BIO Web of Conferences **121**, 04012 (2024) https://doi.org/10.1051/bioconf/202412104012
GLSBIA 2024

Awareness of patients with metabolic syndrome about the role of the main components of this syndrome, their application to doctors and following recommendations

Matluba Badritdinova*, *Shakhodat* Nurilloeva, *Dilshod* Naimov, *Farkhod* Yazmuradov, and *Muniskhon* Atoeva

Bukhara State Medical Institute n. a. Abu Ali ibn Sino, Bukhara, Uzbekistan

Abstract. Development of proposals and recommendations for reducing the risks of metabolic syndrome among the population based on multicomponent analysis and development of an innovative program for non-drug treatment and prevention of metabolic syndrome, including a software product. The survey was conducted among the unorganized population of the city of Bukhara. At the same time, to study the dynamics of distribution and levels of the main components of MS, 2 groups of people were examined. The first group - 797 people were examined in 2006 (materials of a population study of the inhabitants of Bukhara). After 15 years, 702 more people were examined under the same program (with additions). Both times, the research program included the identification of the main components of MS. 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 frequency of arterial hypertension and overweight among the category of patients who consider increased weight to be an insignificant risk factor, and in other cases, which are not a risk factor for cardiovascular diseases, indicates an urgent need to increase public awareness of risk factors. There is a lack of public awareness about the metabolic syndrome, its main components and the harm they cause to health. At the same time, the attitude of the population to their health and the fulfillment of the corresponding prescriptions of doctors require the development of new methods and methods for primary and secondary prevention. There is a direct relationship to patient awareness of an objective assessment of health status, and on the other hand, to the state of the main metabolic ingredients. The most inadequate attitude takes place among young people.

* Corresponding author: badritdinova17@mail.ru

1 Introduction

It should be noted that the significance 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 in order to create and adequately implement prevention programs. For MS, this means identifying and tracking its key components. MS and its main components need to be studied in each region and each population [7, 10, 23]. This is due to the fact that that factors such as lifestyle, ecology, nutrition, and genetic and behavioral characteristics of the population are of great importance in diagnosing metabolic syndrome and many other diseases. The main priorities of WHO's activities are to preserve and improve the health of the world's population. The current health status of the population is mainly related to noncommunicable diseases. In this series, the high prevalence of metabolic syndrome should be noted. The overall prevalence of MS in different countries ranges from 67% to 35-56% [30-36].

To make a diagnosis of metabolic syndrome, it is enough that the patient has 3 of these 5 signs. At the same time, in scientific research, 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, which is the insulin resistance index [5-7]. 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 other: in other areas of medicine, we mean surgical diseases, extragenital diseases, including in 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. Taking into account 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 for both the state and the patient [14-19]. It should also be noted that metabolic syndrome also causes social damage, since many patients develop disabilities and their quality of life is significantly reduced [20]. In assessing the significance of a disease or syndrome as a health problem, one of the criteria is prevalence. According to current data obtained from numerous population studies, the incidence of metabolic syndrome on average in the world is more than 30-35%. Moreover, this figure increases as the population ages. Some studies conducted in Australia, North America, and other countries, among others, suggest that the incidence or, say, prevalence of metabolic syndrome may be as high as 60% [17-19]. In Australia, for example, an epidemiology study found that the prevalence of metabolic syndrome in that country was 64.2 per cent of the population. Another important problem of metabolic syndrome is the constant, steadily increasing increase in the number of patients with this pathology. Of particular importance is the fact that every year there is an increase in the incidence of MS among young people, as well as among children and adolescents [14-16]. 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 the metabolic syndrome as a whole and its main components, special attention should be paid to the prevention of this syndrome. This is due to the fact that preventive measures include, first of all, lifestyle changes, the formation of a healthy lifestyle, dietary restrictions, increased physical activity, and some other points that completely depend on how competently, accurately, and regularly the patient fulfills the doctor's prescription [10-13].

Today, metabolic syndrome (MS) is one of the most important problems of modern healthcare. This is due to the high prevalence of MS, the high number of complications caused by the disease, and the high disability and mortality associated with high blood pressure. The prevalence of MS varies significantly by region, age, gender, etc. According to the World Health Organization (WHO), about 20% of the world's adult population suffers from MS. The formation of MS is influenced by such risk factors as nervous and mental strain, physical inactivity, hyperlipidemia, smoking, alcohol abuse, dietary errors, etc. At present, significant experience has been accumulated in the treatment of the main components of Met C (obesity, arterial hypertension, diabetes mellitus and hyperlipidemia). However, they remain at the level of the methods of the last century. Meanwhile, the development and implementation of modern IT technologies in the process of disease prevention is of great importance.

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 against cardiovascular diseases [23-29]. Preventive programs implemented in production teams have made it possible to increase the effectiveness of drug control of arterial hypertension by 7 times, reduce the incidence of arterial hypertension by 10%, and up to 25% of men quit smoking [4]. Multifactorial prophylaxis is generally effective in both men and women [5]. However, it should be noted that the effectiveness of prevention of hypertension and smoking was more pronounced among men than among women. Among men aged 30-59 years in Samarkand, the incidence of CHD with normal BP was 3.4%, with borderline hypertension – 7.5%, and with hypertension – 16.7%, respectively [6].

A certain importance in the development of CHD is given to excess body weight (BMI). Most researchers note that the incidence of BMI is higher among those engaged in mental work than among people engaged in manual labor. Among individuals with BMI suffering from coronary artery disease, 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 [7]. CHD patients with BMI have low tolerance to physical activity and lower efficiency of the cardiovascular system [8-14]. It should be noted that impaired central and peripheral hemodynamics is considered one of the important risk factors for death from cardiovascular diseases [9,10]. When comparing such RFs as hypertension, overweight, smoking, and impaired glucose tolerance (IGT), it turned out that the most unfavorable factor is hypertension, since mortality from CHD among people with high blood pressure is 7 times higher than at normal pressure, which is significantly higher than with other RFs. In the presence of hypertension due to SBP, the risk of death from CVD increases by 5 times, due to DBP by 3 times. In this study, it was shown that the risk of cerebral stroke increases more intensively with an increase in blood pressure [10-13]. 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. According to 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 on the importance of IGT as a RF for the development of CHD and mortality from it.

The purpose of the study: To develop proposals and recommendations for reducing the risks of metabolic syndrome among the population based on a multicomponent analysis and to develop an innovative program for the non-drug treatment and prevention of metabolic syndrome, including a software product.

2 Material and methods

The survey was conducted among the unorganized population of the city of Bukhara. At the same time, 2 groups of people were examined to study the dynamics of the distribution and levels of the main components of MS. The first group - 797 people - were examined in 2006 (materials of a population study of Bukhara residents). 15 years later, another 702 people were examined under the same program (with additions). In both cases, the study program identified the main components of MS. The research methods were as follows: 1. Survey using a special questionnaire. 2. Instrumental methods: blood pressure measurement, ECG, anthropometry (height and weight to calculate the Quetelet index), waist circumference. 3. Biochemical studies: lipid content: cholesterol, triglycerides, α-cholesterol, fasting blood glucose, as well as 75 grams of glucose, glycosylated hemoglobin, immunoreactive insulin (the HOMA-IR index was calculated according to the formula fasting serum insulin (μU/ml)/fasting plasma glucose (mmol/l)/22.5). 4. Statistical processing was carried out with the help of MedCalc software (https://www.medc alc.org). Intensive and average values, mean values of quantitative variables, as well as their standard deviations (M+δ or M+SD) 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.

3 Results and discussion

Health and illness are a state of equilibrium. Modern methods of treatment should be aimed at changing the patient's attitude to the state of his health. Impaired self-esteem, including the assessment of one's own health, makes its own adjustments to the catamnesis. Therefore, in order to assess the possibility of increasing the effectiveness of information influence on attitudes to health, a study was conducted among 698 patients, In the course of 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.

According to the data obtained (Table 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 go to the doctor, when their health deteriorates, 62.2% go only if they feel very bad, and 2% of patients do not go to the doctor even if they feel bad; 4.7% of the surveyed considered themselves healthy and therefore did not seek medical help, and 0.6% found it difficult to answer.

Table 1. Incidence of arterial hypertension among individuals with different referrals to doctors.

Going to the doctor	AG is available	AG no	Altogether
Always	164 77,0% RT 30,6% CT 23,5% GT	49 23,0% RT 30,2% CT 7,0% GT	213 (30,5%)
Only if you feel very unwell	329 75,8% RT 61,4% CT 47,1% GT	105 24,2% RT 64,8% CT 15,0% GT	434 (62,2%)
I don't turn to me, even when I'm sick	6 42,9% RT 1,1% CT 0,9% GT	8 57,1% RT 4,9% CT 1,1% GT	14 (2,0%)

Continuation of Table 1.

Never got sick	33 100,0% RT 6,2% CT 4,7% GT	0 0,0% RT 0,0% CT 0,0% GT	33 (4,7%)
It's hard to say	4 100,0% RT 0,7% CT 0,6% GT	0 0,0% RT 0,0% CT 0,0% GT	4 (0,6%)
It's hard to say	**536 (76,8%)**	**162 (23,2%)**	**698**
Chi-square	20,469		
DF	4		
Significance level	P = 0,0004		

Note: RT is the horizontal frequency of the indicator; CT – 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 go to doctors suffer from arterial hypertension. At the same time, only 30.6% of all patients suffering from hypertension (536 people) always consult doctors. Among the patients who turned to doctors with very poor health, 75.8% of patients with hypertension were identified. At the same time, among the total number of hypertensive patients, 61.4% consult doctors only when their health deteriorates significantly. An interesting fact was established: all (100%) of the people who had never consulted a doctor suffered from hypertension (Table 2).

Table 2. Incidence of BMI and obesity among individuals with different referrals 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 turn to me, 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
Never got sick	0 0,0% RT 0,0% CT	7 21,2% RT 2,8% CT	26 78,8% RT 9,0% CT
It's hard to say	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 of the indicator; CT – vertical frequency of the indicator; *- means reliable relative to the normal weight group.

Among people who went to the doctor 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

consult 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 had a BMI.

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

Table 3. Incidence of hypertension in patients who assess differently cardiovascular risk from hypertension.

Evaluation	AG is available	AG no	Altogether
Greatly increases	273 77,6% *	79 22,4%	352 (51,0%)
Doesn't increase much	157 78,9% *	42 21,1%	199 (28,8%)
Does not increase	69 88,5%	9 11,5%	78 (11,3%)
The risk of mortality depends mainly on other causes	39 63,9% *	22 36,1%	61 (8,8%)
Total	538 (78,0%)	152 (22,0%)	690
Chi-square	12,129		
DF	3		
Significance level	P = 0,0070		

Note: *- denotes significant differences between groups with hypertension

At the same time, almost the same number of those 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 a risk factor (88.5%). Of particular note is the fact that among those who believed that "the risk of mortality depends mainly on other causes", the incidence of hypertension was 63.9%.

A study of public awareness of the relationship between BMI and obesity and complications of CVD, in particular myocardial infarction and cerebral stroke, also revealed an unfavorable situation (Table 4). It turned out that only 26.2% of those surveyed with normal weight considered BMI and obesity to be an important risk factor for CVD.

Table 4. Incidence of BMI and Obesity in Patients Who Assess Differently cardiovascular risk from hypertension.

Evaluation	Norm	BMI	Obesity	Altogether
Greatly increases	66 26,2%	72 28,6%	114 45,2% *	252 (36,5%)
Doesn't increase much	36 24,7%	55 37,7%	55 37,7%	146 (21,2%)
Does not increase	25 16,2%	62 40,3% *	67 43,5% *	154 (22,3%)
The risk of mortality depends mainly on other causes	27 19,7%	65 47,4% *	45 32,8% *	137 (19,9%)
Total	154 (22,3%)	255 (37,0%)	281 (40,7%)	690
Chi-square	20,052			

Continuation of Table 4.

DF	8
Significance level	P = 0,0101

Note: *- denotes 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 believed that "the risk of mortality depends primarily on other causes", the incidence of BMI was 47.4%, and obesity was 32.8%.

Thus, the presented data showed that among the studied groups there is a significant underestimation of arterial hypertension, as well as overweight and obesity as risk factors for cardiovascular diseases. The category of patients who consider weight gain to be an insignificant risk factor, and in other cases a risk factor for cardiovascular diseases, shows the need to increase public awareness of risk factors.

At the same time, an urgent issue today is to increase the adherence of patients to contact doctors and comply with medical recommendations. It is necessary to develop modern methods of working with patients aimed at increasing the number of patients visiting doctors. At the same time, preventive programmes should be developed to reduce the incidence and levels of the main components of metabolic syndrome.

This program was developed by U.K. Kayumov 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 has modified it for this dissertation. A general view of the program for calculating cardiovascular risk in metabolic syndrome and an example of calculating the number of points is presented below (Figure 1).

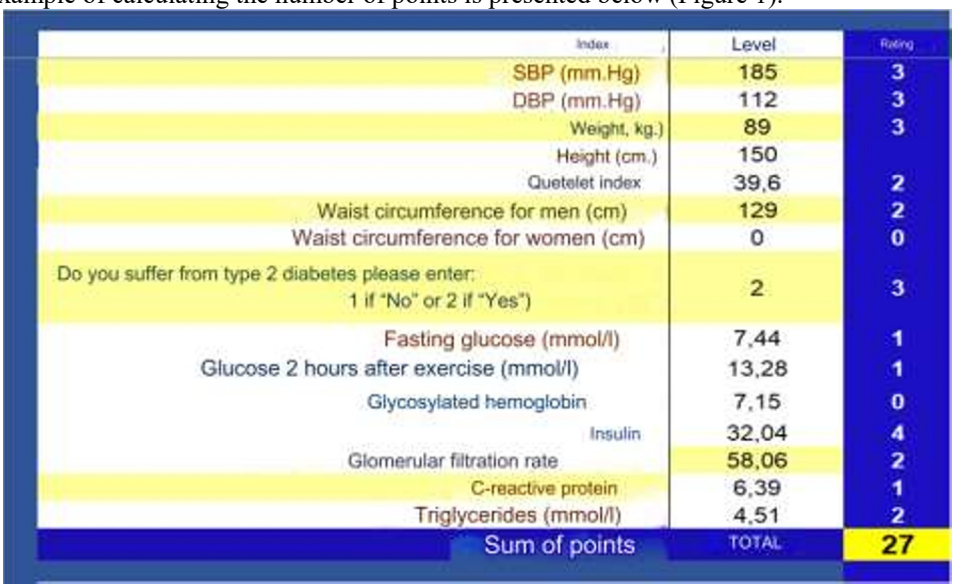

Fig. 1. Example of calculating the rating of points for each attribute.

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

A score of more than 18 indicates high risk.

The presented program is part of the overall 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 to the patient. And taking into account the significant comorbidity and the presence of concomitant diseases, the entire economic and material effectiveness of this program becomes clear.

The following algorithm for the prevention of MS is proposed

Methodology of Cardiovascular Disease Prevention

Stage 1 – Risk Factor Assessment.

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

Low Risk:

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

Medium risk:

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

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

High Risk:

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

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

Stage 3 – Dispensary observation.

The Digital Program for the Diagnosis and Prevention of Metabolic Syndrome is a program for the diagnosis, monitoring and prevention of metabolic syndrome. To assess the patient's condition and for the purpose of monitoring indicators and prevention, a digital risk assessment model has been developed. This program uses the CVD risk assessment principle. The created program expanded the diagnostic capabilities of the prototype and added a preventive part to it. The program with patient data is located in Cloud. With the help of the Internet, it can be accessed by both the doctor and the patient, regardless of their location and time of day. The program can run on a computer, tablet and smartphone. This program allows you to carry out most of the 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 exchanging information. This, in turn, contributes to better collaboration.

Below are the step-by-step steps of the doctor when working with the program (Figure 2).

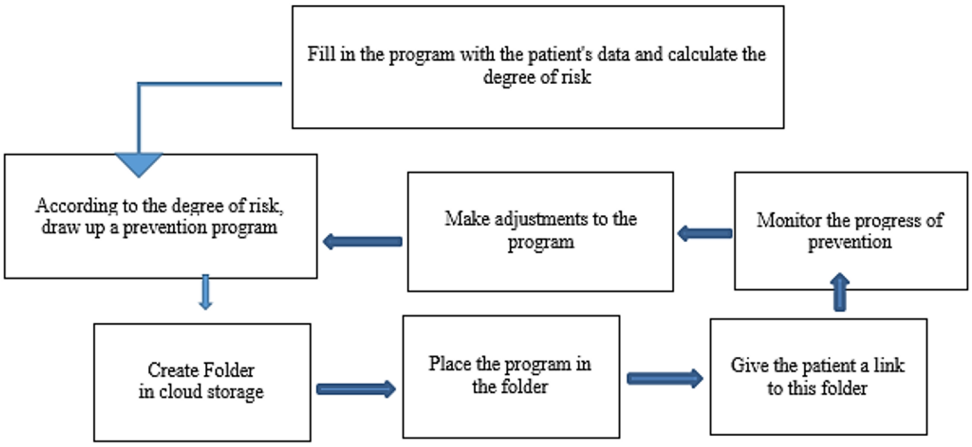

Fig. 2. Algorithm for creating and using the program on the part of the doctor.

For their part, the patient must also work with the program. Step-by-step actions of the patient consist in following the doctor's recommendations and timely recording the results of prevention (Figure 3).

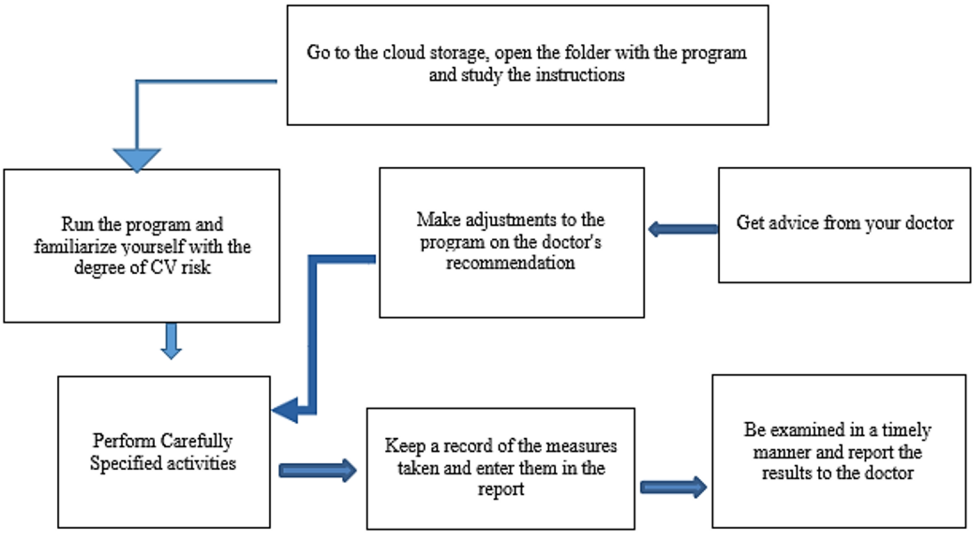

Fig. 3. Algorithm of the patient's use of the program.

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

Below are the steps to work with the program to determine the degree of risk and identify the main components of metabolic syndrome (Figure 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.

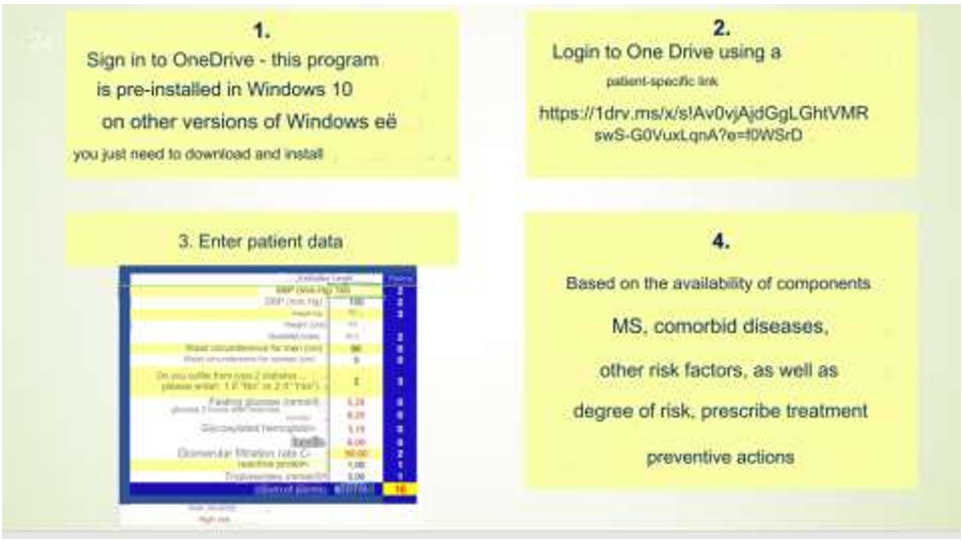

Fig. 4. Step-by-step algorithm of the doctor's actions at the stage of forming a prevention program.

At the next stage, the preventive intervention program itself is implemented (Figure 5). At this stage, the doctor makes a diagnosis, determines the degree of risk, and chooses methods interventions and prescribe individual preventive measures.

Fig. 5. Step-by-step actions of the doctor on the prevention program.

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

A method for assessing the optimization of prevention of components of metabolic syndrome in an outpatient setting through the implementation of an innovative program in primary health care institutions will improve the early detection and systematization of key components of metabolic syndrome. Non-pharmacological prevention and treatment of

metabolic syndrome expands the possibilities of lifestyle changes by involving family members in the treatment and prevention process.

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

4 Conclusion

There is a lack of awareness of the population about metabolic syndrome, its main components and the harm they cause to health. At the same time, the attitude of the population to their health and their compliance with the relevant prescriptions of doctors requires the development of new methods and methods of primary and secondary prevention. On the one hand, between patients' awareness of metabolic syndrome and their objective assessment of their health status, and the state of their main There is a direct correlation between the components of metabolic syndrome. The most inadequate treatment is among young people.

References

1. O. S. Akmalovna, B. M. Najmidinovna, NeuroQuantology **20(8)**, 4954 (2022)
2. M. N. Badritdinova, G. K. Razhabova, S. M. Akhmedova, G. I. Akhmedova, International Journal of Current Research and Review **12(24)**, 146-150 (2020)
3. M. N. Badritdinova, G. K. Razhabova, S. M. Akhmedova, G. I. Akhmedova, International Journal of Current Research and Review **12(24)**, 146-150 (2020)
4. A. G. Bozorov, G. A. Ikhtiyarova, S. S. Davlatov, International Journal of Pharmaceutical Research **12**, 4894–4897 (2020)
5. K. M. Daminova, R. Z. Matmurodov, D. T. Akramova, G. Khamdamova, G. Turayeva, M. K. Abdullayeva, N. T. Tilabov, “Evaluation of prodromal stage biomarkers in parkinson's disease and their role in disease progression use of modern digital technologies”, in *ACM International Conference Proceeding Series* (2022)
6. S. S. Davlatov, B. Z. Khamdamov, Sh. J. Teshaev, Journal of Natural Remedies. **22(1(2))**, 147-156 (2021)
7. S. Davlatov, K. Rakhmanov, N. Qurbonov, I. Vafayeva, D. Abduraxmanov International Journal of Pharmaceutical Research **12**, 1931-1939 (2020)
8. S. Davlatov, K. Rakhmanov, S. Usarov, F. Yuldoshev, U. Xudaynazarov, J. Tuxtayev, International Journal of Pharmaceutical Research **12**, 1912-1921 (2020)
9. S. Davlatov, Sh. Teshayev, X. Fayziev, N. Khamidova, International Journal of Pharmaceutical Research **13**, 970-976 (2020)
10. F. Nurutdinova, Z. Tuksanova, Y. Rasulova, E3S Web of Conferences 474, 01002 (2024)
11. S. Kamalova, S. Teshaev, D. A. Khasanova, Russian Journal of Operative Surgery and Clinical Anatomy **5(2)**, 26–31 (2021)
12. M. N. Khalimovich et al., Journal of Advanced Zoology **44** (2023)
13. S. S. Davlatov, B. Z. Khamdamov, Sh. J. Teshaev, Journal of Natural Remedies. **22(1(2))**, 147-156 (2021)
14. Y. N. Majidova, D. K. Khaidarova, D. T. Khojaeva, Uspekhi Gerontologii **33(3)**, 496-500 (2020)

15. N. Kh. Mavlonov, D. E. Tursunova, Sh. N. Nurilloeva, D. K. Naimov Journal of Advanced Zoology **44(S6)**, 342–346 (2023)
16. F. Oripov, S. Blinova, T. Dekhkanov, S. Davlatov, International Journal of Pharmaceutical Research **13(1)**, 299-301 (2020)
17. F. S. Oripova, G. A. Ikhtiyarova, K. Shukurlaev, M. T. Khamdamova, Annals of the Romanian Society for Cell Biology **25(4)**, 1865-1872 (2021)
18. F. Sh. Oripova, G. A. Ikhtiyarova, S. S. Davlatov, International Journal of Pharmaceutical Research **13(1)**, 761-765 (2021)
19. N. A. Qurbonov, S. S. Davlatov, K. E. Rakhmanov, A. F. Zayniyev, Annals of the Romanian Society for Cell Biology **25(4)**, 1927-1932 (2021)
20. K. E. Rakhmanov, S. S. Davlatov, D. Sh. Abduraxmanov, International Journal of Pharmaceutical Research **13**, 4044- 4049 (2020)
21. D. B. Rakhmatova, O. N. Khusenov, A. U. Soliev, N. S. Nurova, Journal of Advanced Zoology **44(S6)**, 326–328 (2023)
22. M. Sanoeva, S. Farruh, I. Amrillo, M. Gulova, M. Avezova, Journal of Critical Reviews **7(3)**, 425-430 (2020)
23. M. J. Sanoeva, Journal of Pharmaceutical Negative Results **13** (2022)
24. A. M. Shamsiev, Zh. A. Shamsiev, K. E. Rakhmanov, S. S. Davlatov, Experimental and Clinical Gastroenterology **174(5)**, 72-77 (2020)
25. A. N. Sharipovna, E. B. Bakhodirovich, N. H. Otaevna, S. G. Avazkhonovna, International Journal of Current Research and Review **13(2)**, 13-17 (2021)
26. A. N. Sharipovna, S. G. Tulkinzhanovna, M. M. Hayatovna, G. N. Odiljonovna, International Journal of Current Research and Review **13(2)**, 127-131 (2021)
27. A. N. Sharipovna, E. B. Bakhodirovich, N. H. Otaevna, S. G. Avazkhonovna, International Journal of Current Research and Review **13(2)** (2021)
28. M. S. Tairov et al., Journal of Advanced Zoology **44** (2023)
29. M. Sh. Tairov, Kh. I. Juraeva, K. Sh. Djumaev, G. Kh. Radjabova, Journal of Advanced Zoology **44(S6)**, 337–341 (2023)
30. S. J. Teshaev, R. R. Baymuradov, N. K. Khamidova, D. A. Khasanova, International Journal of Pharmaceutical Research **12(3)** (2020)
31. S. Z. Teshaev, D. A. Khasanova, Russian Journal of Operative Surgery and Clinical Anatomy **3(2)**, 19–24 (2019)
32. S. Z. Teshaev, D. A. Khasanova, Russian Journal of Operative Surgery and Clinical Anatomy **4(1)**, 41–45 (2020)
33. Sh. Zh. Teshaev, R. R. Baimuradov, Russian Journal of Operative Surgery and Clinical Anatomy **4(2)**, 22–26 (2020)
34. S. J. Teshayev, D. K. Khudoyberdiyev, S. S. Davlatov, International Journal of Pharmaceutical Research **13(1)**, 679-682 (2021)
35. S. V. Yanchenko, A. V. Malyshev, S. Zh. Teshaev, L. M. Petrosyan, S. Sh. Ramazonova, Oftalmologiya **20(4)**, 772–779 (2023)
36. S. V. Yanchenko, A. V. Malyshev, Sh. Zh. Teshaev, R. R. Boboeva, G. B. Juraeva, Oftalmologiya **20(4)**, 780–786 (2023)