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ORIGINAL RESEARCH PAPER

PHYSICAL ACTIVITIES AND BODY COMPOSITION AMONG WOMEN IN FITNESS

Aleksandra Čuprika, Andra Fernāte, Leonīds Čupriks

Latvian Academy of Sport Education
Address: 333 Brivibas Street, Riga, LV-1006, Latvia
Phone: +371 67799546
E-mail: aleksandra.cuprika@lspa.lv, andra.fernate@lspa.lv, leonids.cupriks@lspa.lv

Abstract

Nowadays sedentary lifestyle is becoming more and more frequent all over the world. Obesity represents one of the most serious health issues (Hill et al., 2008). It develops because of misbalance between energy intake and consumption, which results from human behavior – feeding behavior, leisure time spent physiology and life quality objective factors (Haslam & James, 2005). The aim of the research is to describe women's involved in fitness relation of body composition parameters and subjective evaluation of the amount of physical activities and objective parameters of life quality. Research methods: the study included 51 women (27 +/- 6 years old). TANITA BC-545 platform was applied to evaluate body composition parameters and IPAQ short version was used to state the amount of physical activities. SPSS ver.17.0 data procession program was applied to analyze the data. Descriptive statistics (frequency, mode, mean); mathematical statistics (One-Sample Kolmogorov-Smirnov Test, Spearman rank correlation) was made. Results: the research showed that there is a number of weak significant correlations between women's in fitness body composition parameters, the amount of physical activities, the habits of spending leisure and the life quality objective factors ($0.2<|rs|<0.49$; $p< 0.05$). Whereas there were noted strong ($0.7<|rs|<0.99$; $p<0.01$) and moderate ($0.5<|rs|<0.69$; $p<0.01$) correlations among body composition parameters. Conclusions: Women's, involved in fitness physical activities, life quality objective factors and the habits of spending leisure have the impact on the body composition parameters.

Keywords: *body composition, IPAQ, physical activities, quality of life*

Introduction

Obesity is one of the most widespread problems all over the world. About 25% of children and 40 – 60% of adults in all developed countries suffer from the excess weight which causes physiological and psychological changes of the body, as well as serious health problems (Lobstein, et al., 2004). At any age sedentary lifestyle and inappropriate diet increase obesity risk (Brach, et al., 2004; Hills et al., 2013; Ara, et al., 2006). However, small number of researches has shown that exactly these two behavior factors not other environmental factors affect human body composition. To understand body weight management, one should understand dynamics of energy balance and also the effect of environment (Giskes et al., 2010; Corder et al., 2010).

Research articles show that 5% of all death causes all over the world is due to obesity and 6% – due to sedentary lifestyle. According to the data of the World Health Organization about death causes of citizens in the European countries in 2012, 80% of all death cases are the ones of non-communicable diseases, including 50% of problems of the cardio-vascular system. It should be added that there are more male cases than female cases. Since 1995 the death cases from diabetes have increased up to 25%. Since 1990 the diseases of the digestion system have increased up to 30% (Health 2020: a European policy framework supporting action across government and society for health and well-being, 2012). If we look in detail at the amount of time EU citizens spend doing vigorous and moderate physical activity we see, that only 8% do it regularly in Europe at all and 6% in Latvia, 33% in Europe and 25% in Latvia do it with some regularity, 42% in Europe and 39% in Latvia never do physical activities. If we compare genders doing physical activities, we can see, that 55% of European men and 63% of European women never or seldom do physical activities. Even worse situation is in Latvia – 66% of men and 71% of women never or seldom do physical activities (Eurobarometer, 2013). The research about worldwide variability in physical inactivity shows, that overall, about 15% of men and 20% of women from the 51 countries analyzed there (most of which are developing countries) are at risk for chronic diseases due to physical inactivity. Both men and women living in urban areas were more likely to be inactive compared to those living in rural areas. The difference was more obvious for men (Guthold et.al, 2008). Also statistical data about children physical activity in the USA, that might be related to family habits, show that only 42% of children aged 6-11 and only 8% of children aged 12-17 are physically active daily (Troiano et al, 2008). Statistical data of Canada also emphasize that the level of physical activities among

adolescents is very low (Colley et al., 2011). Also in Australia the data about the number of adolescent moderate physical activities are lower than the recommended ones to improve and maintain one's health (Cleland et al., 2008). Researchers suggest that even slight alterations of human behavior can change a situation and decrease the speed of the spread of obesity epidemic (Hill et al., 2003; Brach, et al., 2004; Hills et al., 2013; Ara, et al., 2006; Hughes et al., 2002; Knöpfli et al., 2008; Yackobovitch-Gavana et al., 2009; Tyler et al., 2007).

The aim of the research is to describe women's involved in fitness relation of body composition parameters and subjective evaluation of the amount of physical activities and life quality objective parameters.

Material and methods

51 women from four fitness clubs participated in the study. The average respondents' age is 27 +/- 6 years old. The women participation in the study was voluntary.

In order to assess women's, involved in fitness, body composition parameters the segmentary bioimpedence body monitor TANITA BC-545 (Japan) was applied, when analyzing the right and left arm, the right and left leg and the trunk. With the help of this device body weight, muscle percentage, fat percentage in body segments, bone mass, the coefficient of the body type, the coefficient of the visceral fat, the metabolic age of the body, and daily calorie amount were stated, as well as the height and body mass index were calculated.

To assess the amount of physical activities International Physical Activity Questionnaire (IPAQ) short version in Latvian (Kaupuzs & Larins, 2010) was used. The respondents answered to what extent they had done very hard or moderately intensive physical activities during the last 7 days and how much time they had spent sitting or walking (Guidelines for data processing and analysis of the International Physical Activity Questionnaire, 2005).

Additionally the objective parameters of life quality, such as age, home, occupation, education level, financial situation, family status, kinds of leisure activities, and belonging to some group or club were stated. The inquiry (questionnaire) and data summarization were made anonymously.

SPSS ver.17.0 data procession program was applied to analyze the data. Descriptive statistics (frequency, mode, mean) was made, Kolmogorov-Smirnov criterion was applied to state whether the data are parametric or non-parametric, and correlation analysis of the non-parametric

statistics was made to determine the Spearman Rank Correlation Coefficient.

Results

Having summed up the data, it can be concluded that all respondents' questionnaires were useful for data procession. Most respondents have higher education (56%) or higher not finished education (18%), they mostly live in a house with no hire (28%), in a property with mortgage (24%) or in a property without mortgage (26%). Most respondents are employed, employers (75%) or those who are studying (18%). 64% of the respondents answered that their material situation is satisfactory, 28% pointed out that they can get along, but 8% think that their material situation is unsatisfactory. 18% of the respondents have the status of free relation, 40% – have relations, 16% – are married and 24% are married and have child (-ren).

A large number of respondents do not take part in leisure activities mentioned in the questionnaire. For example, 36% of the respondents have not visited any bar or café during the last month, 86% – have not been to any sport events, 78% – have not been to a service in a church, 30% – have not chatted to acquaintances or neighbors, 22% – have not had a meal out, 42% – have not been to a cinema, 24% – have not visited friends, 18% – have not done any physical activities, and 96% of the respondents do not belong to a club or society.

With the Kolmogorov-Smirnov criterion it was stated that the data are non-parametric, and the method of non-parametric statistics correlation analysis should be applied.

Having evaluated the obtained Spearman rank correlation coefficients (one-tailed), it can be concluded that there are several weak ($0.2<|r_s|<0.49$) and one medium close ($0.5<|r_s|<0.69$) (Dravnieks, 2012) correlations between the objective factors and body composition parameters, for example:

- the older the respondent is, the more is her weight ($r_s = .246$, $p<0.05$); the higher the body mass index is ($r_s = .242$, $p<0.05$), the higher the fat percentage in the body is ($r_s =.352$, $p<0.01$); the less there is water amount in the body ($r_s =-.270$, $p<0.05$), the higher the visceral fat coefficient is ($r_s =.460$, $p<0.01$), as well as the higher is the metabolic age ($r_s =,504$, $p<0,01$) (see Fig.1).

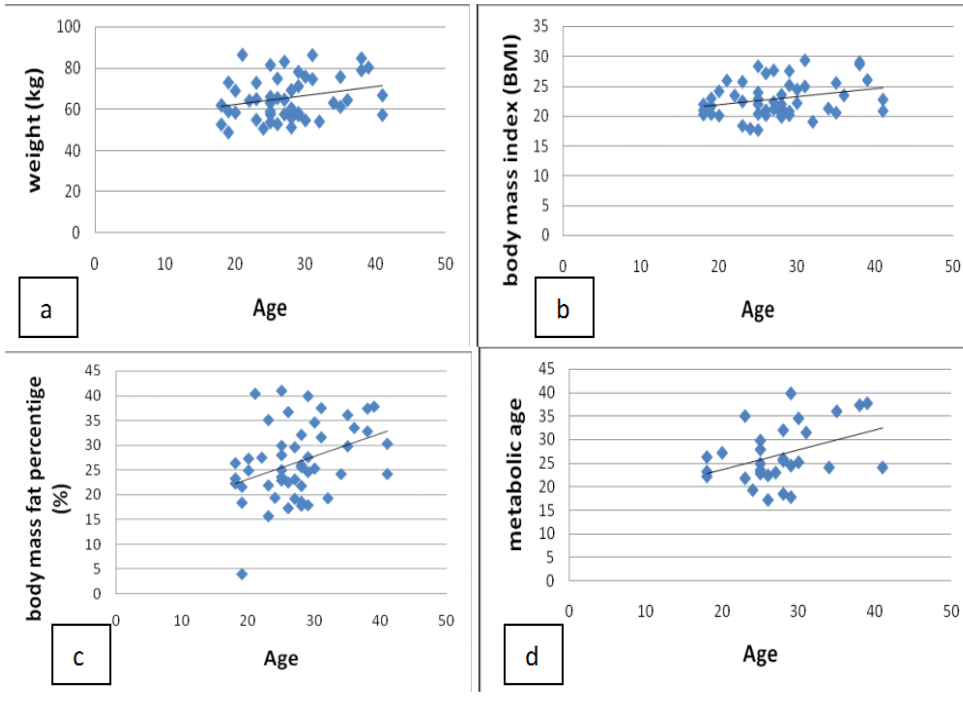

Figure 1. Correlation between age and weight (a), body mass index (b), body mass fat percentige % (c), metabolic age (d) (n=51)

- the higher a respondent's education level is, the bigger her weight is (r_s =.275, $p<0.05$), the higher the body mass index is (r_s =.342, $p<0.01$), the higher the fat percentage in the body is (r_s =.264, $p<0.05$), the bigger the muscle mass is (r_s =.310, $p<0.05$), the less the body structure type coefficient is, which shows obesity, hidden obesity or bad physical condition (r_s =-.237, $p<0.05$);
- the better a respondent's financial situation is, the less the visceral fat coefficient is (r_s =-.271, $p<0.05$).

There are some weak ($0.2<|r_s|<0.49$) correlations between the habits of spending leisure and the body composition parameters:

- the more often one attends sports competitions, the higher the body structure type coefficient is, which shows that the body is trained, muscled (r_s = .342, $p<0.01$) (see Fig. 2);
- the more often one chats with neighbors or acquaintances, the less the body mass index is (r_s = -.248, $p<0.05$);

- the most often one eats out, the less the fat percentage in the body is ($rs = -.239$, $p<0.05$);
- the more one goes to the cinema, the less her weight is ($rs = -.255$, $p<0.05$);
- the most often one visits her friends or acquaintances, the less her body weight is ($rs = -.253$, $p<0.05$), and the less the body mass index is ($rs = -.305$, $p<0.05$) (see Fig.2).

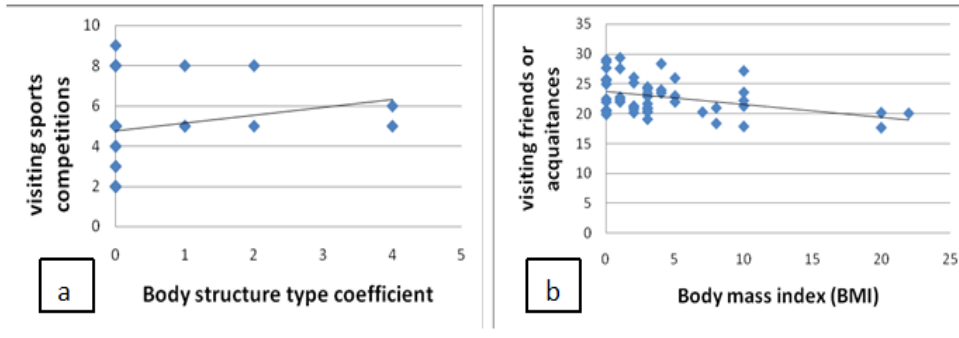

Figure 2. Correlation between body structure type coefficient and visiting sports competitions (a), body mass index and visiting friends/acquaintances (b) (n=51)

There are several medium close ($0.5<|rs|<0.69$) and close ($0.7<|rs|<0.99$) (Dravnieks, J., 2012) correlations between the body composition parameters:

- the more is weight, the higher the body mass index is ($rs = .914$, $p<0.01$); the higher the fat percentage is ($rs= .695$, $p<0.01$), the less there is water amount in the body ($rs = -.733$, $p<0.01$), the higher the visceral fat coefficient is ($rs = .736$, $p<0.01$), the less the body structure type coefficient is which draws closer to the obesity coefficient ($rs = -.538$, $p<0.01$) and the higher the metabolic age is ($rs = .742$, $p<0.01$);
- the higher the fat percentage is, the less there is water amount in the body ($rs = -.880$, $p<0.01$), the higher the visceral fat coefficient is ($rs =.784$, $p<0.01$), the higher the metabolic age is ($rs =.815$, $p<0.01$);
- the less there is water amount in the body, the higher the visceral fat coefficient is ($rs = -.918$, $p<0.01$), the less the body structure type coefficient is (obesity, hidden obesity) ($rs = .729$, $p<0.01$); the less

- metabolism in rest state is (rs = -.304, p<0.05), the higher the metabolic age is (rs = -.939, p<0.01).

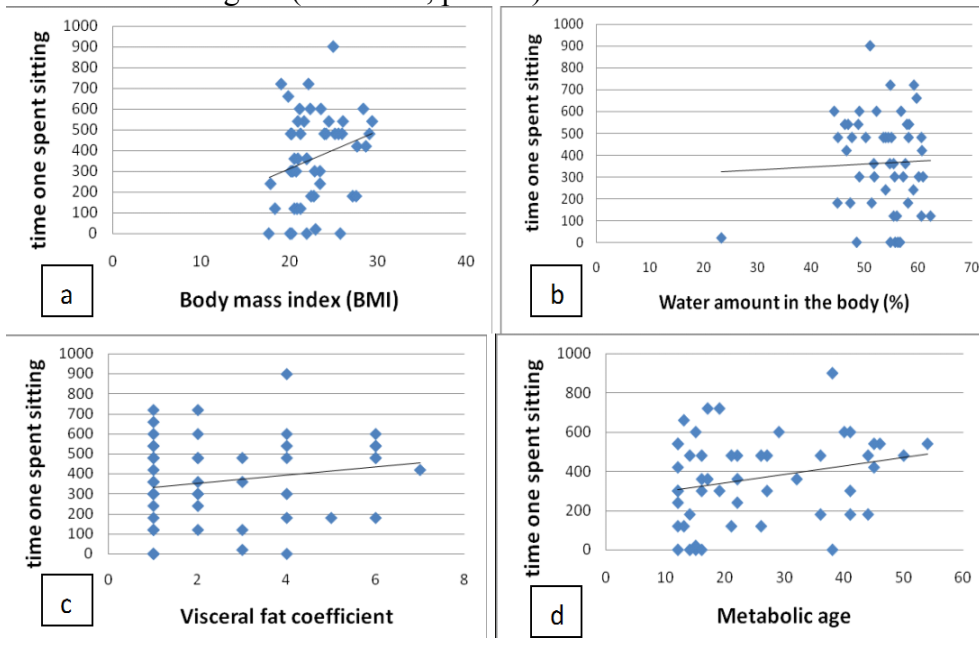

Figure 3. Correlation between the time one spends sitting and the body mass index (a), water amount in body (b), visceral fat coefficient (c), metabolic age (d) (n=51)

Studying women in fitness, several weak and medium close correlations are stated between the body composition parameters and the kinds and amount of physical activities:

- the less one does very hard physical activities, the bigger the body weight is (rs = -.312, p<0.01); the higher the fat percentage in the body is (rs = -.327, p<0.05), the less the body mass is (rs = -.254, p<0.01); the less the body structure type coefficient is (obesity, hidden obesity) (rs = .408, p<0.01), the slower metabolism is (rs = -.308, p<0.05).
- the less a respondent does moderate physical activities, the less there is water amount in the body (rs = .252, p<0.05), the higher the metabolic age is (rs = -.250, p<0.05).
- the more hours one spends sitting, the higher the body mass index is (rs = .245, p<0.05), the higher the fat percentage in the body is (rs = -.243, p<0.05), the less there is water amount in the body (rs = -.243, p<0.05), the higher the visceral fat coefficient is (rs = .255, p<0.05),

- the less muscle mass is ($rs = -.243$, $p<0.05$), the slower metabolism is ($rs = -.243$, $p<0.05$) and the higher the metabolic age is ($rs = .245$, $p<0.05$) (see Fig.3).

Discussion

Having compared the study results to other researches on body composition, physical activities and the objective factors of life quality, it can be concluded that in several researches there are similar connections as between the parameters of our study. However, most part of researches is about children and the subjects of puberty period, as well as people at senior age (+55).

In our study there was a correlation between the women's in fitness body composition parameters, the kind and amount of physical activities. That is, by increasing physical activities or changing their kind, we can beneficially affect the body composition parameters. In the research of 2013 it was proved that low intensity physical activities can decrease women's body fat percentage and increase their muscle mass (Fuentes Bravo et al., 2013). In the research about the effect of dancing classes on women's body composition it was testified that aerobic load, such as dancing, can positively change the body composition parameters (Kostić et al., 2006). In the research about physical activities, health and body composition it was also stated that any physical activity protects us from physical dysfunctions and beneficially affects body composition (Brach, et al., 2004). In the research of 2006 about body composition and physical activities during the puberty period it was stated that without changing the diet, but doing physical activities 3 hours per week it is possible to decrease body fat percentage, to increase muscle and bone mass ($p<0.05$), as well as an correlation was stated between the body muscle mass and fat percentage ($r_s = - 0.37$, $p<0.05$) (Ara, et al., 2006). In another research was stated, that in order to positively affect body composition, in the sedentary women it is enough to control the energy balance, whereas in those that trained regularly it is necessary to control energy balance and composition of daily meals (D'Angelo et.al. 2010). In the research about body management it was pointed out that the first what should be done to decrease weight and get rid of the excess weight is to change one's lifestyle, what includes the increase of the amount of physical activities (A statement of the American Diabetes Association, the North American Association for the Study of Obesity, and the American Society for Clinical Nutrition, 2005).

As another interconnection of our research the correlation was shown between the body composition parameters and the habits of spending one's

leisure time, what emphasized that the more active one is in one's leisure time, the more his/her body composition parameters correspond to the norm. In the research of 2001 about young women and men it was proved that the body fat percentage and the body mass index of those who have an active lifestyle correspond to the norm (Görner et al., 2001). In the research of 2002 about the body composition and physical activities at senior age (55+) there was also a correlation between age, leisure time spending habits and fat percentage in women, but there was no correlation between age, leisure time spending, muscle and bone mass in men and women ($p<0.01$) (Hughes et al., 2002).

In our research there was another correlation found out between the objective factors of life quality and body composition parameters. So, changing the objective factors of life quality we can change the body composition parameters. In 2008 in the research about body composition, physical activities and life quality a correlation was stated between the increase of physical activities and the improvement of body composition with the result of the increase of life quality level ($p<0.01$) (Knöpfli et al., 2008). In 2009 in the research about the effect of diet and physical activities on the body composition parameters and life quality it was proved that weight management programs that facilitates eating of healthy food and increase of physical activity amount can improve life quality (Yackobovitch-Gavana et al., 2009). In the research about bad life quality of Mexicans, living in the USA and suffering from obesity, it was testified that even decrease of small weight can improve one's life quality and psychological feeling (Tyler et al., 2007).

Having summed up the data about research articles about body composition, physical activities and life quality parameters, it can be concluded that these factors are interrelated.

Conclusions

In our study about women in fitness it was found out that there are several weak correlations between the body composition parameters and kind and amount of physical activities, for example, between the time how long very hard physical activities are executed and body weight ($r_s = -.312$, $p<0.01$); between the time how long moderate physical activities are executed and the metabolic age ($r_s = -.250$, $p<0.05$); between the time how long one spends sitting and the visceral fat coefficient ($r_s = .255$, $p<0.05$).

There are also several weak and one medium close correlation between the body composition parameters and the objective life quality parameters, for example, age and the visceral fat coefficient ($r_s = .460$,

$p<0.01$); education level and the body mass index (r_s =.342, $p<0.01$); financial situation and the body visceral fat coefficient (r_s =-.271, $p<0.05$).

It was stated in the study about women in fitness that there are several weak correlations between the leisure time spending habits and the body composition parameters, for example, attending sports competitions and the body structure type coefficient (r_s = ,342, $p<0,01$); visiting friends and acquaintances and the body mass index (r_s = -.305, $p<0.05$). There are several medium close and close correlations between the body composition parameters: weight and the fat percentage (r_s = .695, $p<0.01$), water amount in the body (r_s = -.733, $p<0.01$), the visceral fat coefficient (r_s = .736, $p<0.01$).

The women's involved in fitness the body composition parameters are affected by the amount and kind of physical activities, the time how long one spends sitting, the objective life quality parameters and also the leisure time spending habits.

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