and progression of metabolic syndrome and to develop a multinational method for assessing the risk of metabolic syndrome.

In this regard, new, innovative prevention programs are needed, the methodological basis of which is a digital assessment of the effectiveness of individual prevention strategies for patients with metabolic syndrome and its main components.

To develop such a program, 1050 patients were examined according to a program that identifies the key components of MS. The following research methods were used during the study: - blood glucose, insulin, glycated hemoglobin, overweight,

coagulogram, creatinine, clinical blood and urine analysis, abdominal obesity, blood pressure, blood lipids, Quetelet index. The study did not include individuals with undiagnosed diseases of the gastrointestinal tract, as well as with severe diseases of the cardiovascular and endocrine systems (including myocardial infarction, severe rhythm and conduction disorders, cerebrovascular and other serious diseases). 5.2.4.).

It has been established that the dynamics of the spread of NTG and disturbances of various phases of the glycemic curve are associated with both a decrease in the activity of the sympathoadrenal system of the body and a violation of the second phase of the glycemic curve. It should be noted that the violation of the glycemic curve associated with a decrease in insulin activity due to an increase in various counterinsular factors is highly dependent on age. Over 15 years, there has been a significant reduction in the incidence of obesity and BMI. In the literature, this fact is explained by changes in lifestyle and diet in a number of countries, including the CIS countries, especially in Russia.

Table 5.2.4.

Dynamics of the spread of risk factors over 15 years (%)

Term / **HO**	**At the beginning of the study**	**Research in 15 years**	**R**
AG	17,13	25,97	<0,05
Obesity and BMI	18.03	13,66	<0,05
SD	3,58	9.29	<0,05
Fasting NTG	35,14	22,51	<0,05
NTG after 1 hour	17, 33	10,29	<0,05
NTG after 2 hours	8,74	16,67	<0,05
NTG after 1 and 2	6.01	4,37	> 0,05
GX	17.31	11.24	< 0,05
Tretyakov Gallery	22,76	28.11	<0,05

Hyper Betta Lipopro	18,65	24.90	<0,05
ALTOGETHER	65,63	80,15	<0,05

As for the dynamics of the prevalence of different types of hyperlipidemia, uncertain changes were also revealed. Along with a significant increase in the prevalence of HTG and Gb LIP, there is a decrease in the incidence of GC (also statistically significant). Within the framework of the study, it is impossible to give an unambiguous explanation for this fact. Apparently, the answer to the question about the multifaceted dynamics of the prevalence of different types of hyperlipidemia can be given by a deeper, more specialized study.

Further, the average levels of dynamics of all RFs over a 15-year period were studied. Analysis of the levels studied by RF over a 15-year follow-up period revealed different dynamics of these indicators (Table 1). At the same time, the average values of SBP and DBP increased significantly. However, there were no significant differences between the growth rate of SBP compared to the increase in DBP.

There was a slight increase in neglycemia and a decrease in the Quetelet index, but the differences found were not statistically significant. Over 15 years, glycemia increased by 14.42 mg% (2 hours after glucose loading), while glycemia decreased by 17.52 mg% after 1 hour.

As shown above, the prevalence of BMI has decreased significantly over 15 years. However, this did not indicate a significant decrease in the level of the Quetelet index. To find out the reasons for this fact, the dynamics of the Quetelet index levels in the groups with normal and increased body weight were studied. It was found that the mean level of IC increased from 0.245 ± 0.028 to 0.253 ± 0.40 among the population with normal body weight over a 15-year period and decreased from the average level of IC in the population from 0.322 + 0.034 to 0.252. + 0,042 ($r < 0,05$).

The nature of the dynamics of the average lipid level generally corresponds to the dynamics of the prevalence of hyperlipidemia. An increase in mean triglycerides and b-lipoproteins was accompanied by a decrease in average cholesterol values. The results show that as the population ages, there is an increase in the prevalence of hypertension and blood pressure. However, there is an increase in systolic and diastolic blood pressure. The prevalence of hyperglycemia increases with age.

Table 5.2.5.

Dynamics of blood pressure, Quetelet index and glycemia levels over 15 years of follow-up

term / **degree**	**At the beginning of the study**		**Research in 15 years**		**R**
	M	± b	M	± b	
GARDEN	121.74	16.03	131.57	16.87	<0,05
DAD	75.42	10.61	83.66	14.06	<0,05
Quetelet index	0.259	0.041	0.252	0.040	> 0,05
Fasting glycemia	83.28	16.77	85.75	20.41	> 0,05
Glycemia after 1 hour	143.47	43.14	125.95	26.38	<0,05
Glycemia after 2 hours	84.16	31.96	98.58	25.42	<0,05
Cholesterol	201.13	32.86	190.81	27.15	<0,05
Triglycerides	105,94	27,64	124,90	28.01	<0,05
Beta lipoproteins	50,17	14.49	56,32	17.29	<0,05

There is an increase in the incidence of diabetes mellitus and a decrease in the glycemic curve associated with a violation of the sympathoadrenal phase, as well as

an increase in the violation of the vagoinsular phase of the glycemic curve. The decrease in the prevalence of IsMS with age does not fully reflect changes in the height and weight characteristics of the population.

Therefore, in normal and increased body weight groups, it is advisable to study the dynamics of the body mass index separately. The increase in the frequency and level of RF with age indicates the expediency of purposeful active detection of these RFs in order to apply timely preventive measures. The distribution of quantitative combinations of RFs in different age groups was studied, taking into account the fact that the negative prognostic value of RFs increases with their combinations according to the literature data (Table 5.2.6).

Table 5.2.6.

Frequency of different RF combinations in age groups (%)

Age Number of CWs	20-29 Years n = 256	30-39 Years n = 255	40-49 Years n = 276	50-59 Years n = 436	60-69 Years n = 112
No FR	53,91	32,94 *	18,48**	9.40 **	8.04
1 FR	33,59	37,25	34,42	33,49	24.11 *
2 FR	11.33	23,92 *	27,17	33.03 *	38,39
3 FR	1.17	5,49 *	17.03 **	19.04	23.21
4 FR (MS)	0	0,39	2,90 *	5.05	6,25

Note. The table shows the reliability of the differences in the studied indicators compared to the previous age group.

The data obtained show that with increasing age, the frequency of RF combinations increases. It should be noted that the spread of various quantitative combinations considered by RF occurs in each subsequent age group. At the same time, a high increase in the RF combination is observed among the age groups of 30-39 and 40-49 years. It is during this period that the most pronounced increase in the frequency of RF combinations occurs.

In the future, as age increases, an increase in the frequency of RF combinations is also observed, but it is no longer noticeable. Please note that individuals aged 20-29 years did not have MS. It is noteworthy that with increasing age, there is a decrease in the number of unstudied RFs (which is quite understandable) in the presence of only one factor. The study of the frequency of cases of various combinations of RF showed that in certain age periods their prevalence is different.

The greatest increase in isolated hypertension occurs after the age of 50.

Hypertension is often combined with BMI and NTG, and the frequency of this combination increases with age. It should be noted that in the youngest group (20-29 years old) there is no combination of NTG with GC and AH, as well as with BMI and GC.

There is no association between AH, BMI, and the combination of NTG and GC with age. The combination of the 4 studied RFs increases with age, but the largest and statistically significant increase in the frequency of this type of RF combination occurs after the age of 40 and continues until the age of 60. Thus, according to the above data, there is a certain correlation between age and the presence of RF, their number and combinations.

In addition, the relationships between the studied RFs were studied. According to the findings, there is an uncertain individual relationship between RFs. As it turned out, in general, the level of almost all coefficients is reliable (except for the correlation coefficients of the Quetelet index with cholesterol and b-lipoproteins).

A digital risk assessment model was used to assess the patient's condition and for monitoring indicators and prevention. The program can be used on a PC, tablet and smartphone. This program allows the patient to independently monitor the condition and risk level of the MS components.

§5.3. Results of the use of a digital program of preventive action on the main components of metabolic syndrome

(indicators of negative dynamics of risk factors in preventive intervention). The results of the risk assessment are presented below (Fig. 5.3.1). According to the results of this part of the work, it can be concluded that the goals of prevention should include: a significant significant reduction in the average levels of the main components of MS, which are important risk factors for various CVDs. Along with the qualitative result, the prevention of MS also pursues the goal of reducing new cases (endpoints) of both the main components of metabolic syndrome and this syndrome as a whole. Reduced cardiovascular risk. Increasing patient adherence to a healthy lifestyle

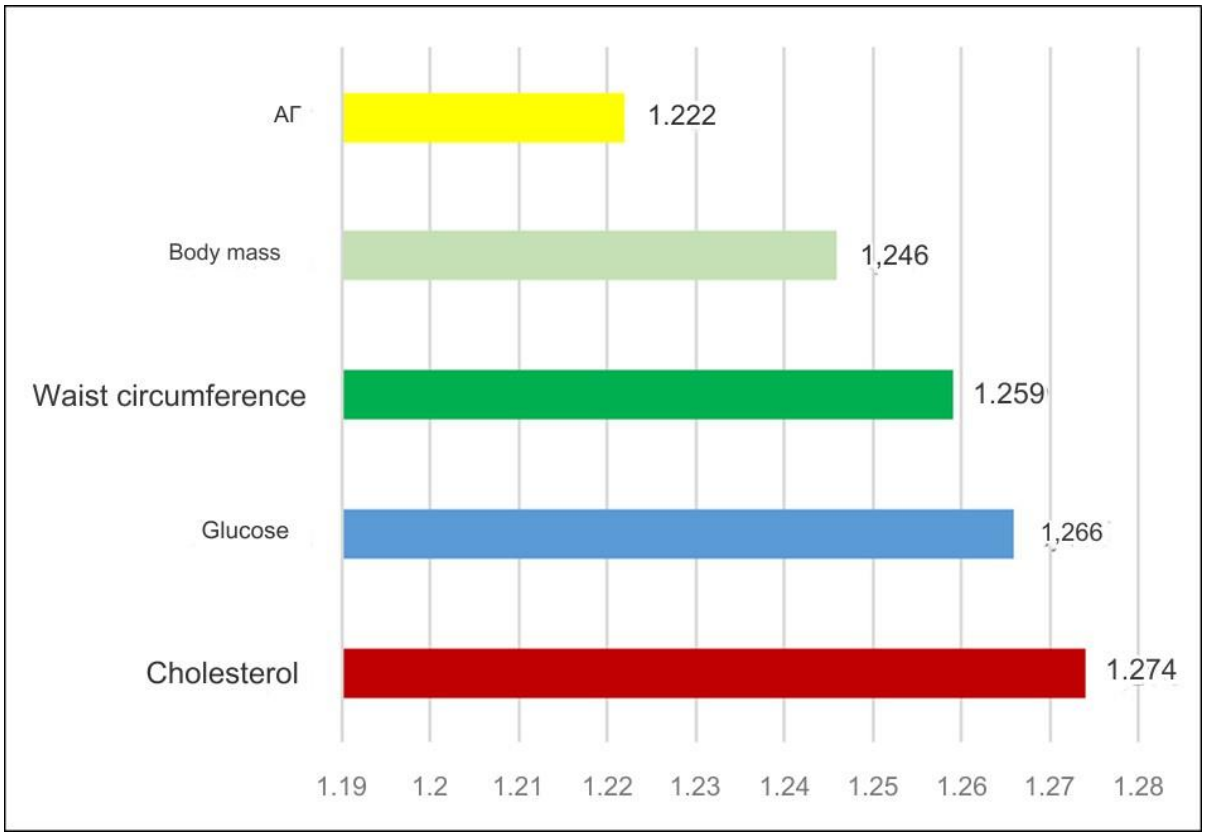


Figure 5.3.1. Results of the metabolic syndrome risk assessment.

Medical efficacy. The method of assessing the optimization of the prevention of metabolic syndrome components in outpatient settings through the introduction of an innovative program in primary health care institutions will improve the early detection and systematization of key components of metabolic syndrome. Drug prevention and treatment of metabolic syndrome expands the possibilities of changing lifestyle by involving family members in the treatment and prevention process.

Social efficiency. The practical use of the innovative prevention program provides a methodological basis for the development of individual prevention strategies for patients with metabolic syndrome and its main components. To study the health status of patients with risk factors for the development of metabolic syndrome and its main components in the conditions of multivariate analysis, to assess the effectiveness of various methods of non-drug treatment of metabolic syndrome based on data from future observations, as well as physical activity. Dietary modification and improvement of anthropometric indicators, as well as the development of a method for multifactorial assessment of the risk of metabolic syndrome, have a positive effect.

Cost-effectiveness. Economic efficiency was calculated on the basis of the application of the proposed guidelines in clinical practice. Examples compared in cost-benefit analysis are more or less, but not equivalent, in contrast to cost minimization analysis. In this regard, it is important to assess the feasibility of the analysis depending on the level of reliability of the data provided.

Cost-effectiveness ratio as a result of cost-benefit analysis. This ratio was calculated according to the following formula (Phillips S., Thompson G., 1999).

$X/S = (X 2 – X 1): (S 2 – S 1) \times 100$, therefore

X/S - "cost/effectiveness",

X 1 and X 2 are the total values of the first and second interventions,

S1 and S2 - the effectiveness of the first and second interventions, respectively, in relation to the desired and undesirable outcomes,

100 is the calculated coefficient.

An analysis of the cost-effectiveness of the recommended in practice methodological recommendation for optimizing the prevention of metabolic syndrome and its components in the population showed that the results of its application have the following results:

S / E = (S2 - S1): (E2 - E1) x 100 = (194430–166500): (90–80) x100 =

27930:10x100 = 2 793 000 soums per year.

Thus, the proposed methodological recommendations for optimizing the prevention of metabolic syndrome components in outpatient settings in the population using an innovative algorithm will save budget funds when carrying out preventive work related to the comparative traditional treatment of patients.

Based on the data obtained, it can be concluded: The prevalence of the main components of metabolic syndrome, which are the leading risk factors for cardiovascular diseases, is quite high among the unorganized population and amounts to 63%.

Among the unorganized population, there is a steady increase in the frequency of risk factors for vascular diseases. Existing preventive technologies do not meet modern requirements and cannot achieve full results as a result of their use. An adequate and effective prevention system needs to use digital, software methods for calculating cardiovascular risk. Along with personal communication, modern information and communication technologies by phone, the positive effect of preventive intervention using instant messengers will significantly increase, i.e. by 75%.

The use of modern gadgets, diagnostic and preventive digital programs significantly increases the effectiveness of preventive measures. Among the unorganized population, there is a fairly high prevalence of the main components of metabolic syndrome, which are important and significant risk factors for cardiovascular diseases. 80% of the positive effect of prevention can be achieved by combining traditional methods with innovative information and communication technologies.

The results of the study presented in this chapter indicate the effectiveness and expediency of the implementation of complex multifactorial prevention of metabolic syndrome. At the same time, the possibility of using digital technologies in this process is shown.

CHAPTER VI. DIGITAL DIAGNOSTIC PROGRAM AND PREVENTION OF METABOLIC SYNDROME

Although the existing programs for the prevention of CVD include the latest medical advances, they are nevertheless quite difficult to implement. This is due to both the amount of work and significant inconveniences in the form of time spent on communication between the patient and the doctor, the need to fill out the appropriate documentation (diaries, tests, treatment and prevention methods). At the same time, a great burden falls on the doctor. He also has to spend a lot of time analyzing the results of prevention, adjusting prescriptions and talking to the patient. And taking into account the significant comorbidity and the presence of concomitant diseases, the complexity of such preventive measures becomes clear.

For example, in the Russian Federation, several large studies have been conducted to study the prevalence of metabolic syndrome, as well as its main components. At the same time, it has been shown that such components of metabolic syndrome as arterial hypertension, overweight or obesity, as well as diabetes mellitus or impaired glucose tolerance are significant factors that significantly increase cardiovascular risk. At the same time, studies have been carried out to study other risk factors for cardiovascular diseases, in particular, physical inactivity, smoking, malnutrition, as well as other risk factors, in search of effective methods of combating diseases of the cardiovascular system, various methods of preventive intervention have been studied. These methods included both medical and non-drug interventions. And comma, although positive results were obtained, nevertheless, the authors note that this work, in particular multifactorial prevention, faces significant difficulties, these difficulties lie in the fact that among the population among the unorganized population it is very difficult to carry out not only the prevention of individual diseases or risk factors, but especially multifactorial prevention. by the attending physician.

Based on this, the development and implementation of innovative methods of preventive intervention using digital information technologies, such technologies that

allow for examination, monitoring, and recommendations to patients for remote communication, while delegating certain functions to the patient himself is of great importance.

In this regard, this paper attempts to develop a digital innovative program for the identification, monitoring and control of the main components of non-Sobolev syndrome for effective prevention of both the syndrome itself and its main components.

In order to improve CVD prevention measures and reduce time and material costs, as well as increase compliance and improve the quality of life of patients with metabolic syndrome, the possibility of using a digital prevention program was studied. For this purpose, the study of the main components of MS, the importance of each of them was carried out and, on the basis of prospective observation, a digital model was developed to assess the patient's condition, identify risk factors and determine the range of preventive measures.

For this, an epidemiological study was carried out using a special questionnaire. This questionnaire was subsequently approved by the Ethics Committee under the Ministry of Health of the Republic of Uzbekistan. (U.K. Kayumov, No2/36-1020 28.02.2019). The questionnaire includes a number of items on anamnesis, complaints, results of laboratory and instrumental research methods (Appendix 1). The data of the epidemiological study conducted on the basis of the submitted questionnaire are given in Chapter III and Chapter IV.

In total, this questionnaire includes 378 items. It is clear that it is not easy to collect such a volume of data. They were needed to highlight the most significant points and further develop a digital questionnaire for the patient and develop a prevention program.

Based on the data obtained, the author has developed a shortened Questionnaire for the patient (see Table 6.1).

Table 6.1.

OPRSNIK QUESTIONNAIRE
for screening for chronic non-communicable diseases

1.	Full name	
2.	Patient's personal number	
3.	Number of the clinic or other medical institution	
4.	Outpatient card or medical history number	
5.	Gender: Male - 1; Female - 2	
6.	Address, phone: (insert)	
7.	Date of birth	
8.	Examination day (e.g.: 12)	
9.	Month of the survey (month number: January -1; February -2; etc.)	
10.	Prevention start date	
11.	Main diagnosis	
12.	Components of metabolic syndrome	
13.	What measures against hypertension (except for taking antihypertensives) do you carry out: Diet -1; Physical education - 2; Cessation: smoking -3; Alcohol -4; Weight loss -5; Others -6; I don't do anything -7	
14.	What anti-obesity medications have you used recently?	
15.	What anti-obesity measures do you carry out (except for medications): Diet ("Uroza" does not count) - 1; Physical education - 2; Others - 3; Doing nothing - 4	
16.	***The first measurement of blood pressure.*** (Measure exactly according to the Instructions!).	
17.	Systolic Blood Pressure	
18.	Diastolic BP	
19.	***The second measurement of blood pressure.*** (5 minutes after the first measurement!).	
20.	Systolic Blood Pressure	
21.	Diastolic BP	
22.	Heart rate per minute	
23.	Weight (in kg. with an accuracy of 100 grams, for example: 64.7)	
24.	Standing height (in cm with an accuracy of 0.5 cm, for example: 172.5)	
25.	Waist circumference, abdomen (in cm with an accuracy of 0.5 cm, for example: 83.0)	

26.	What medications for hyperlipidemia have you been taking recently?	
27.	What measures against hyperlipidemia (except for medications) do you take: Diet ("Urosa is not counted") - 1; Physical education - 2; Others - 3; Do nothing – 4	
28.	What medications against hyperglycemia and diabetes have you used recently?	
29.	What measures against hyperglycemia and diabetes do you carry out (except for insulin and glucose-lowering pills): Diet ("Urose" does not count) - 1; Physical education - 2; Others - 3; Do nothing – 4	
30.	Do you have a dry mouth? Yes - 1; No - 2	
31.	Is this feeling related to eating? Yes - 1; No - 2	
32.	If "Yes", then how many minutes after eating does it occur?	
33.	Do you experience weakness in the morning, on an empty stomach, dizziness, which disappears after eating, or especially after sweets? Yes - 1; No - 2	
34.	Do you feel thirsty? Yes - 1; No - 2	
35.	If yes, is it related to eating? Yes - 1; No - 2	
36.	If yes, how many minutes after eating does it occur?	
37.	How much liquid do you drink during the day (in liters): Up to 1 liter - 1; Up to two – 2; Up to three – 3; Up to four - 4, Over five - 5	
38.	Have you noticed itchy skin? Yes - 1; No - 2	
39.	If "Yes", then what was associated with it, if it was treated, then was there an effect	
40.	The doctor said that it was an Allergy Yes - 1; No - 2	
41.	Effect of allergy treatment: Yes - 1; No - 2	
42.	The doctor said that this is a skin disease: Yes - 1; No - 2	
43.	Effect of skin disease treatment: Yes - 1; No - 2	
44.	The doctor said that it was Diabetes: Yes - 1; No - 2	
45.	Effect of diabetes treatment Yes - 1; No - 2	
46.	Other reasons (what)_____	

47.	Effect of treatment of another cause: Yes - 1; No - 2	
48.	Do you have boils or other pustular skin diseases? Yes - 1; No - 2	
49.	Has your weight changed? Yes - 1; No - 2	
50.	If "Yes", then how: decreased - 1, increased - 2	
51.	How many kilograms_____	
52.	For how many years: _____	
53.	Do you feel: Burning sensation in the soles - 1; feeling cold or numbness of the toes - 2; a feeling of crawling goosebumps - 3; no sensations – 4	
54.	Is your eyesight impaired? Yes - 1; No - 2	
55.	If so, how can it be corrected by optical lenses? Does not yield - 1; yields, but not very well - 2; responds well - 3; I haven't tried it - 4	
56.	How many years ago did you start noticing these symptoms? _____	
57.	Have you consulted a doctor about these symptoms? Yes -1; No - 2	
58.	If "Yes", then what diagnosis did the doctor make? Diabetes mellitus – 1; I don't know – 2; Other – 3 (specify what)	
59.	**INSTRUMENTAL AND LABORATORY DATA**	
60.	Hemoglobin	
61.	Erythrocytes	
62.	Leukocytes	
63.	ESR	
64.	Color Index	
65.	General urinalysis	
66.	Color: 1 - cloudiness of urine; 2 - red; 3 - dark brown, 4 - straw yellow, 5 - light yellow	
67.	Protein: No – 1; Traces - 2; (if there is protein, then indicate how much)	
68.	Urine reaction: 1 - neutral; 2 – alkaline; 3 - acidic	
69.	Share	
70.	Hematuria: none - 1; Completely – 2; From 1 to 3 in the field of view - 3;	

	If there are more than 3 erythrocytes, the number of	
71.	Leukocytes: none - 1; Completely – 2; From 1 to 3 in the field of view - 3; If more than 3 leukocytes must be indicated	
72.	Cylinders: None - 1; Completely – 2; From 1 to 3 in the field of view - 3; If there are more than 3 cylinders, you need to specify the number of cylinders	
73.	Bacteria: none - 1; Completely – 2; From 1 to 3 in the field of view - 3; If there are more than 3 bacteria, the number must be indicated	
74.	Urine glucose: 1 – none; 2 - traces; 3 - % content	
75.	Nechiporenko's test:	
76.	Leukocytes	
77.	Erythrocytes	
78.	Cylinders	
79.	Fibrinogen	
80.	C-reactive protein	
81.	Cholesterol	
82.	Triglycerides	
83.	A-cholesterol	
84.	Beta lipoproteins	
85.	Fasting glucose	
86.	Glucose 2 hours after exercise	
87.	Glycosylated hemoglobin	
88.	ECG changes: Scars - 1; Hypertrophy - 2; Ischemia – 3; Atrial extrasystoles - 4; Ventricular extrasystoles – 5; a/v blockade – 6; Ventricular blockades – 7; Other - 8	

This questionnaire is somewhat broader than the generally accepted ones. However, it allows us to identify the main components of MS. In addition, many items are filled out only once. At the same time, it contains a survey to identify both diabetes mellitus and NTG. Patient data is entered in the right column on digital media such as a smartphone, tablet, laptop or desktop computer.

This digital questionnaire is transmitted over the Internet to the attending physician, who enters it into his patient database. Subsequently, based on the results of this questionnaire, he decides on preventive and treatment measures. He also sends his recommendations to the patient via the Internet.

Along with this Questionnaire, a digital program has been developed to assess the degree of CVD risk in patients with MS. The algorithm and criteria for evaluating the indicators of this Questionnaire are presented below (see Tables 6.2.-6.6).

Table 6.2.

Instructions for filling out the Application Form

Glucose and glycosylated hemoglobin analysis
Simplified version.
The analysis is carried out separately.
1 table on glucose - in one form (Form...), and the other on glycol. hemoglobin - in another form (Form...).
At the beginning, it is necessary to give a certificate of the criteria for assessing blood glucose and glycosylated hemoglobin:For example: In this algorithm, the following are taken as normal values:- levels of glucose in capillary blood < 5.5 mmol/l;- levels of glycosylated hemoglobin ≤5.6%.
It is also necessary to indicate the following: "Glycosylated hemoglobin analysis is needed both for the diagnosis of various categories of hyperglycemia (diabetes mellitus and NTG), as well as for the differential diagnosis of first-time and previously diagnosed cases of diabetes mellitus. This, in turn, is necessary to determine the treatment tactics for various categories of hyperglycemia."

When choosing treatment tactics and prescribing insulin, blood glucose levels are the determining factor.
It should be noted: "High glycemia values in patients with glycosylated hemoglobin indicators corresponding to compensated or subcompensated diabetes mellitus indicate stress hyperglycemia."
Patient Growth
Patient weight
Fasting glucose level (mmol/L)
Glucose level after meals - postprandial hyperglycemia (mmol/L)
Diabetes mellitus
Increased blood glucose
Glycosylated hemoglobin level (HbA in %)
Body mass index (kg/m2)
Other indicators
Patient Group

Table 6.3.

Glucose Assessment

Diabetes mellitus	Code	Interpretation
	1	Diabetes has not been previously diagnosed
	2	Suffers from diabetes mellitus
Increased blood glucose	Code	Interpretation
	1	Previously, glucose did not rise
	2	Previously, glucose rose
Fasting glucose level (mmol/L)	Code	Interpretation

	1	< 5.6 Norm, provided that the level of glycemia after meals < 7.8 mmol/l
	2	5.6 to 6.1 Fasting hyperglycemia, assuming a normal post-meal glycemic level of 7.8 mmol/L
	3	> 6.1Diabetes mellitus with an increase in glycemia after meals > 11.1 mmol/l
Glucose level after meals (mmol/L)	Code	Interpretation
	1	< 7.8Normal, provided that the fasting glycemia level < 5.6 mmol/l
	2	from 7.8 to 11.1NTG
	3	≥ 11.0

Table 6.4.

Glycosylated hemoglobin score

Diabetes mellitus	Code	Interpretation
	1	Diabetes has not been previously diagnosed
	2	Suffers from diabetes mellitus
Increased blood glucose	Code	Interpretation
	1	Previously, glucose did not rise
	2	Previously, glucose rose
Glycosylated hemoglobin level	Code	Interpretation

(HbA in %)	1	< 5.6 Normal
	2	from 5.7 to 6.4 NTG
	3	> 6.4Diabetes mellitus

Note: all other options should be marked in the results as: "Data should be double-checked and compared with HbA1c and clinic"

Table 6.5.

Classification by glucose level

y$(1)	y$(2)	x(1)	x(2)	
Diabetic	**Increased blood glucose**	**Fasting glucose**	**Glucose after meals**	**Criteria**
Diabetes has not been previously diagnosed	Previously, glucose did not rise	< 5,6	< 7,8	Norm
Diabetes has not been previously diagnosed	Previously, glucose did not rise	< 5,6	7.8 to 11.1	NTG detected for the first time
Diabetes has not been previously diagnosed	Previously, glucose did not rise	5.6 to 6.1	< 7,8	Fasting hyperglycemia
Diabetes has not been previously diagnosed	Previously, glucose did not rise	5.6 to 7.0	7.8 to 11.1	NTG detected for the first time
Diabetes has not been previously	Previously, glucose did not	> 6,1	> 11,1	Diabetes mellitus newly diagnosed

diagnosed	rise			
Diabetes has not been previously diagnosed	Previously, glucose rose	< 5,6	< 7,8	Norm
Diabetes has not been previously diagnosed	Previously, glucose rose	< 5,6	7.8 to 11.1	NTG previously identified
Diabetes has not been previously diagnosed	Previously, glucose rose	5.6 to 7.0	< 7,8	Fasting hyperglycemia
Diabetes has not been previously diagnosed	Previously, glucose rose	5.6 to 7.0	7.8 to 11.1	NTG previously identified
Diabetes has not been previously diagnosed	Previously, glucose rose	> 6,1	> 11,1	Diabetes mellitus newly diagnosed
Suffers from diabetes mellitus	Previously, glucose rose	5.0 to 6.0	0t 7.5 to 8.0	Diabetes mellitus in the compensation stage
Suffers from diabetes mellitus	Previously, glucose rose	6.1 to 6.5	8.1 to 9.0	Diabetes mellitus in the subcompensation stage
Suffers from diabetes mellitus	Previously, glucose rose	> 6,5	> 9,0	Diabetes mellitus in the decompensation stage

Table 6.6.

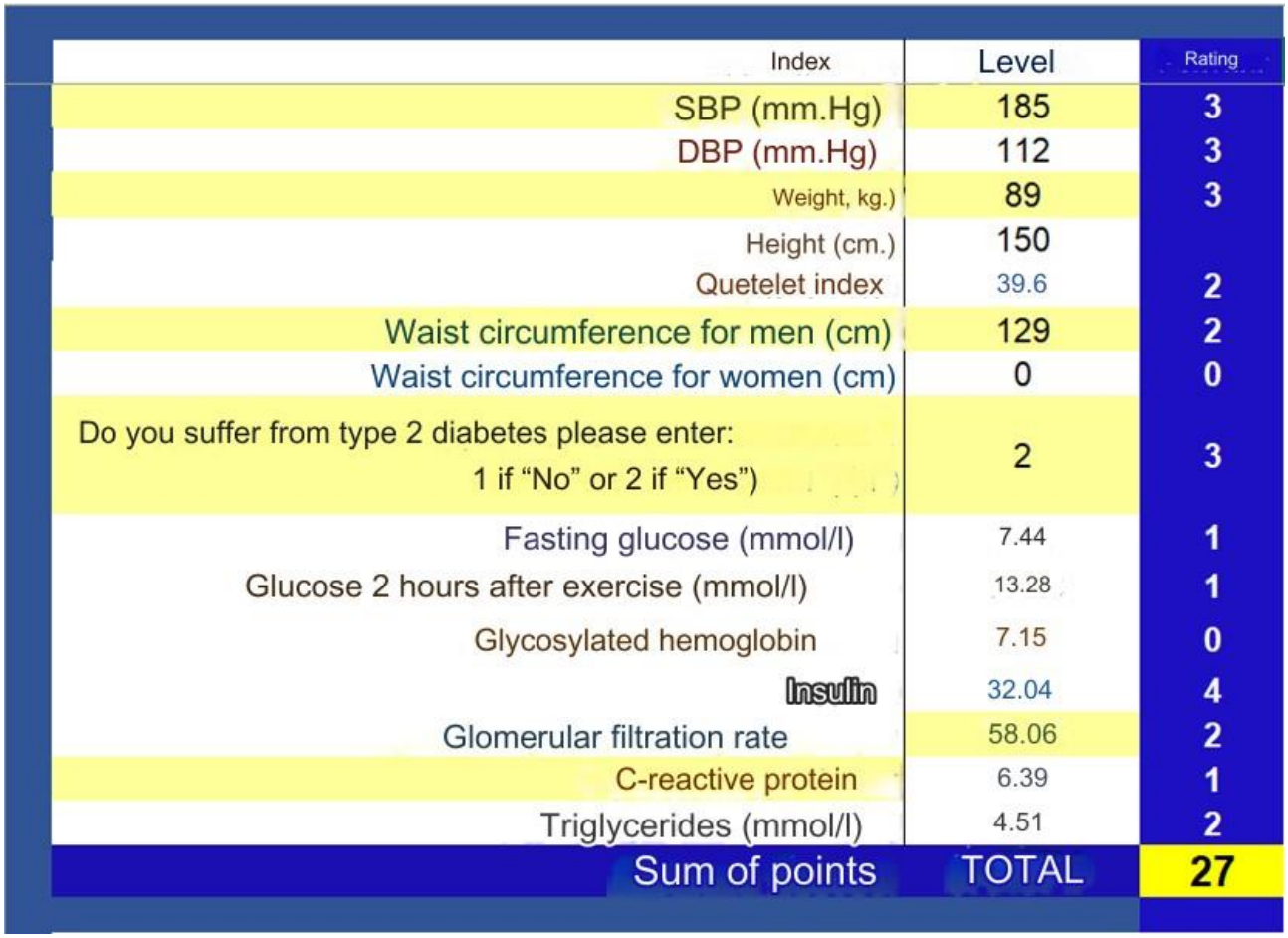
Classification by glycosylated hemoglobin

y$(1)	**y$(2)**	**x(3)**	
Diabetic	**Increase in glucose in crocs**	**HbA level**	**Criteria**
Diabetes has not been previously diagnosed	Previously, glucose did not rise	< 5,6	Norm
Diabetes has not been previously diagnosed	Previously, glucose did not rise	5.6 to 6.4	NTG detected for the first time

Diabetes has not been previously diagnosed	Previously, glucose did not rise	> 6,4	Diabetes mellitus newly diagnosed
Diabetes has not been previously diagnosed	Previously, glucose rose	< 5,6	Norm
Diabetes has not been previously diagnosed	Previously, glucose rose	5.6 to 6.4	NTG previously identified
Diabetes has not been previously diagnosed	Previously, glucose rose	> 6,4	Diabetes mellitus newly diagnosed
Suffers from diabetes mellitus	Previously, glucose rose	< 6,5	Diabetes mellitus in the compensation stage
Suffers from diabetes mellitus	Previously, glucose rose	from 6.5 to 7.5	Diabetes mellitus in the subcompensation stage
Suffers from diabetes mellitus	Previously, glucose rose	> 7,5	Diabetes mellitus in the decompensation stage

Note: All other options should be marked in the results as: "Data should be double-checked and compared with glucose levels and clinic"

This program was developed by Kayumov U.K. and co-authors (No DGU 06283. Registered in the State Register of Computer Programs of the Republic of Uzbekistan. 19.04.2019). The author of this dissertation modified it for this dissertation. A general view of the cardiovascular risk calculation program for metabolic syndrome and an example of calculating the number of points is presented below (see Figure 6.1).



Index	Level	Rating
SBP (mm.Hg)	185	3
DBP (mm.Hg)	112	3
Weight, kg.)	89	3
Height (cm.)	150	
Quetelet index	39.6	2
Waist circumference for men (cm)	129	2
Waist circumference for women (cm)	0	0
Do you suffer from type 2 diabetes please enter: 1 if “No” or 2 if “Yes”)	2	3
Fasting glucose (mmol/l)	7.44	1
Glucose 2 hours after exercise (mmol/l)	13.28	1
Glycosylated hemoglobin	7.15	0
Insulin	32.04	4
Glomerular filtration rate	58.06	2
C-reactive protein	6.39	1
Triglycerides (mmol/l)	4.51	2
Sum of points	TOTAL	27

Rice. 6.1. Example of calculating the rating of points for each attribute

Conclusions about the patient's condition and the degree of cardiovascular risk are made by the number of points.

Evaluation of results:

From 0 to 5 points - low risk,
from 6 to 18 points – medium risk
more than 18 points – high risk.

The presented program is part of the general prevention program. It significantly reduces the time spent on communication between the patient and the doctor, the need to fill out the appropriate documentation (diaries, tests, treatment and prevention methods). At the same time, the burden on the doctor is also reduced. He will be able to save time on analyzing the results of prevention, adjusting prescriptions and talking with the patient. And taking into account the significant

comorbidity and the presence of concomitant diseases, all the economic and material effectiveness of this program becomes clear.

The following algorithm for the prevention of MS is proposed

Methodology for the prevention of cardiovascular diseases.

Stage 1 – Assessment of risk factors.

Stage 2 – Determination of groups of dispensary observation based on the degree of risk.

Low risk:

Group I – practical healthy – will include a group with a low risk of developing the disease.

Medium risk:

Group II – risk of developing the disease, but there is no disease.

Group III – the presence of a disease (needs outpatient treatment)

High Risk:

Group IV – the presence of a disease (needs hospital treatment).

Group V – the presence of a disease (needs high-tech medical care).

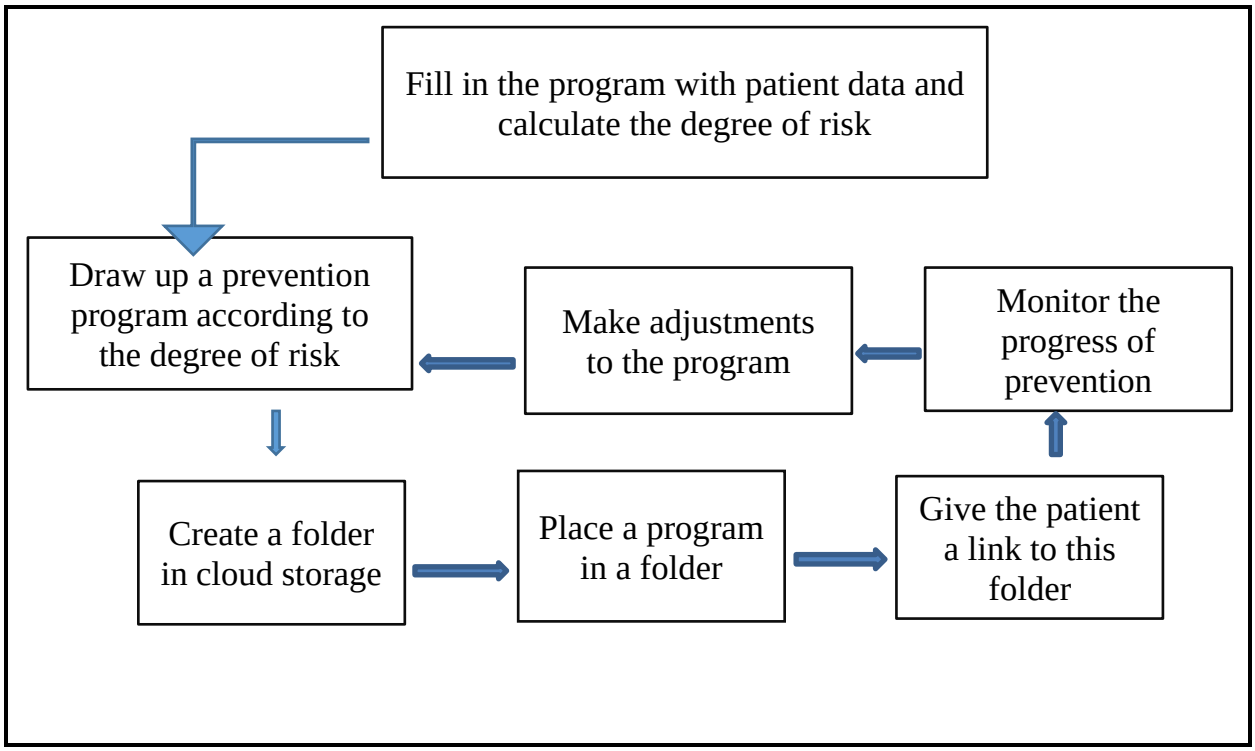
Stage 3 – Dispensary observation.

A digital program for the diagnosis and prevention of metabolic syndrome is a program for the diagnosis, monitoring and prevention of metabolic syndrome. A digital risk assessment model has been developed to assess the patient's condition and for the purpose of monitoring indicators and prevention. The program with patient data is located in cloud storage. With the help of the Internet, it is possible to access both the doctor and the patient, regardless of their location and time of day. The program can work on a computer, tablet and smartphone. This program allows you to carry out the bulk of preventive measures remotely. At the same time, the doctor organizes and controls the patient's activities. The patient's time and material costs associated with visiting the clinic are saved. At the same time, the doctor's working time is also saved. And most importantly, the doctor and the patient, although remotely, can communicate more often. The transfer of information in both directions is fast. At the same time, the doctor and the patient have the opportunity to choose a

convenient time for the exchange of information. This, in turn, promotes better collaboration.

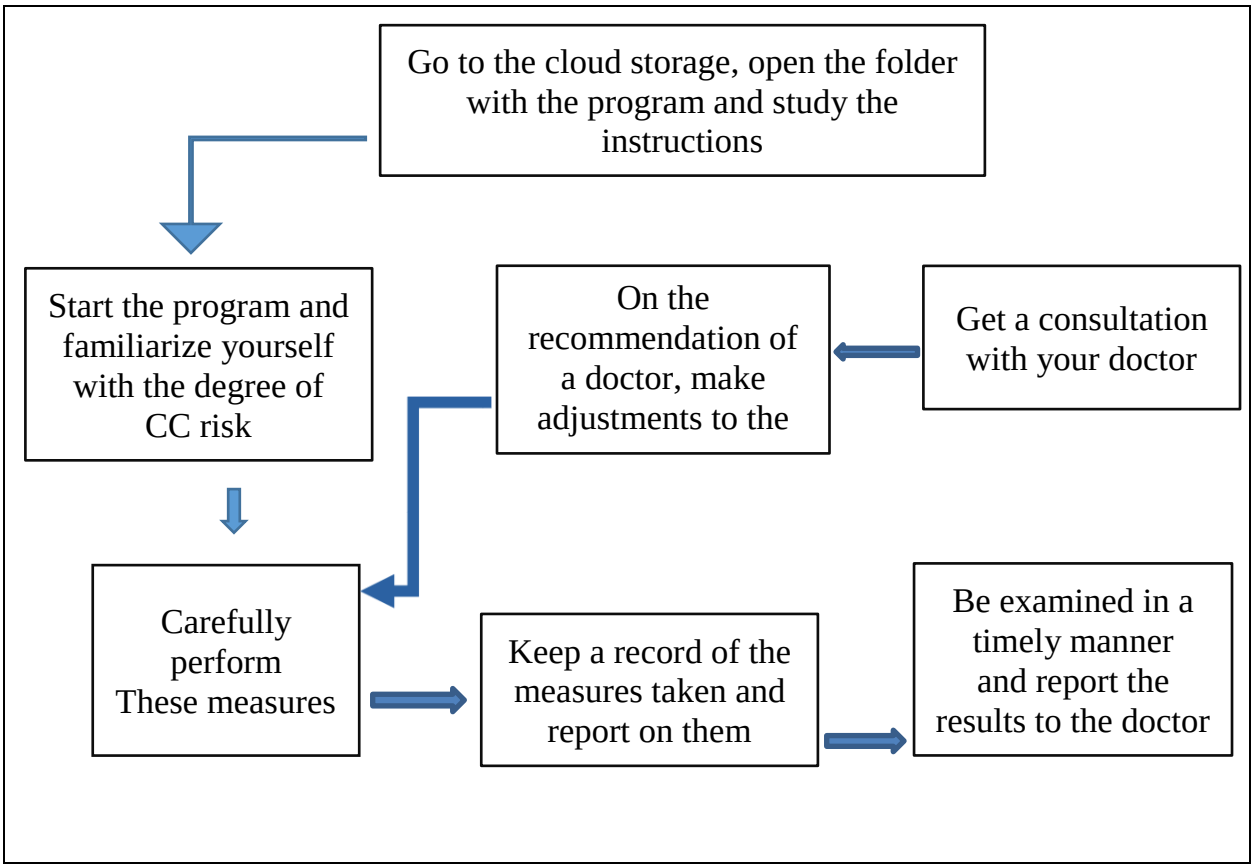
A digital program of preventive intervention on the main components of metabolic syndrome (indicators of negative and positive dynamics of risk factors) during preventive intervention gave encouraging results, which are presented in the previous chapter (see Figure 5.4.).

Below are the doctor's step-by-step actions when working with the program (see Figure 6.2.).



Rice. 6.2. Algorithm for creating and using the program by the doctor

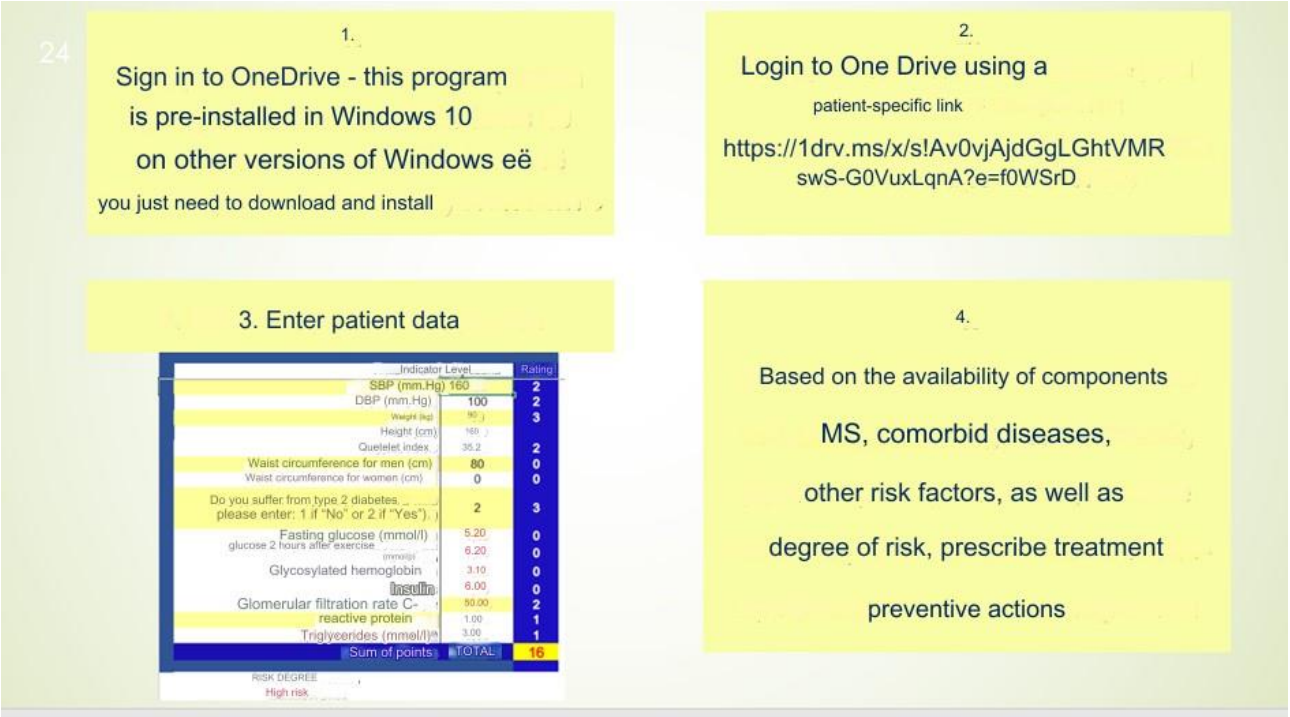
For his part, the patient must also work with the program. The patient's step-by-step actions consist in following the doctor's recommendations and recording the results of prevention in a timely manner (see Figure 6.3.).



Rice. 6.3. Algorithm for using the program on the part of the patient

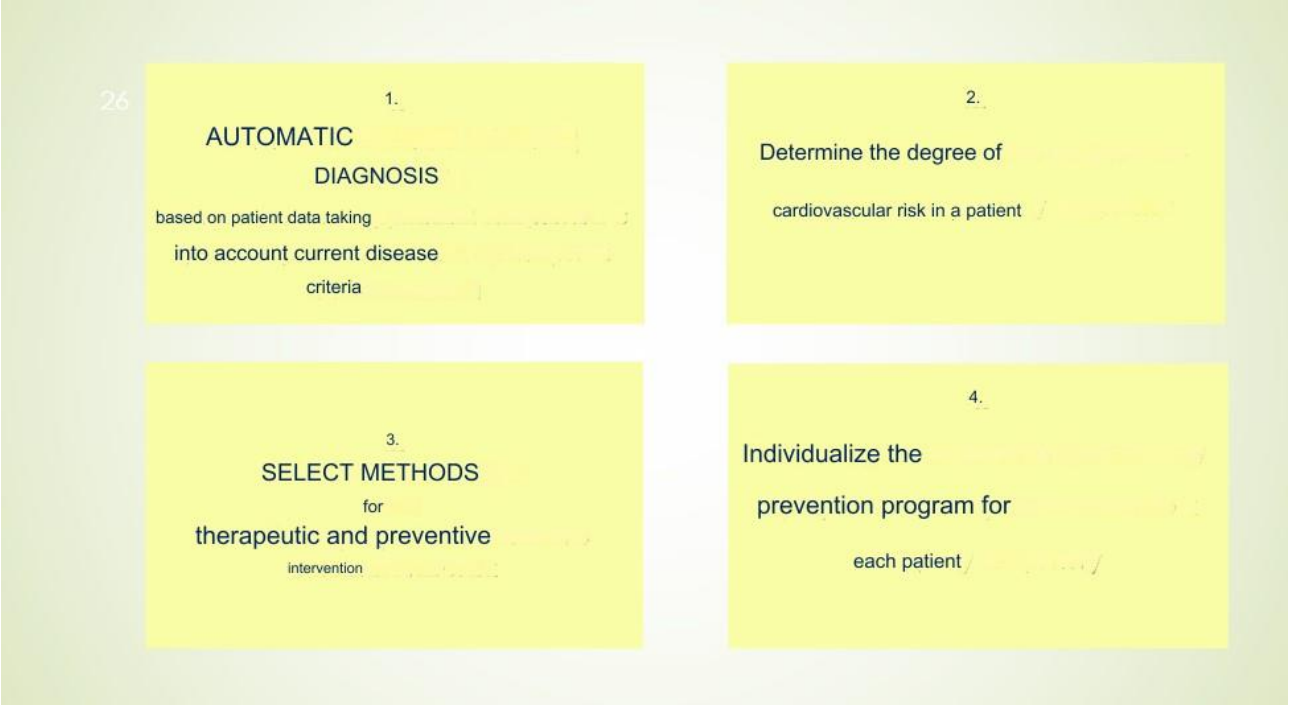
According to the results of this part of the work, it can be concluded that prevention methods should be aimed at reliably reducing the level of the main components of metabolic syndrome, i.e. risk factors for cardiovascular diseases, reducing the frequency of the main components of this syndrome, reducing the risk of comorbid diseases, as well as increasing patients' adherence to a healthy lifestyle.

Below are the steps to use the program to determine the risk and identify the main components of metabolic syndrome (see Figure 6.4.). These 4 steps allow the doctor to start the program, fill in the basic information, assess the degree of risk and the presence of risk factors and diseases, taking into account their severity.



Rice. 6.4. Step-by-step algorithm of doctor's actions at the stage of formation prevention programs.

At the next stage, the preventive intervention program itself is implemented (see Figure 6.5.). At this stage, the doctor makes a diagnosis, determines the degree of risk, and chooses methods



Rice. 6.5. Step-by-step actions of the doctor on the prevention program.

intervention and prescribe individual preventive measures.

Below is a link for a trial entry, familiarization, and evaluation of the Metabolic Syndrome Remote Prevention Program: https://1drv.ms/x/s!Av0vjAjdGgLGhtVMRswS-G0VuxLqnA?e=f0WSrD

The method of assessing the optimization of the prevention of metabolic syndrome components in outpatient settings through the introduction of an innovative program in primary health care institutions will improve the early detection and systematization of key components of metabolic syndrome. Non-drug prevention and treatment of metabolic syndrome expands the possibilities of changing lifestyle by involving family members in the treatment and prevention process.

The practical use of the innovative prevention program provides a methodological basis for the development of individual prevention strategies for patients with metabolic syndrome and its main components.

CONCLUSION

Over the past decades, there has been a steady increase in the number of patients with chronic non-communicable diseases. At the same time, the largest part of these diseases are cardiovascular and oncological diseases. Most often, various risks arise from these diseases, such as myocardial infarction, cerebral stroke, acute renal failure, as well as other complications. They raise the issue of the need to develop new, effective and cost-effective methods of combating these diseases.

In Uzbekistan, public health protection is one of the priority areas of State activity. In 2018, by the Decree of the President of the Republic of Uzbekistan, the country began large-scale work on early detection, prevention and treatment of chronic non-communicable diseases. At the same time, it should be noted that in order to successfully combat various diseases, it is necessary to have accurate data on the prevalence of not only the diseases themselves, but also their risk factors.

When considering risk factors, special attention should be paid to the fact that this category includes not only such generally accepted factors as overweight, hyperglycemia, blood pressure and other traditional risk factors, but also such components of the pathology as an improper lifestyle, violations of the daily and work regimen, errors in cooking and eating regimen, the state of the nervous and mental status. At the same time, it should be borne in mind that risk factors also include some socio-demographic characteristics of the population. These include factors such as age, gender, marital status, living conditions, as well as environmental factors.

In connection with the above, in the Bukhara region, in particular in the city of Bukhara, the epidemiology analogy of some non-communicable diseases and the comma, first of all, metabolic syndrome, was studied. The choice of metabolic syndrome and its main components was due to the fact that in this syndrome, as well as in the presence of its main components, there is not only a high prevalence of various non-communicable diseases, but also a high disability and mortality of the population.

Studies have shown that there is a high prevalence of hypertension in the unorganized population. Even among women, a high prevalence of arterial hypertension was revealed, amounting to more than 20%. Comparison of these data with similar indicators in other countries indicates that in the Bukhara population the prevalence of arterial hypertension among women is significantly higher than in similar populations in Russia. According to the data obtained, the prevalence of hypertension among the female population turned out to be quite high. The overall prevalence of hypertension among women was 20.54%. Thus, every fifth woman aged 20 to 69 years suffers from high blood pressure.

Another component of metabolic syndrome is increased body weight, which occurs in about two out of 5 women. At the same time, every 5th woman is overweight, and a little less than 20% of women are obese of varying degrees of severity. These data, to a certain extent, are consistent with the results of epidemiological studies in Russia. However, the prevalence of obesity among the population of Russia is slightly higher than in the city of Bukhara.

In our study, an interesting fact has been established: the increase in overweight and obesity cases begins after 20 years, and the greatest place is found in people after 30 years. who have reached the age of thirty and above. Then, in the 5th decade, the frequency of increased body weight does not increase significantly. However, in subsequent age periods, the incidence of overweight and obesity increases again. The results obtained by us are slightly different from the data of previous epidemiological studies conducted in Uzbekistan. The prevalence of overweight and obesity among the population of Bukhara was slightly lower than similar indicators among the population of the city of Tashkent (Narzikulova S.P., 2008).

Over the past decades, abdominal obesity has become more important as a risk factor for cardiovascular and other diseases. This type of obesity claims to be one of the triggers for the development of many diseases, including endocrine. Such conclusions were made on the basis of studies that proved the role of abdominal

obesity in the formation of insulin resistance. Abdominal obesity among the population of the city of Bukhara was found in more than 40%.

Diabetes mellitus is a key risk factor for the formation of many diseases. At the same time, the data accumulated to date allow us to believe that such a category of hyperglycemia as impaired glucose tolerance is also a risk factor for a number of diseases, including heart and vascular disease. The results of our study indicate that the population of the city of Bukhara has a high prevalence of both diabetes mellitus and impaired glucose tolerance. Hyperglycemic conditions among the unorganized population of the city of Bukhara are more than 25%. Moreover, every 5th resident of Bukhara suffers from latent diabetes, and more than 5% of the population has obvious diabetes mellitus. It should be noted that cases of hyperglycemia occur already in persons 20-30 years old. At the same time, the incidence of hyperglycemia consistently increases with age, but in the 5th and 6th decades this pathology is somewhat less common. We can explain this fact by the fact that after 50 years, firstly, there is an intensive withdrawal from the population due to premature death, as well as by the fact that the elderly are more likely to follow medical recommendations.

From the data presented, it follows that among the unorganized population of Bukhara, there is a high prevalence of the main components of metabolic syndrome. At the same time, it should be noted that the frequency of these components maintains a steady tendency to increase. Therefore, the issue of preventing metabolic syndrome among the population, as well as secondary prevention in order to prevent the development and aggravation of this syndrome, is acute.

Modern human life and activities are in many ways different from the way people behaved, worked, and communicated in previous decades. The peculiarity is that digital information technologies penetrate almost all spheres of our life. Given the significant labor intensity, long-term work with the patient, including the issues of primary prevention, detection of diseases, their treatment, as well as secondary and tertiary prevention, indicate the need to develop new methods and technologies for the implementation of the above measures.

The initial examination of the patient, the phenomenon of risk factors and the implementation of primary prevention can be greatly facilitated by the use of non-invasive research methods. One of the ancient and effective, as well as low-cost methods is the survey method. In relation to the modern world, it is appropriate to note that the use of the surveyed methods in combination with information and communication technologies makes it possible to quickly, and most importantly, in a form convenient for the patient and the doctor, to conduct primary screening limited to questions and answers by incoming voice calls

In this study, generally accepted questionnaires were used, which are used to detect cardiovascular pathology, as well as a domestic questionnaire to detect impaired glucose tolerance (Kayumov U.K., 1983).

It should be noted that the above data are the result of studies that began in 2005. At stage 1, population studies were checked, which are represented by the prevalence of various diseases of the unorganized population of the city of Bukhara. After 15 years, a second study was carried out, taking into account the methodology of the first study. This made it possible to draw certain parallels between the situation that has developed to date. The revealed dynamics of the main components of the metabolic syndrome allows us to assume that in the unorganized population of the urban population there is a constant increase in the number of patients with arterial hypertension, obesity, dyslipidemia, as well as hyperglycemic states.

At the 2nd stage of the study, an attempt was made to develop and implement modern methods of prevention. In particular, a digital program has been developed for assessing, determining the severity and carrying out preventive measures using remote digital technologies.

The results of the study allow us to recommend the widespread introduction of remote digital methods for diagnosing, assessing the condition and preventing metabolic syndrome in practical healthcare.

The introduction of these technologies makes it possible to optimize preventive measures, and, as a result, to achieve an economic, as well as medical and social effect.

When implementing the proposed digital prevention program, modern criteria for diagnosing various diseases should be used, including remote survey methods. At the same time, it should be borne in mind that the doctor and the patient must have access to the Internet, as well as a smartphone with a touch screen.

A significant economic effect is achieved by saving time, transport costs, as well as quick decision-making. On the other hand, the use of this digital program creates significant convenience for the patient and, in addition, allows the doctor and the patient to be in constant contact.

According to the results of the study, among the population there is an inadequate assessment of the state of their own health, untimely visit to a doctor, as well as insufficient compliance by patients with the recommendations of the attending physician. This situation indicates the need to develop new approaches to the prevention of metabolic syndrome, taking into account information support, as well as methods of communicating it to the patient.

Based on the above, it becomes obvious that the use of remote methods of communication with the patient in practical health care in order to identify and prevent Miss Sobolev syndrome and its main components is an urgent problem that needs to be solved.

In this regard, a digital program for the diagnosis and prevention of metabolic syndrome was developed in this study. According to the results of the study, it allows for primary screening, limited to survey research methods, among the unorganized population. At the same time, the program allows you to fill in risk assessment tables with laboratory and instrumental data from both the doctor and the patient.

The use of this program allows you to monitor the patient's condition remotely. If necessary, and in accordance with the medical examination program, the doctor conducts a face-to-face reception of the patient. At the same time, between these face-to-face appointments, the doctor-patient communication continues through the method of online communication and by evaluating the experience data located in the cloud storage. At the same time, the doctor has the opportunity to quickly respond to changes in the patient's condition and make appropriate adjustments to the prevention

and treatment program. Below is a link for trial entry and evaluation of remote prevention of metabolic syndrome work.

https://1drv.ms/x/s!Av0vjAjdGgLGhtVMRswS-G0VuxLqnA?e=f0WSrD

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