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Influence of Diet and Yoga Exercises on Body Mass and Physical Fitness

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ABSTRACT

Objectives: *Yoga is one of the alternatives that attract the attention of a large number of people in the hope of positive changesin health. The purpose of this study is to assess the influence of diet and yoga exercises on the body mass and various functional parameters.*

Methods: *Eleven subjects practicing yoga and 11 healthy, non-yoga participated in the study. Body composition was determined with Body Composition Analyzer, model IoI 353. The energy value of the usual diet is calculated through a simple food questionnaire. The assessment of physical development and functional training was done by several indices.*

Results: *The main results are that diet containing less fat and protein and more carbohydrates leads to lower body mass index and there is no relationship between muscle mass and the amount proteins in the diet. Yoga affects the breath holding during inhalation in comparison with the control group ($p = 0.019$), but does not affect the breath holding during exhalation.*

Conclusion: *Yoga could significantly improve the general condition of a person, with the main benefits of maintaining a healthy weight.*

INTRODUCTION

Yoga is an ancient Indian system of knowledge, one of the six orthodox philosophies in India, that teaches how to discipline the body, the mind, how to overcome fears and earthly temptations to be free from the physical suffering. In 21century the yoga system is spread on almost all continents. Thousands of people practice different types of yoga because it makes them feel healthy and manage to cope with stress in the surrounding environment. Kumar (1) describes numerous scientific studies on the influence of yoga on the different aspects of human health. Streeter et al. (2) suggest that the healing effect lays in the nervous system response, in particular the regulation of the exciting nervusvagus processes. Yoga involves a certain way of eating, certain movements and postures, as well as certain behaviors.

In the Western world, yoga philosophy is often associated with a vegetarian way of eating. This is actually very misunderstood, because for yoga, it is important whether the food is clean and freshly prepared, whether it satisfies your fleshly pleasures or, on the contrary, gives you strength and energy, prana, calms your mind. The main concept in modern nutrition science is the energy balance; the energy obtained from the food corresponds to the energy consumed by the body. Within the yoga philosophy, body energy is examined in a more subtle and difficult way of measuring, which affects the control of total energy intake and total energy expenditure. Yoga talks about bio energy or kundalini which comes in three states: the common dormant, the aroused and the awakened states. Only the awakened energy of kundalini gives stable transformations of consciousness and progressive realization (3).

Yogi are not interested in developing physical strength or athletic abilities, at least not in the way they are presented in the West. The yogi are only interested in controlling their body for the development of Atman. To achieve this level of bio energy, the yogis combine yamas, purity, moderation and modesty in everyday life, and even some dietary (4) and physical aspects (5, 6) rely on these principles. Nevertheless, some studies that use subjective methods to study the effect of hatha yoga on bio energy show that systematic practice improves yogi's vitality and perception of their own physical condition, social functioning and quality of life (7). Also, due to the nature of the physical exercises carried out in hatha yoga, there are often exceptional physical abilities in the yoga exercises, especially in muscular flexibility, strength (8)and stress control (9, 10).

The aim of the study is to determine the influence of diet and yoga on the body mass index and physical fitness of the subjects involved in the study.

METHODS

Subjects

Eleven subjects practicing yoga (age 33 ± 7.01 years, height 175.82 ± 9.27 cm, weight 69.94 ± 13.41 kg) and 11 healthy, non-yoga (age 32, 09 ± 7.88 years, height 173.73 ± 10.66 cm, weight 73.49 ± 12.27 kg) participated in the study. It was conducted at the end of 2018 and beginning of 2019. Prior to the study, participants were asked to refrain from physical exercise, food, and fluid intake. Each participant in the study signed a declaration of informed consent and the study was approved by the Scientific Research Committee of South-West University "Neofit Rilski". The investigated persons come once at the Center for Functional Studies in Sport and Kinesitherapy of South-West University "Neofit Rilski" - Blagoevgrad, where the anthropometric measurements were made and the tests were carried out.

Determination of body composition was done with Body Composition Analyzer, model IoI 353. The participants in the study were wearing the lightest possible clothes and took off socks before the measurement. From the obtained results we used Body Mass Index (BMI) and Soft Lean Mass (SLM) or muscle mass.

Determination of the energy value of usual diet of the subjects was done through a simple food frequency questionnaire (FFQ) (11), prepared and validated for the conditions in Bulgaria. Each person fills in a pre-encoded questionnaire that automatically calculates the total amount of kilocalories that a person normally consumes and the amount of carbohydrates, proteins and fats normally found in his menu.

Demographic study of the subjects in both groups was conducted using a questionnaire. It consists of the following questions: What is your education? How many people live in your village? What is your marital status? Do you work? Are you retired? Do you smoke? Have you ever smoked?

Assessment of physical development and functional training (12)

Body Mass Index (BMI) was calculated using formula $BMI = \frac{M}{H^2}$, where M- mass in kg, H – height in m. It could be used to determine whether there is excess or insufficient weight and the potential risk of weight-related illness. The obtained result were compared with the following values: 16 and less – very low body mass; 16.5-18.4 – insufficient body weight; 18.5-25.4 – normal body weight; 25.5-30.4 - increased body weight; 30.5-35.4 - obesity first degree; 35.5-40.4 obesity second degree; and 40.5 and more obesity third degree.

Body type index (BTI) was calculated according to a formula $BTI = H - (M + CCI)$, where H – body height, M – body mass, CCI – chest circumference during inhalation. The criteria for rating the BTI are following:≤ 10.9 - very strong; 11.0 -15.9 – strong; 16.0-20.9 – harmonious; 21.0-25.9 – average; 26.0-30.9 – weak; and ≥ 31 - very weak.

*Erisman index (EI)*was intended for evaluation of the development of the chest and was calculated by the formula $EI = CCP - \frac{H}{2}$, where CCP – chest circumference in pause (cm), which is equal to the half sum of inhalation chest circumference (cm) and expiratory chest circumference and H – height. Criteria for evaluation of the chest development are: under development – 2 and less (male) and 0 and less (female); medium development – 3-6 (male) and 1-4 (female); and good development – 7 and more (male) and 5 and more (female).

Evaluation of chest excursion (ECE) characterizes the development of respiratory organs. The indicator was calculated by the formula$ECE = CCI - CCE$, where CCI is the chest circumference while inhaling and CCE is the circumference of the chest on the exhale. Chest excursion rating is according to the following values:5 or less – underdevelopment; 5–8 – medium development; and 8 or more - good development.

Voluntary breath holding at exhalation (VBHe) was held in a sitting position. Pre-performed deep inhale, exhale, inhale followed by a quiet exhalation and holding the breath with the nose clamped by the fingers. The norms are: healthy untrained people – 25-30 sec and athletes – 40-60 sec.

Voluntary breath holding at inhalation (VBHi) was carried out as follows. Breathing is held after full inspiration, which the subject makes after three breaths to 3/4 the depth of full inspiration. The test was performed with the nose clamped by the fingers and the time is recorded by a stopwatch. The norms are: healthy untrained people – 45-55 sec and athletes – 60-90 sec.

The Ruffier test was used to evaluate the resistance of a heart to physical. The subject is being in the supine position for 5 min. The pulse for 15 s (P1) is determined; then for 45 seconds the subject performs 30 squats. After the end of the load, the subject lays down, and his pulse is again measured for the first 15 sec (P2), and then for the last 15 sec from the first minute of the recovery period (P3). Assessment of cardiac muscle performance (CMP) was by the formula $CMP = \frac{4*(P_1+P_2+P_3)-200}{10}$. Assessment of the working capacity of the heart is as follows: 3 and less – high performance; 4-6 – good performance; 7-9 – average performance; 10-14 – satisfactory performance; and 15 and more – unsatisfactory performance.

Measurement of blood pressure is the most common method for assessing the functional state of the cardiovascular system of a subject and is of great importance for the contemporary diagnosis and prevention of vascular diseases. Values of arterial pressure are 15-20 years – 100-120/70-80; 21-40 years – 120-130/70-80; and 41-60 years – 130-140/80-90.

The endurance coefficient (EC) was calculated by formula and represents an integral value that combines the heart rate (HR), systolic pressure (SP) and diastolic pressure (DP). $EC = 10 * \frac{HR}{SP-DP}$. In the norm, the coefficient of endurance is equal to 16. Its increased value shows decreased activity of the cardiovascular system, the decrease of its amplification.

Assessment of the adaptation potential (AP) of the blood circulation system was by using the one of the simplest formulas used, which provides accuracy over 70% (Bayevski 1979) (compared to experimental estimates). The formula was: $AP = 0{,}011 * HR + 0{,}014 * SP + 0{,}008 * DP + 0{,}014 * Age + 0{,}009 * M - 0{,}009 * H - 0{,}273$, where AP – adaptation potential; HR – heart rate; SP and DP - systolic and diastolic pressure; Age in years; M - mass of the body; H-height. The results were compared with the following scale: less than 2.59 – satisfactory adaptation; 2.60-3.09 - stress in adaptation mechanisms; 3.10-3.59 –unsatisfactory adaptation; and more than 3.60 - adaptation collapse.

Data analysis

For data processing and analysis Excel and Graph Pad Prism (Ver 3.0) were used. A spreadsheet has been prepared in Excel to calculate the food questionnaire results. Formulas that calculate total energy intake with food, protein, carbohydrate, and fat are introduced. The mean values, standard deviations and coefficients of variation of all variables are calculated by descriptive statistics. Experimental data are presented in two ways: - as mean ± SD; and - as individual values for each subject. For the statistical analysis of the results (Mann Whitney test and One-way ANOVA, Kruskal-Wallis test, Dunn's multiple comparison test), for relationship determination (Pearson's correlation coefficient) and figure generation the Graph Pad Prism statistical software was used.

RESULTS

The study involved 11 subjects, practicing yoga, and 11 non-yoga (control group). Tables 1 and 2 showed their anthropometric data.

Table1. *Anthropometric data of the examined yogi*

ID	Height, cm	Weight, kg	BMI, kg/m^2	SML, kg	CCI, cm	CCE, cm	CCP, cm
Y1	182	74.2	22.40	52.50	98	89	93.50
Y2	191	77.5	21.20	63.20	101	91	96.00
Y3	182	68.2	20.60	56.10	94	84	89.00
Y4	158	45.5	18.20	33.30	84	76	80.00
Y5	178	69.5	21.90	46.30	100	94	97.00
Y6	173	65.8	23.10	46.10	98	89	93.50
Y7	170	55.9	19.30	40.10	89	82	85.50
Y8	177	89.5	28.60	59.30	112	104	108.00
Y9	165	65.0	23.90	39.30	90	84	87.00
Y10	174	66.2	21.90	42.20	107	94	100.50
Y11	184	92.0	27.20	36.80	114	107	110.50
Mean	175.82	69.94	22.57	46.84	98.82	90.36	94.59
±SD	9.27	13.41	3.10	9.74	9.46	9.22	9.29

BMI – body mass index, SLM – soft lean mass, CCI – chest circumference during inhalation, CCE – chest circumference during exhalation, CCP – chest circumference in pause

Table2. *Anthropometric data of the control group*

ID	Height, cm	Weight, kg	BMI, kg/m^3	SLM, kg	CCI, cm	CCE, cm	CCP, cm
N1	177	86.8	27.70	58.40	118	109	113.50
N2	159	70.5	27.90	40.10	111	104	107.50
N3	170	85.0	29.40	52.50	110	103	106.50
N4	179	71.2	22.20	55.00	98	91	94.50
N5	193	90.8	24.40	69.90	108	99	103.50
N6	165	61.6	22.60	39.00	99	92	95.50
N7	168	56.0	19.80	39.60	92	84	88.00
N8	176	79.2	25.60	55.30	102	92	97.00
N9	158	56.0	22.40	37.30	98	90	94.00
N10	172	69.3	23.40	46.60	103	94	98.50
N11	180	81.1	25.00	58.50	106	94	100.00
Mean	172.45	73.41	24.58	50.20	104.09	95.64	99.86
±SD	10.13	12.18	2.90	10.48	7.40	7.31	7.31

BMI – body mass index, SLM – soft lean mass, CCI – chest circumference during inhalation, CCE – chest circumference during exhalation, CCP – chest circumference in pause

Nutrition was studied using a FFQ (11). The results of the questionnaire were presented in Tables 3 and 4, respectively, and Figure 1.For determination of the proportion of energy provided by primary sources (carbohydrates, proteins and fats) the following formulas were used: $E_{cho}\% = \frac{M_{cho}*4}{TEI} * 100$; $E_{pro}\% = \frac{M_{pro}*4}{TEI} * 100$; $E_{fat}\% = \frac{M_{fat}*9}{TEI} * 100$, where TEI is total energy intake, M – mass and E% is the percentage of energy obtained from the substance. The obtained values are plotted for the two study groups in Figure 2.

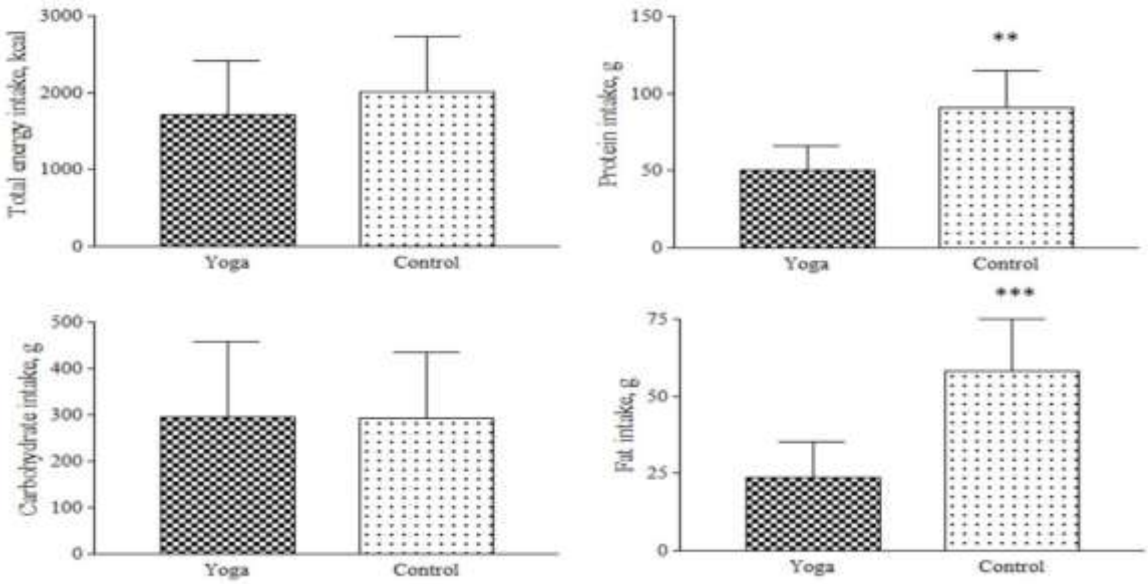

Figure1. *Results of FFQ of yoga and control group (** p<0.001, *** p<0.0001)*

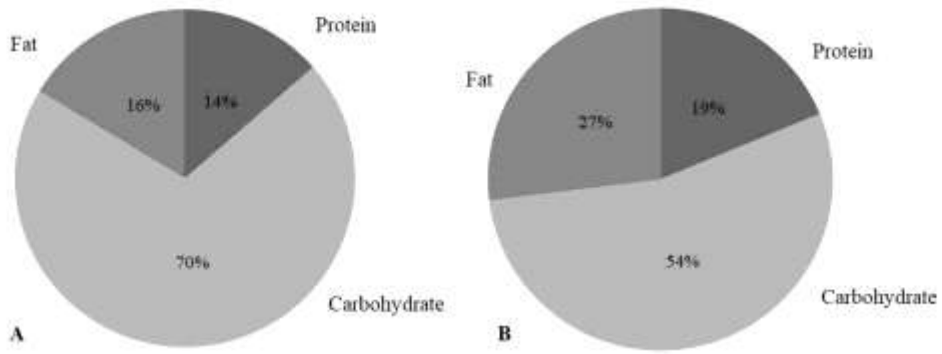

Figure2. *Percentage distribution of energy intake from essential nutrients: carbohydrates, proteins and fats in yogi (A) and control group (B).*

Table3. *Dietary intake of yogi*

ID	Total energy intake, kcal	Protein intake, g	Carbohydrate intake, g	Fat intake, g
Y1	2262.86	59.57	422.57	20.00
Y2	2497.14	56.93	473.43	18.00
Y3	3325.71	81.64	662.14	0.00
Y4	1473.14	32.93	246.03	25.00
Y5	1635.43	48.79	305.69	15.00
Y6	1320.00	31.00	182.00	41.00
Y7	1641.14	43.43	268.83	32.00
Y8	914.29	48.36	140.86	27.50
Y9	1291.43	39.29	215.29	15.00
Y10	1417.14	69.93	217.43	36.50
J12	1022.86	45.57	121.57	29.50
Mean	1709.19	50.68	295.99	23.59
±SD	715.58	15.38	162.81	11.58

Table4. *Dietary intake of control group*

ID	Total energy intake, kcal	Protein intake, g	Carbohydrate intake, g	Fat intake, g
N1	2345.14	120.43	341.23	63.00
N2	1880.00	70.50	271.00	59.00
N3	2257.14	77.93	377.43	41.00
N4	2834.29	109.36	466.86	56.00
N5	1315.43	44.29	194.69	37.00
N6	2531.43	119.29	367.29	76.00
N7	3298.29	115.86	548.26	95.50
N8	1868.57	97.71	232.71	61.50
N9	1485.71	87.14	201.14	59.50
N10	1251.43	83.79	148.29	45.00
N11	1000.00	74.00	76.00	46.50
Mean	2006.13	90.94	293.17	58.18
±SD	646.87	27.66	134.90	20.26

In order to determine the relationship between lifestyle and physical development and functional training, a series of tests were conducted in both groups. In addition to the BMI, a BTI, EI, and ECE have been evaluated. The results were presented for the two groups in Tables 5 and 6, respectively. There was a correlation between BMI and BTI, the larger the BMI, the smaller the BTI and the body type is stronger (yoga - r = 0.94, control - r = 0.94, p <0.0001) (Figure 3). The other index, which depends on BMI, is the EI (yoga - r = 0.84, control - r = 0.77, p <0.001). Figure 3 shows the dependence of this index on BMI.

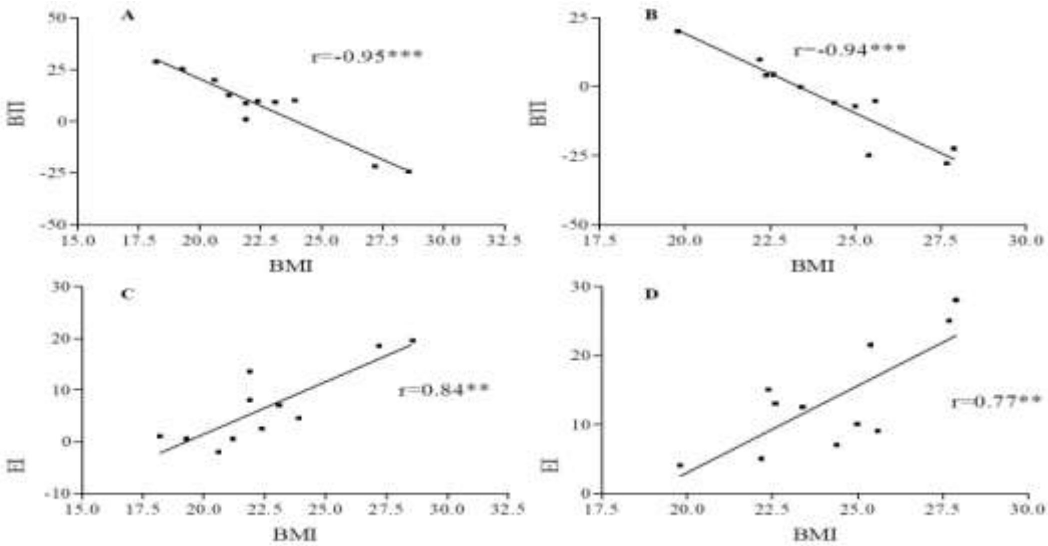

Figure3. *Relationship between BMI and BTI (*** p <0.0001, A - group of yogis, B - control group) and BMI and EI (** p <0.001, C - group of yogi, D - control group)*

Functional training characterizes the condition of the main systems for providing the body and its working capacity. The values of different values obtained are presented intables 5 and 6.

Table5. *Assessments of physical development and functional training of yogi*

ID	BTI	EI	EGE	VBHe	VBHi	HR for 15 sec			Ruffier test	EC	AP
						P1	P2	P3			
J1	9.8	2.5	9	31	108	12	24	18	1.6	12	1.8
J2	12.5	0.5	10	35	89	14	23	17	1.6	14	2
J3	19.8	-2	10	42	120	18	23	20	4.4	18	2.23
J4	28.5	1	8	31	80	16	21	17	1.6	21.3	1.8
J5	8.5	8	6	21	64	16	25	18	3.6	16	2
J6	9.2	7	9	18	100	17	26	17	4	17	2.27
J7	25.1	0.5	7	36	86	15	19	16	0	23.1	1.46
J8	-24.5	19.5	8	32	126	15	31	19	6	14.3	2.64
J10	10	4.5	6	35	54	17	28	21	6	16	2.37
J11	0.8	13.5	13	22	27	16	24	16	2.2	16	2.11
J12	-22	18.5	7	35	100	16	28	16	4	16	2.65
Mean	7.06	6.68	8.45	30.73	86.73	15.64	24.73	17.73	3.18	16.70	2.12
±SD	16.97	7.47	2.07	7.38	29.43	1.63	3.41	1.68	1.94	3.18	0.36

BTI – body type index, EI – Erisman index, VBHe – voluntary breath holding during exhalation, VBHi – voluntary breath holding during inhalation, HR – heart rate, EC – endurance coefficient, AP – adaptation potential.

Table6. *Assessment of physical development and functional training of the control group*

ID	BTI	EI	ECE	VBHe	VBHi	HR for 15 sec			Ruffier test	EC	AP
						P1	P2	P3			
N1	-27.8	25	9	32	70	17	25	22	5.6	8.9	2.66
N2	-22.5	28	7	20	50	17	25	19	4.4	13.6	2.31
N3	-25	21.5	7	17	47	19	26	22	6.8	19	2.59
N6	9.8	5	7	14	61	19	27	23	7.6	19	2.48
N7	-5.8	7	9	61	80	14	18	14	-1.6	14	2.18
N11	4.4	13	7	26	30	18	30	19	8.4	22	2.28
N12	20	4	8	30	63	16	27	19	4.8	16	2.03
N13	-5.2	9	10	37	61	20	28	20	7.2	17.2	2.73
N14	4	15	8	14	17	16	28	19	5.2	15.2	2.16
N16	-0.2	12.5	9	28	78	19	28	20	6.8	19	1.99
N17	-7.1	10	12	23	90	17	26	19	4.8	17	2.35
Mean	-5.04	13.64	8.45	27.45	58.82	17.45	26.18	19.64	5.45	16.45	2.34
±SD	15.06	8.04	1.57	13.39	21.77	1.75	3.09	2.38	2.68	3.52	0.25

BTI – body type index, EI – Erisman index, VBHe – voluntary breath holding during exhalation, VBHi – voluntary breath holding during inhalation, HR – heart rate, EC – endurance coefficient, AP – adaptation potential.

In the demographic survey we received data on how many people are current or former smokers. The group of yogi had no current smokers but five were former smokers and stopped smoking after starting practicing yoga. There were four current and three former smokers in the control group.

Discussion

In the hectic daily routine, various forms of physical exercises were constantly sought to improve the overall condition and maintain weight. Yoga is one of the modern health alternatives in recent decades. The benefits of yoga on the body condition, as well as its application for the prophylaxis of various diseases, are known (13).

Eleven individuals practicing yoga and 11 healthy, non-yoga were participating in the study. As can be seen from the values of the height, weight, BMI, and muscle mass of the subjects in the two groups, there is no statistically significant difference (Mann-Whitney test). However, comparing the mean BMI, the yogi had a significantly lower index (22.57 ± 3.10) than that the control (24.22 ± 2.45).Only two of the yogi had BMI greater than 24, whereas in the control group, only 5 of the subjects had BMI less than 24. This fact was related to the regime of people practicing yoga. One of the major changes in their lifestyle was the change in the way they eat, which also affects their body weight.

Diet was studied using a FFQ (11). By comparing the data obtained for the group of yogi with the control group, it was clearly seen (Figure 1) that there was no statistically significant difference between energy and carbohydrate intake but statistically significant differences in protein and fat intake. Analysis of the results indicated that yogi consume little or no animal products, which strongly affected the protein and the fat intake. In the usual diet of yogi, the main source of energy from food was the carbohydrates, about 70%. In the control group, although carbohydrates delivereda large amount of the energy, it was lower, about 54%. While the protein and fat in group of yogi were almost equal 14 and 16%, respectively, in the control group, the proportion of energy gained from fats was significantly higher than that of proteins (27 and 19%, respectively).Considered the nutritional regime in relation to the mass, it was clear that a diet containing higher amounts of carbohydrates did not lead to weight gain; on the contrary, it is associated with lower body mass and, respectively, lower BMI. In a number of studies (14), it was found that body weight was significantly lower in both men and women on a high carbohydrate diet compared to a diet with the same energy but a larger amount of fat. Such a trend is also observed in our investigation. In the control group, the average amount of fat in the usual diet is 0.84 g/kg/d, which is 27% of the total energy. In the group of yogi, the fat is on average 0.35 g/kg/d or only 16%. In the control group, the amount of fat in the food was higher and BMI, respectively, was higher. According to the recommendations of a number of healthcare organizations, the recommended daily amount of protein is 0.8 g/kg/d. In the group of yogi, the proteins in the usual diet were 0.74 g/kg/d, whereas in the control group they are nearly twice as high - 1.29 g/kg/d. Much of the research on dieting for weight loss showed that higher protein content in food led to an increase in muscle mass (15). There was no statistically significant difference in muscle mass in the two groups; therefore less amount of protein in the yoga diet did not lead to a decrease in muscle mass. There was no correlation between the muscle mass and the amount of protein taken with food in both groups.

Physical development is the process of changing the body's natural morpho-functional properties over the course of individual life, an important indicator of the health of children and adults, driven by internal factors and living conditions.

BTI measures body type. The lower its value, the stronger the body is. There was a correlation between BMI and BTI, the larger the BMI, the smaller BTI and the body type is stronger (yoga - $r = 0.94$, control - $r = 0.94$, $p < 0.0001$). Since yogi had a lower BMI, their BTIs were also higher. Seven were very strong, while the rest are strong (1), harmonious (1) and weak (2). In the control group, the situation was different - only one had a harmonious type, while all others were very strong, i.e. BTI was less than 10.9. In the control group, the mass and chest circumference were larger, so the index also had lower values.

The other index, which depends on BMI, is EI (yoga - $r = 0.84$, control - $r = 0.77$, $p < 0.001$). Figure 3 shows the dependence of this index on BMI. It is clear that the larger the BMI, the greater the EI. Values were different for women and men. The person with the lowest BMI of the control group also had the lowest EI and a poorly developed chest. In the group of yogi, the number of people with medium developed chest is four, even here there is a person with a underdeveloped chest. Of course, one must also take into account the fact that these people have low body mass and a small amount of subcutaneous fat.

The development of breathing organs could be assessed by the ECE, which is unrelated to BMI and the weight of the investigated person. Its value is entirely dependent on genetic factors, as well as on the level of training of the individual. Yoga does not include exercises that significantly burden the respiratory system, so the group of yogi was not expected to show exceptional values of this index. Six of the investigated yogi had a moderate development of the breathing organs, while the other 5 were well developed. The situation was the same in the control group - 5 of the subjects were good and 6 have moderate development of the breathing organs.

Two tests were used to assess breathing: VBHe and VBHi. There was no statistically significant difference between the times of VBHe in the two groups, as there were individuals in both groups who showed a result below the norm for healthy untrained people (less than 25 seconds) – three in the group of yogi and 5 in the control group. It is interesting that the best achievement was by a person in the control group (61 seconds) despite our expectations that the yogi will perform better. There is no correlation between VBHe and chest development. VBHi had a statistically significant difference in the times of the two groups of subjects ($p = 0.019$). The group of yogi showed significantly higher scores, with only two having an unsatisfactory result that was well below the norm for healthy untrained individuals, while the others showed results that exceeded the norm for athletes. Seven of the control group also showed times over 60 seconds. There was again no correlation between VBHi and chest development. In the demographic survey we received data on how many people are current or former smokers. In the group of yogi, there was no dependence between performances in breath holding tests. All three poor results are for people who have never smoked. In the control group, smoking influenced the VBHe in three subjects (one former and two current smokers), and only one current smoker's VBHi. One of the subjects had VBHe time below the norm, although it is not a smoker. Smoking may play a role in breathing, but there are a number of other factors (16). Voluntary breath holding depends on mechanical factors such as lung volume, chemical factors such as partial pressure of carbon dioxide and oxygen (pCO_2, pO_2), concentration of ions (H^+), non-chemical factors such as involuntary muscle contractions, psychological factors such as motivation, stress , competition, external factors like exercise (17)and muscle training.

To assess the cardiovascular function, the most accessible methods are HR and arterial pressure. Often, the HR (pulse) in the adult trained person at rest is within the range of 60 to 90 bpm. There was a statistically significant difference between the HR at rest in both groups ($p = 0.02$). In the group of yogi, the HR was lower, which is related to yoga exercises, including relaxation and breathing exercises. Measurement of HR immediately after loading in both groups increased and there was no statistically significant difference between the values. By the first minute after loading, however, the yogi restored the pulse rate more quickly and again there was a statistically significant difference between the HR in both groups ($p = 0.03$). Between the values of the index of cardiac muscle performance in the two groups there was a statistically significant difference ($p = 0.01$), the values in the group of yogi were significantly lower than those of the control group. In the control group, only one of the subjects had high cardiac capacity, whereas there were five in the group of yogi. The remaining six yogi and seven of the control group have good cardiac function. Three of the control group have medium cardiac capacity. This result again revealed the benefits of practicing yoga to develop the capacity of the heart, as yoga techniques help to restore the heart rate to the initial state faster.

Using the HR and blood pressure values, the EC of the subjects were calculated. There are no statistically significant differences between the coefficient values in the two groups. In the group of yogi, six have a value of 16 and less, whereas in the control group there are 5. The rest have a value greater than 16, which means reduced cardiovascular activity. For athletes, this index is lower than 16, with tend the cyclic sports to lead to a greater reduction in its value from acyclic (18). Yoga is not related to aerobic exercise affecting the cardiovascular system. This is probably the reason why the majority of yogi had a higher score than normal.

Adaptive potential is an important indicator and with its help, we could predict the state of health and the degree of tension in the regulatory systems. There is no statistically significant difference between the values obtained for the two groups. In both groups there were people who had tensions in the mechanisms of adaptation – two in the yogi and two in the control group which is indicative of reducing the adaptive capacity of the body and, in the opinion of some authors (19, 20), indicates a lower level of health and an increased risk of developing a disease.

In conclusion, yoga could significantly improve the general condition of a person, with the main benefits of maintaining a healthy weight.

Conflict of Interest

The authors declare that they have no conflict of interest.

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