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Relationship between body composition and general health of male students

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ABSTRACT

Each person's general health can be threatened by various factors. Although both general health and body composition variables have a mutual influence on each other, the more body composition components shift away from the normal conditions, the more they might affect the individual's general health. This study aims to investigate the association between general health and body composition status of male students. Participants were 219 male students, with a mean age of (22.9 ± 3.01) , height of (174.62 ± 6.31) and Weight of (65 ± 9.9) who have been selected as volunteers. The amount of liquid, percent of body fat, protein and minerals in participants' body was measured using Body Composition device. In order to evaluate the general health of participants, General Health Questionnaire GHQ28 was used. Descriptive statistics were used to classify and modify the data, and the Spearman correlation coefficient was used to determine the relationship between variables at the level $\alpha \leq 0.05$. The results showed that there is a significant relation between the amount of body liquid and general health ($r=0.151, p=0.026$), percent of body fat and general health ($r=0.154, p=0.023$) protein and general health ($r=0.2, p=0.001$), weight and general health ($r=0.133, p=0.049$) and the body minerals and general health ($r=0.157, p=0.001$) of participants. Also, there was no significant association between the height and general health factors ($p=0.683, r=0.028$) and the age and general health ($p=0.09, r=0.122$) of participants. The findings of this study suggest that body composition and factors affecting it such as physical activities could have a significant influence on improvement of general health among students; therefore implementing exercise programs and events is essential to increase physical and psychological health of students.

Key word: general health, body composition, General Health Questionnaire GHQ28, percent of body fat, body liquid.

INTRODUCTION

Regular physical activity, mental health and happiness connected with each other. Mental health is a state in which people are able to have activities in the society easily and their progress and achievements would be joyful for them [1]. Previous studies have often shown that there is a relation between physical activity and improvement of psychological health, physical health and life satisfaction [2, 3]. Epidemiological and clinical studies also show a relation between physical activity and decrease of anxiety and depression [4, 5]. These studies confirm a negative relationship between physical activity and depression and anxiety. Other clinical data show that physical activities can lead to body composition fitness and they are related to positive feelings and emotions as well as increasing psychological health. These studies particularly show that aerobic physical activity decreases depression symptoms and the fitness gained through exercise is useful for our psychological and physical health [6]. Results from studies

on correlation showed that participants with psychological distress are in a lower level compared to participants with higher psychological health, in terms of fitness [7, 8]. Similarly, the study showed that participants with physical activity have a better psychological health than inactive participants.

Adolescence and puberty is a vulnerable period due to physical, cognitive, emotional and behavioral changes and increase in psychological problems is reported to occur during this period [9, 10]. Results from different studies show that incidence of psychological distress is higher among girls than boys [11, 12]. Several studies have been conducted on the relationship between body composition and general health in adolescents. In a study by Slettakk et al (2011)[13] on Norwegian adolescents, they did not find any significant relationship between different measurements of body composition and depression symptoms. In another study by Cortese et al (2009)[14] they figured out that girls with weights higher than the average or lower than the average have the highest level of depression, while the highest level of depression among boys were reported to occur in obese ones. Erermis et al (2004)[15] showed that psychological disorders (depression, behavioral problems and lack of self-esteem) were higher among obese adolescents than adolescents who were not obese. However, other studies have not found such relationships [16,17]. It is also reported that physical activity has a desirable effect on some psychological problems such as depression, distress and behavioral problems among adolescents [18, 19, 20, 21, 22]. A review of 54 studies showed that most of the results show a reversal relationship between physical activity and depression [23]. However, another study by Larun et al (2003)[18] on effect of fitness exercise on prevention and treatment of depression and distress among adolescents showed that physical activity has just a negligible influence on depression.

The present study aims at scrutinizing body composition, fat percent and its distribution pattern in body and its relationship with general health of male students; A subject on which lots of studies are conducted, but there are many pros and cons of its results and we are in search of reasons why there are so many incongruence , here.

MATERIALS AND METHODS

Methodology

The participants of this study were male students (n= 9550). The statistical sample of this study was a group of 219 male students between an age range of 18-30 and they were tested voluntarily. To collect the data required for examining the general health of participants we used GHQ28 questionnaire [24]. GHQ28 questionnaire is consisting of four subsidiary measures which evaluate physical symptoms, distress, sleep disorder, social function disorder and severe depression. The questionnaire is a multi choice test. To grade the questionnaire we used Likert scale. The amount of body fat percent, weight, body protein and body liquid of the participants were measured through Body Composition Analyzer 720, made in South Korea, in laboratory. Body composition of participants was tested after examining their psychological health, by meeting some criteria. For example, they should not have any physical activity before the test, their last meal has to be served at least 3 hours before the test and they should take a shower prior to the test.

Statistical Method

To study the relationship between body composition and psychological health we used Spearman's correlation test for measuring the relationship between variables. The alpha error is considered to be at $\alpha \leq 0.05$ level.

RESULTS

Individual characteristics of the subjects are presented in table 1.

Table 1. Individual characteristics of subjects

Variable statistical index	Age	Height	Weight	BMI	Body liquid	Body protein	Body fat percent	Body minerals	general health
Mean	22.9	174.62	65.	21/52	41.02	21.4	14.15	0.81	22.9
Standard Deviation	3.01	6.31	9.91	3/6	4.82	2.6	5.55	0.03	10.8

As it is shown in Table 1, the average body fat percent is 14.15 which is in a relatively normal range. Also according to the data on Table 1, the amount of body protein is in a low level and it shows that participants have a low BMI, in spite of their normal weight.

Table 2. Results from Spearman correlation coefficient among research variables

Statistical index Variable	Spearman correlation coefficient (r)	p-value (P)
Percent of body fat and general health	0.154	0.023*
Weight and general health	0.133	0.049*
Body minerals and general health	0.157	0.001*
Body liquids and general health	0.151	0.026*
Body proteins and general health	0.2	0.001*
Height and general health	0.028	0.683
Age and general health	0.122	0.09

As the Table 2 shows, there is a significant relationship between the general health of participants and their levels of body fat percent ($P=0.01$), weight ($P=0.049$), body minerals ($P=0.01$), body liquids ($P=0.026$) and body proteins ($P=0.001$). However, there was a stronger association between the amount of minerals and body proteins with the general health of participants. There was no significant relationship between general health of participants and their height ($P=0.683$) and age ($P=0.09$).

DISCUSSION AND CONCLUSION

Several factors lead to psychological tension in people, including environmental, social, organizational, personal and economical factors. Today it is proved that better amenity with community requires adequate physical fitness, body composition and psychological health of the individuals and if they have not such qualifications, they will be solitary, pessimist and in other words they will not have adequate equilibrium in terms of their psychological health [25]. A longitudinal study on employees by Kouvonen et al (2005)[26] shows a weak relationship between work stress and BMI. Another study on stress-related eating and drinking behavior (the attempt to get better feelings by eating and drinking in stressful situations) showed a significant relationship with obesity in women, while there was not such a report about men [27]. There might be a particular answer related to sex, according to which women have more inclination to eating in stressful situations, compared to men. However men could use other oral behaviors like consuming alcohol [28] or cigarette [29] as a strategy against stress and psychological tension. If the stress-related avidity is related to obesity then it is safe to assume that obese people will consume more food in response to stress and psychological tension, compared to thin people.

Results of the present study show that there is a significant relationship between body fat percent and general health. These findings confirm the findings of studies by Adams et al (2007)[24], Stewart et al (2003)[30], Lagerberg (2005)[30] and Jorm et al (2003)[31]. Inactiveness or lack of physical activity along with other factors such as inheritance, low level of fat oxidation, weak performance of sympathetic nervous system, decline of leptin level in plasma, stress, economical and social status and lack of control on diets can bring us an issue called obesity. According to several studies, this issue is the source of many diseases like diabetes type 2, increase in blood pressure, stroke, joints inflammation and insufficiencies during child-birth [32,33]. Decrease in energy consumption for occupational activities and personal duties and daily affairs which is an outcome of mechanical life and change of work environment and professions, is one of the reasons behind obesity. On the other hand, eating habits have an important role in creating a positive equilibrium in energy and thus lead to increase of weight and obesity. Eating full-fat foods along with inactive life style, as well as some eating disorders in recent decades are some of the factors affecting the equilibrium between energy consumption and the input foods [34]. While physical activity can, in addition to increasing the physical health and control of body metabolism, improve the psychological health of individuals. Because having a healthy and active body will itself decrease depression, distress and it will increase self-esteem and other psychological health factors.

Results of the present study show that there is a significant relationship between body liquids and general health of the participants. In fact some two third of body weight consists of water and through the aging and by decrease of active fibers, the amount of liquids in body will decrease. This portion can vary depending on age, sex and level of obesity. Gradually as the age increases, the portion of total body weight in terms of liquids will decrease. This is because of the fact that by aging the amount of body fat will increase and thus the amount of body liquids will be decreased [35]. The decrease in amount of body liquids is followed by symptoms and disorders like exhaustion, stupor, decrease in urination, increase of heart rate and etc. One of the other risks following the lack of body liquids is the decrease in efficiency of the cells. The body consists of millions of cells. Many factors affect them and one of

the most important factors is the lack of liquids in body. Thus according to the above mentioned facts (i.e, the decrease in body liquids due to age and increase of obesity) we can conclude that one of the probable reasons behind the influence of body liquids on psychological health can be the increase of body fat in solitary individuals.

The results of our study show no significant relationship between age and general health. The reason behind this might be the fact that there is no relationship between age and psychological health, that is there are some individuals who have general disorders in spite of their young age and also there are some individuals who are healthy in spite of their eldership. It means that individual's age has no significant influence on his/her general health. One of the other probable reasons for this might be the fact that the more the individuals get older and experience the life conditions, they will find more accordance with the conditions and thus this experience decreases the probable effects of age on general health. Also as all our participants were in a range of 18 to 30 years, thus they are in an equivalent age range and therefore we can not exactly watch the effect of age factor on psychological health. This should be considered in future studies.

The results of the present study makes us believe that , in addition to economical and social issues in each society, the physical and general health of community individuals and especially the students are of most importance, too. Thus it is highly recommended that governments should design and implement various exercise programs to solve this problem among students.

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