



Yoga practitioners body composition and health related indicators

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Abstract

Introduction: Yoga is becoming increasingly popular and widely available form of physical activity. It is believed that yoga practice has a beneficial effect on the practitioner's body even with a small amount of exercise. There are also studies confirming the usefulness of yoga practice in the fight against obesity, which is a serious health problem of the 21st century. *The aim of the study:* Analysis of body composition of people who regularly practicing yoga, analysis of the relationship between body composition and anthropometric parameters, as well as a comparative analysis with people not related to yoga practice. *Material and methods:* The study ultimately included 42 women who were divided into two groups. The group of yoga practitioners (G1) consisted of 21 women aged 24-59. Out of 46 tested women who did not practice yoga, 21 women were selected due to age and height as close as possible to women from group 1. Group of non participants in yoga (G2) consisted of 21 women aged 23-62. The body composition was performed using TANITA BC 420 SMA analyzer, which uses BIA method. Anthropometric measurements were made using the SECA 201 measuring tape. *Results:* Statistically significant differences ($p < 0.05$) between women practicing yoga, and women not related to yoga occurred in body weight, BMI, waist circumference, hip circumference, fat mass, muscle mass, lean body mass and total body water. Women who practice yoga had lower BMI, waist circumference and hip circumference than women in second group. Interestingly, only 10% of women practicing yoga expressed their intention to reduce weight, in non yoga practitioners it was 81% of women. *Conclusions:* The results show that people practicing yoga are characterized by normal body weight and waist circumference, and they have lower body fat content and BMI index compared to non-practitioners. In addition, it can be stated that regular yoga practice contributes to a better body perception.

Keywords: yoga, health, body composition, BMI, obesity

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INTRODUCTION

Yoga has evolved from a controversial and eccentric system of practices and ideas into an increasingly popular form of physical activity. There are many different styles of yoga, but in all we find the emphasis on the regulation of breathing, mindfulness during exercise and the accuracy of the exercises. Generally, yoga is included in low-intensity exercises which seems to have the most beneficial effect on health. Yoga classes are easily accessible and offered by fitness clubs, which additionally affects its universal availability [1].

The popularity of yoga is growing all over the world, and in the United States alone from 2008 to 2012 there was a 29% increase in participation in yoga practices. In addition, the same four-year period saw 44.7% increase in spending on products and yoga-related activities [2]. With the increase in the popularity of this form of physical activity, the number of studies confirming a beneficial effect on the practitioner's body is growing. The positive effect of yoga practice on the cardiovascular system is determined by the regulation of blood pressure and heart rate, which contributes to its effectiveness in the fight against hypertension[3]. Regular practice also modifies risk factors for coronary heart disease [4]. Yoga helps to overcome stress and turns out to be useful in the treatment of mental health disorders such as anxiety, depression or sleep disorders [5]. It also has a great influence in the therapy of chronic low back pain [6]. There is numerous evidence for the physiological benefits of such practices for children and adolescents [7-9]. Yoga practice plays an important role in the fight against obesity, which is a serious health problem of the 21st century [10-12].

There are studies suggesting that yoga contributes to reduction of anthropometric parameters such as body weight, waist circumference, hip circumference, BMI, and improvement of biochemical components like blood sugar or lipid profile [13-15].

The aim of this article is analysis of body composition of women who regularly practicing yoga, analysis of the relationship between body composition and anthropometric parameters, as well as a comparative analysis with women who are not related to yoga practice.

MATERIALS AND METHODS

The study was conducted in 2018 and ultimately included 42 women who were divided into two groups. First group (G1) consisted of 21 women aged 24-59 who regularly practice yoga at least for one year. Out of 46 tested women who did not practice yoga, 21 women were selected due to age and height as close as possible to women from group 1. Group of non participants in yoga (G2) consisted of 21 women aged 23-62.

The G1 group included participants of the hatha yoga instructor training course. The course takes place in Częstochowa, it is addressed to people who want to learn about the methodology and technique of performing hatha yoga exercises according to the author's programme developed by prof. dr hab. Janusz Szopa and receive qualifications to practice the profession of a hatha yoga instructor. The course is based on hatha yoga static physical exercises and relaxation techniques taking into account the achievements of modern physical education. The requirement to take part in the course is an earlier yoga practice of minimum one year [16].

The G2 group consisted of random people not related to yoga who were interested in participation in the study. Measurements were taken at the Częstochowa University of Technology.

The body composition was performed using TANITA MC 780 SMA analyzer, which uses the bioelectrical impedance method (BIA). It is a non-invasive method, based on electrical resistance inversely proportional to the body's water content [17]. The TANITA analyzer gives the possibility of taking measurements such as body weight (kg); BMI body mass index; FM fat mass (kg,%); LBM fat-free mass (kg); MM muscular mass (kg); BM bone mass (kg); TBW total body water (kg). Anthropometric measurements were made using the SECA 201 measuring tape. All participants completed the subjective health assessment questionnaire.

Data are presented as means and standard deviations. The normality of the distribution was tested with a Shapiro-Wilk test and the significance of intergroup differences between means was calculated using the Student t-test. The level of significance was set at 0.05.

RESULTS

In the first group (G1) of women practicing yoga there were women cultivating this form of activity on average 5.12 ± 3.59 (1-15) years. The frequency of practicing yoga during the week was on average 3 ± 1 (1-6) times a week, and on average 1.42 ± 0.36 (1-2) hour per lecture. In this group additional physical activity was taken on average 2 ± 1 (1-3) times a week. In the group of non participants in yoga (G2) recreational physical activity was cultivated on average 2 ± 1 (1-3) times a week. The list of types of physical activity in particular groups is presented in Table 1. The most commonly undertaken physical activity not including yoga in G1 was cycling and leisure walking. People who do not practice yoga in G2 also often chose cycling and leisure walking as a practiced activity.

Table 2 presents declared diseases by the participants. In the group of yoga participants, no one declared hypertension, heart problems and joint degeneration. In group of non-participants in yoga, the percent of women with hypertension was 29%, 14% of them had heart problems and 14% had joint degeneration. In the G1 group allergy, hypothyroidism and hashimoto were most often declared diseases.

The subjects in both groups were of similar age and had similar body height. (Table 3) Statistically significant differences ($p < 0.05$) between women practicing yoga G1, and women not related to yoga G2 occurred in body weight, BMI, waist circumference, hip circumference, fat mass, muscle mass, lean body mass and total body water.

Women of the G1 group had a lower body mass ($p < 0.001$) and lower BMI ($p < 0.001$). Among women in G1 there was no one with overweight or obesity according to BMI standards. Among women in G2, 29% of them were overweight (5 women) or obese (1 woman). Women practicing yoga had lower body fat content ($p < 0.001$) and according to the standards of body fat percentage (BFP), none of these women had an elevated BFP value. In the second group of women, 24% of them had increased BFP. Women in the G1 group also had a smaller waist circumference ($p < 0.001$) and in this group no woman had $WC \geq 0.88$ m. In the G2 group, 33% (7 women) had $WC \geq 0.88$ m, which is associated with very high risk of metabolic complications [18,19]. Interestingly, 6 out of 7 women in group of non-participants in yoga who had elevated WC declared to have hypertension. Women in G2 had higher level of muscle mass, lean body mass and total body water.

According to the health assessment questionnaire, which every participant of the study filled out, the majority of people assessed their health as good (G1- 76% of women, G2- 57% of women). The remaining percentage of people rated their health as average. No person has assessed their health as bad. In response to the question about the intention to lose weight in the near future, 81% of women from the group of non-participants in yoga expressed such an intention. In comparison, in the group of yoga practitioners it was only 10% of women. This result leads to the assumption that yoga practice contributes to better body perception and that yoga practitioners are more likely to accept their body.

Table 1. Physical activity declared by participants

Type of physical activity in G1		Type of physical activity in G2	
yoga	100% 21/21	leisure walking	52% 11/21
cycling	62% 13/21	cycling	48% 10/21
leisure walking	52% 11/21	gym	19% 4/21
swimming	29% 6/21	running	19% 4/21
running	24% 5/21	swimming	10% 2/21
gym	14% 3/21	nordic walking	10% 2/21

* a multiple choice answer was possible, G1- Yoga participants, G2- Non-participants in Yoga

Table 2. Diseases declared by participants

Declared diseases in G1		Declared diseases in G2	
Allergy	29% 6/21	hypertension	29% 6/21
Hypothyroidism	19% 4/21	allergy	19% 4/21
Hashimoto	10% 2/21	hypothyroidism	19% 4/21
Astma	10% 2/21	heart problems	14% 3/21
healed breast cancer	5% 1/21	degeneration of joints	14% 3/21
stomach ulcers	5% 1/21	hyperthyroidism	10% 2/21
		asthma	5% 1/21

* a multiple choice answer was possible, G1 - Yoga participants, G2 - Non-participants in Yoga

Table 3. Body composition of women.

Parameter	Groups	x	±SD	t	p<
Age	G1	39.14	10	-0.542	0.591
	G2	41.05	12.51		
height [m]	G1	1.67	0.07	-0.378	0.707
	G2	1.68	0.05		
weight [kg]	G1	58.15	5.9	-4.378	0.001
	G2	67.59	7.92		
BMI [kg×m ⁻²]	G1	20.86	2.01	-3.799	0.001
	G2	24.1	3.3		
WC [m]	G1	0.73	0.04	-3.883	0.001
	G2	0.81	0.09		
HC [m]	G1	0.96	0.04	-4.543	0.001
	G2	1.03	0.06		
WHR	G1	0.76	0.03	-1.979	0.055
	G2	0.79	0.05		
FM [%]	G1	23.30	4.59	-3.704	0.001
	G2	29.64	6.36		
FM[kg]	G1	13.66	3.5	-4.372	0.001
	G2	20.4	6.15		
MM [kg]	G1	42.24	3.98	-2.243	0.03
	G2	44.79	3.34		
LBM[kg]	G1	44.50	4.2	-2.248	0.03
	G2	47.18	3.52		
TBW[kg]	G1	31.76	2.98	-2.292	0.038
	G2	33.69	2.47		

G1- Yoga participants, G2- Non-participants in Yoga, BMI- Body Mass Index; WC- waist circumference; HC- hip circumference; WHR- waist-to hip ratio; FM- fat mass; MM- muscle mass; LBM- Lean body mass; TBW- total body water; p - statistically significant results are bolded,

DISCUSSION

Our study confirms previous reports about the positive effect of yoga exercises on the regulation of anthropometric indicators. In the Suchetha et al. study monthly program of yoga exercises for people who were new in yoga caused regulation of BMI and helped to reduce the risk of obesity-related complications [20]. Similarly in the Shetty et al. study, a 3-month program using yoga exercises implemented among obese people caused a decrease of anthropometric indicators such as BMI, waist circumference, hip circumference and others [21]. Research by Chauhan et al. published in 2017 showed the same dependence. After applying the monthly yoga program and comparing the results with the control group, it was shown that the BMI index significantly decreased in the yogi group [22]. Cengiz et al. confirmed that the 8-week yoga intervention program improved the values of BMI and WC in 40-51 years women [23]. All these studies focused primarily on the introduction of a yoga program among people without previous experience associated with this form of physical activity. Our study in the yogi group includes people who exercise for a minimum of one year (average 5 years) and on average three times a week. Among tested women, there were many statistically significant ($p < 0.05$) differences in individual components of the body. The body mass and BMI of women exercising yoga was normal and statistically smaller than of women who are not related to yoga. Similar dependence was found in waist circumference, which is an important indicator of the increased risk of metabolic disorders related to abdominal obesity [18]. Women practicing yoga had a lower waist circumference than women in the control group, in which 33% had a very high risk of metabolic complications. Importantly, 6 of 7 women with significantly elevated WC declared to have hypertension, which confirms the negative impact of a high WC index on health. Increased BMI and WC in the group of women not related to yoga were reflected in the increased level of body fat (BFP). In the group of women practicing yoga, none was characterized by an increased level of BFP. It can therefore be concluded that in comparison to the group of women who do not practice yoga, a group of yoga participants enjoy better anthropometric results related to health.

Such results, in line with previous studies, prove the beneficial effect of yoga exercises on the components of the body composition, which contributes to the effective prevention of lifestyle-related diseases that most often occur in the modern world. Based on the above considerations it can be concluded that the introduction of yoga exercises into lifestyle can have a beneficial effect on the regulation of anthropometric indicators and avoiding health disorders related to, inter alia, obesity and central obesity [24-26].

In the present study, the analysis of the results of the subjective health assessment showed that most women assessed their health as good. In yoga participants group it was 76% of women and that result is in line with Ross et al. study, where more than 85% of yoga practitioners reported their health as very good or excellent. Moreover in the cited study, the authors concluded that yoga practitioners are not free from health problems, but the majority of them think that their health has improved thanks to yoga [27]. Another important outcome in our study is that 81% of people in the non-participants in yoga expressed a desire to reduce their body weight in the near future compared to 10% of people from the group of yoga practitioners. Such a result may indicate significant intergroup differences in the perception of one's body. A positive body image is associated with greater self-confidence and body satisfaction. People with a positive image of their bodies are more resistant to unhealthy or unrealistic standards of social appearance, such as a thin, perfect body in Western women [28]. There are studies confirming the influence of yoga on the positive image of body. One of them is the Leeann Marlo et al. published in 2016, which proves the potential of yoga in promoting a beneficial relationship with one's body. Importantly, the authors emphasize that yoga can be an easily accessible form of activity on the acceptance of one's image for young girls [29]. Similar conclusions result from study Ariel-Donges et al., and Neumark-Sztainer et al., where authors suggest that yoga practice, which is widely available form of activity could help people in developing healthy relationship with their bodies [30,31]. What is interesting, there are findings that yoga can improve positive body image at relatively low yoga doses, which is very important as intervention length have influence on the potential of prevalence [32]. This is an important aspect of optimizing psychophysical functioning [33-34].

The limitation of the study is a small number of participants. In the future, more detailed analysis of diet and health-related behaviors is planned. Relatively large intergroup disproportion in the body perception is interesting and determines the need for further testing. This study allows authors to notice the need to continue research on influence of hatha yoga practice on body composition and body image with a larger number of participants including men.

CONCLUSIONS

The results of this study show that women related to yoga are characterized by normal body weight and waist circumference, and they have lower body fat content and BMI index compared to non-practitioners. Moreover, among tested yoga participants no woman reported hypertension or heart problems, in contrast to the group of women not related to yoga, where these problems occurred. In addition, it can be stated that regular yoga practice contributes to a better body perception. Such results indicate the potential preventive and therapeutic capability that comes from practicing yoga, but there is a need for further research including a larger sample of participants.

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