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Increasing Physical Activity in Metabolic Syndrome

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Abstract: Components of metabolic syndrome are highly prevalent among the disorganized population. Preventive technologies used in modern medicine are not fully effective in eliminating metabolic syndrome and its components. The active involvement of modern achievements of preventive medicine in local medicine makes it possible to fully implement the prevention of components of the metabolic syndrome in patients.

In an organized and unorganized group of patients with components of the metabolic syndrome, taking into account the composition of the daily diet, recommending fats, carbohydrates, proteins, taking into account energy consumption, increases the possibility of effective prevention in patients. Calculation of the basal metabolic rate in patients and correction of the diet taking into account the coefficient of physical activity increase the effectiveness of preventive measures. This makes it possible to increase physical activity based on recommendations that take into account the individual characteristics of patients.

Keywords: physical inactivity, excess body weight, impaired glucose tolerance, individual energy consumption.

Relevance. Metabolic syndrome is a concept that combines a number of cardiovascular risk factors, in particular: arterial hypertension, abdominal obesity, dyslipidemia and insulin resistance. The criteria for the diagnosis of “metabolic syndrome” are the presence of three or more risk factors in the patient. Metabolic syndrome leads to an increase in visceral fat mass and a decrease in the sensitivity of peripheral tissues to insulin. This condition, in turn , leads to disorders of carbohydrate, lipid, purine metabolism and arterial hypertension [1,2,3,5].

According to American researchers, the prevalence of metabolic syndrome is 23.7%. The risk of death from coronary heart disease increases 4 times in men with metabolic syndrome. The risk of cerebrovascular disease and death from all causes increases by 2 times. In women, metabolic syndrome is accompanied by an increased risk of developing coronary heart disease [11,12,13,17]. In addition, in individuals with metabolic syndrome, the incidence of diabetes mellitus increases 5-9 times. The incidence of metabolic syndrome is directly correlated with body mass index, and this condition has the same prevalence in both men and women [4,5,6,7].

The prevalence of metabolic syndrome is 22-25% in overweight people and 50-60% in obese people. Scientists predict that the number of patients with metabolic syndrome will increase in the coming years, and this will happen mainly due to obese people [14,15,16,18].

The age-related prevalence of metabolic syndrome has been clearly demonstrated: the prevalence is 7% in people aged 20-29 years and 40% in people over 60 years of age.

One of the important epidemiological trends is the general increase in the number of people with

metabolic syndrome. Accordingly, damage to the heart, blood vessels and kidneys increases. Along with hemodynamic disturbances, metabolic and humoral factors also play a key role in the occurrence of these injuries. Metabolic syndrome occurs due to lifestyle and genetic factors[4,5].

One of the main causes of metabolic syndrome, which is now recognized as an epidemic, is the consumption of foods containing many carbohydrates and a decrease in physical activity. There is currently no general understanding of the underlying causes of metabolic disorders. At the same time, tissue insulin resistance and compensatory hyperinsulinemia lead to impaired glucose tolerance and activation of the mechanisms of metabolic syndrome formation [6,7,8]. 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 various preventive methods to reduce risk factors. Currently, these programs are carried out in two directions: screening and prevention of type 2 diabetes and cardiovascular diseases. Increasing the level of education among people with metabolic syndrome problems, obese people, people with diabetes, etc. is associated with the need to improve the basic principles of prevention, especially among children and youth, socially significant healthy eating and physical activity.

Decreased physical activity is the second most important environmental factor after overeating, leading to obesity and insulin resistance. With physical inactivity, the process of lipolysis decreases , the utilization of Pri triglycerides in muscles and adipose tissue decreases, and the translocation of glucose transporters into muscles decreases , which in turn leads to insulin resistance [17,18]. Currently, these programs are carried out in two areas: screening and prevention of type 2 diabetes and cardiovascular diseases. Increasing the level of education among people with metabolic syndrome problems, obese people, people with diabetes, etc. is associated with the need to improve the basic principles of prevention, especially among children and youth, socially significant healthy eating and physical activity.

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Purpose of the study: to develop a method for regulating physical activity using a special algorithm in patients with components of the metabolic syndrome.

Materials and methods: research was conducted among indigenous peoples living in the Jondor, Peshkon and Romitan districts of the Bukhara region. The study identified 102 patients with components of the metabolic syndrome and determined their effectiveness using a special algorithm.

During the study, the following examination methods were used: determination of blood sugar, insulin, glycosylated hemoglobin, determination of body weight according to the Quetelet index, creatinine, clinical analysis of blood and urine, blood pressure, blood lipids, body composition.

All patients were comparable in age, gender, previous treatment and concomitant diseases. The age groups of patients included in the survey ranged from 20 to 80 years.

The group of people who did not participate in the study included those who were in the period of exacerbation of diseases of the gastrointestinal tract, those who had severe diseases of the cardiovascular system and endocrine system.

The composition and order of the patients' diet was calculated, during which: individual energy consumption was studied, daily calorie content was calculated;

When determining the daily requirement, the basic course is determined taking into account gender, age and body weight:

1. Calculation of basal metabolism:

Women 18–30 years old: 0.0621x actual body weight + 2.0357 kg.

31-60 years: 0.0342 x actual body weight kg + 3.5377

> 60 years: 0.0377 x actual body weight kg + 2.7545

Men 18-30 years old: 0.0630 x actual body weight kg + 2.8957.

31-60 years: 0.0484 x actual body weight kg + 3.6534

>60 years: 0.0491 x actual body weight kg + 2.4587

The result is multiplied by 240.

Calculation of total energy consumption taking into account physical activity:

The base exchange rate rate (No. 1) obtained from the formula is multiplied by a coefficient representing physical activity:

- ✓ 1.1 (low physical activity)
- ✓ 1.3 (moderate physical activity)
- ✓ 1.5 (high activity)

The result obtained represents the need for individual daily kilocalories, taking into account physical activity.

To reduce body weight without harming your health, it was recommended to reduce the calorie content of food by 500-600 kcal per day, that is, you need to subtract this amount from formula No. 2.

Example:

Woman, 35 years old, weight - 100 kg, work involves heavy physical activity.

1. 0.0342 x 100 kg + 3.5377

6.9577 x 240 = 1669.8 ~ 1670

2. 1670 x 1.5 = 2505 kcal

3. 2505 – 500 = 2005 kcal. Women 18–30 years old: 0.0621x actual body weight + 2.0357 kg.

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In order to gradually reduce body weight in pregnant women, daily caloric intake should not exceed 2005 kcal. The main source of energy - OILS should consist mainly of vegetable oils, since they are "relatively low-risk " and have considerable energy value. Fats should not make up less than 30% of the daily diet, animal fats - 10%, vegetable fats - 20%.

CARBOHYDRATES are the main source of energy for the body. It is necessary to pay special attention to the amount of carbohydrates in patients with diabetes; their amount should not exceed 50% of the daily diet.

PROTEINS are the main "building material" for all body tissues. The daily rate is 15-20%.

If patients did not want to count calories, they were advised to reduce the amount of fat. High-fat foods were replaced by low-calorie, low-fat foods. In patients, weight loss of 2-4 kg per month is considered harmless.

Patients were educated and collaboration between physician and patient was ensured. A diary was kept for each patient.

In addition, increasing physical activity was emphasized as a core part of the program. Aerobic exercise was recommended to optimize physical activity. These exercises are continuous, rhythmic training involving large muscle groups over an extended period of time.

Aerobic exercises used were walking, swimming, running, cycling, tennis, basketball and fitness. When choosing exercises, the individual interests, abilities and individual state of the patient's body were taken into account. Aerobic stress was controlled by monitoring the ratio of maximum heart rate (MHR)/maximum heart rate to normal during exercise. In the age group under study, this was done as follows: HR = 220 - (patient's age). According to the indicators, physical activity is low (30-50% HR), moderate activity (50-70% HR), intense physical activity (>70% HR). If the participant was able to talk comfortably during the exercise, the load was considered moderate. In order to prevent unpleasant reactions, the intensity and duration of physical activity in sedentary patients was gradually increased from 10-15 minutes a day (for example, walking) to 40-60 minutes.

Results of the study Subjects selected for the study were divided into two groups: study and control. The main group consisted of 50 patients, of which 31 (62%) were men, 19 (38%) women. There were 52 people in the control group, of which 30 (57.7%) were men and 22 (42.3%) women (Table 1). All those selected were involved in the trials and the results were analyzed.

Table 1. Distribution of patients by gender and age.

Group	Group distribution				General
	Main group n= 50 (20-80 years old)		Control group n= 5 2 (20-80 years old)		
	male	young woman	male	young woman	
I	3 1	1 9	thirty	22	102
General	50 (100%)		52 (100%)		102

During the examinations, the basic exchange rate was calculated for representatives of the main group and the level of physical activity of the patients was analyzed. After this, the representatives of this group underwent correction of energy expenditure according to the level of physical activity and normalization of the diet. Representatives of the control group continued the usual treatment measures. The daily diet of representatives of this group was regulated, and only their calorie ratio

was adjusted depending on the level of physical activity and no work was carried out to increase physical activity. (Table 2)

Table 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 components of metabolic syndrome
Group II Main group Patients with risk factors (n =50)	Standardization of the daily diet, adjustment to the level of physical activity and individual programs have been prepared.

The presence of metabolic syndrome components in the study group was analyzed. An analysis was carried out of the level of blood pressure, the presence of excess body weight in patients, diabetes mellitus, impaired glucose tolerance, hypercholesterolemia, hypertriglyceridemia, hyperlipidemia in representatives of these age groups and these data are presented below (Table 3).

Table 3. Distribution of metabolic syndrome components (%)

Syndrome components or risk factor	**Indicators n=102**	**P**
AG	17, 01	<0.05
BMI	18, 12	<0.05
diabetis	3.47	<0.05
ITG general	3 3 , 94	<0.05
ITG on an empty stomach after 1 hour	19, 02	<0.05
ITG on an empty stomach after 2 hours	8, 51	<0.05
ITG on an empty stomach after 1 and 2 hours	6, 41	> 0.05
HX	1 6 , 21	< 0.05
HTG	2 1 , 69	<0.05
G b-lip	1 9 , 07	<0.05
There is a general FR	6 4 , 02	<0.05

The results obtained showed a relatively even distribution of risk factors in patients; to a greater extent, only a general state of impaired glucose tolerance was observed, and therefore the level of HCB after a meal, 1 hour after a meal and 2 hours after a meal was also analyzed. The analysis showed that body mass index, especially BMI, significantly decreased. According to the literature, it is noted that this situation is observed due to changes in lifestyle.

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Various changes in the manifestations of hyperlipidemia were observed in patients. Among those examined in the study, significant amounts of GTG and GbLIP were detected. The characteristics of the average amount of lipids generally correspond to the dynamics of the distribution of hyperlipidemias.

The results showed an increase in blood pressure and hypertension as the population ages. An increase in both systolic and diastolic pressure was observed. It has also been observed that the number of risk factors increases with age.

After analyzing the prevalence of risk factors in patients, the daily diet was adjusted according to individual choice and level of physical activity. In addition, patients performed aerobic exercise according to the specified parameters.

In addition, the main meals received certain points: breakfast - 4 points, lunch - 2, dinner - 0. Midday breakfast - 2 points, and evening breakfast - only 1.

52 patients of the first group (control group) had risk factors for the development of metabolic syndrome and received traditional preventive measures.

The second group (main) consisted of 50 patients, in whom, along with traditional preventive measures, a special algorithm was used to increase the level of physical activity and correct the level of social activity based on energy consumption, and monitoring was also carried out. completed.

The results of patients in the control group were distributed as follows: no positive changes were noted in 31 out of 55, i.e. 56.4%. Adherence to a healthy lifestyle was noted in 24 patients in the control group, i.e. 43.6%.

In 47 out of 55 patients of the main group, i.e. 85.5%, along with traditional preventive measures, physical activity was corrected taking into account energy costs, and when using a special algorithm, the prevalence of MS components decreased. In 8 patients, that is, 14.5%, the change was not obvious, that is, these patients did not change their usual lifestyle, and the harmful effects of risk factors in these patients remained.

Results achieved as a result of the work carried out during the study:

1. Cardiovascular risk significantly decreased in 85.5% of patients.
2. By adapting physical activity to the daily diet, control of metabolic syndrome components improved in 94.2% of patients in the main group.
3. In 72.3% of patients who took part in the survey, it was possible to organize a healthy diet, plan the composition of products based on established standards and, as a result, gradually and gradually reduce body weight.
4. Individual diary keeping was achieved in each of 90.1% of patients during the examination. As a result, effective monitoring of patients' diet compliance was ensured.
5. Optimization of the level of physical activity in patients leading a healthy lifestyle through individual selection of physical exercises based on a study of the level of activity.

Conclusion

1. Components of metabolic syndrome are highly prevalent among the unorganized population.
2. Preventive technologies used in modern medicine are not fully effective in eliminating metabolic syndrome and its components.
3. Active involvement of modern achievements of preventive medicine in local medicine makes it possible to fully implement the prevention of components of the metabolic syndrome in patients.
4. In an organized and unorganized group of patients with components of the metabolic syndrome, taking into account the composition of the daily diet, recommending fats, carbohydrates, proteins, taking into account energy consumption , increases the possibility of effective prevention in patients.
5. Calculation of the basic metabolic rate in patients and correction of the diet taking into account the coefficient of physical activity increases the effectiveness of preventive measures.
6. Allows you to increase physical activity based on recommendations that take into account the individual characteristics of patients.

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