THE RELATIONSHIP BETWEEN FITNESS AND BODY COMPOSITION WITH GENERAL HEALTH OF NON-ATHLETE HIGH SCHOOL STUDENTS IN MIANDOAB

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Abstract:

The aim of this study was to investigate the relationship between physical fitness and body composition with overall health of non-athlete high school boys of Miandoab in 2014-2015 school year. One hundred one students were selected by convenience sampling method. To check the physical fitness, subjects' indices such abdominal muscle endurance (sit up), flexibility (seated hand stretch to toe), cardiorespiratory endurance (548 meter race), agility (4 in 9 meters race) shoulder girdle muscles endurance (modified horizontal bar), sprint (45 meters), and body composition by measuring subcutaneous fat in triceps and calf using Slater et al formula were measured. To check the general health status, General Health Questionnaire was used. Analysis of the data showed that there was no significant relationship between body composition components (P=0.045). No significant relationship was observed between physical fitness and general health subscales (P=0.292), which may be due to sampling foolproof. There was a significant relationship between flexibility and cardio-respiratory endurance with some general health measures (P=0.038). The negative correlation between the level of physical fitness and general health indicators and its scores' getting lower indicate a lack of physical and mental health. Moreover, the significance of the relationship between flexibility and cardio-respiratory endurance with indices of general health factors may be due to the impact of fitness elements on individuals' health*.*

Keywords: fitness, body composition, general health, non-athlete

Introduction

In many countries of the world, adolescents make up the majority of the population (45). Adolescence is the sensitive stage in which one's quality of future life takes shape. It is a transitional stage of life and the bridge between childhood and adulthood (41). Many of the diseases in this period will affect the quality of life in the future. One of these diseases is obesity, which is associated with an increased risk of side effects later in life (22). The prevalence of overweight and obesity has increased rapidly in recent decades (21,28,35). It is expected that two third of the burden of diseases in 2020 will be related to non-communicable chronic diseases that are often associated with nutrition and way of life (12,37).

Recognizing factors affecting physical and mental health is of cases that human has been looking to discover (6). Investigations show that obesity in children and adolescents is a complex health problem that depends on numerous factors including parental obesity, childhood nutrition, socio-economic status, and physical activity (29). Overweight and obesity in adolescence even independent of obesity in adulthood increase the risk of metabolic diseases in later years and can affect growth and sexual maturation (23,34). Obesity in children is associated with psychological abuse from classmates, and its complications are shown in form of cardiovascular diseases, blood pressure, diabetes, etc. (2,13,26,33). In fact, the purpose of the activity and regular exercise is to achieve optimum physical condition to have more health, happiness, and longer useful life (17). Reduced physical activity and, consequently, reduced physical fitness can cause weight gain, and abnormal weight gain is the beginning of many diseases of body and spirit (21,45). Preventing obesity in childhood and adolescence is needed not only due to its early physical and psychological effects, but also due to adult obesity, mortality, and its heavy economic costs to society. Studies show that obesity in adulthood is directly related to obesity in childhood and adolescence (11).

Galougahi (2002) in his study of physical fitness relation to mental health using GHQ28 questionnaire and its subscales in stress of guidance school boys of Behshahr said that there was significantly a negative relationship among all the measures of general health and fitness level (4).

Rahmani Nia (2007) examined the relationship between underweight and overweight with physical fitness of primary, guidance and high school boy and girl students in Arak. The results showed a significant relationship between underweight and physical fitness of students (P<0.05) whereas no significant relationship was found between students' physical fitness and overweight (3). Abu Omar et al (2004) examined physical activity, fitness and general health of the people, and in their findings

indicated that people with more activity and better physical fitness have good health and more favorable general health (8,18).

Tero Teral And Pinar Aayi (2009) in a study titled "The relationship between overweight and obesity with physical fitness of children 9 to 12 years in South Africa" studied 280 children of 9 to 12 years regarding anthropometric measurements (body fat and body mass index) and fitness factors (cardiovascular endurance, body composition, muscular endurance, muscular power, and flexibility) and concluded that overweight and obesity have a negative impact on fitness, and health of obese people (42).

Elirmaei (2006) examined the relationship between public health and body mass index (BMI) of 300 women who referred to health centers in the Sanandaj. In the study, he used two-part (GHQ-12) general health questionnaire and demographic characteristics in regular interview method and measurement of height and weight. He concluded that there is no significant correlation between general health and BMI (5). Fitness that is the result of physical activity and exercise has been emphasized as a basis for achieving proper mental condition. Results show that exercise is effective in improving mental conditions such as depression, anxiety and self-esteem (1).

Research results show that better compatibility with the environment needs the balance between person's physical fitness and body composition. If people are not in favorable physical and body composition conditions, they are usually withdrawn, pessimistic and isolated, or in other words, they will not have a good mental balance (24).

Awareness of level of physical and mental health of children and adolescents can play a significant role in planning to reduce disruptions and improve their health in adulthood, so controlling this problem in adolescence and childhood is of great importance.

A lot of research has been carried out on the relationship between physical fitness, body composition and general health of the students, but the relationship of these factors in adolescent boys is neglected topic teenage boys, so the present study, examines the relationship between physical fitness and body composition with general health of non-athlete male high school students.

Research Methodology

This study is a descriptive correlational study that was conducted in field way. One hundred and one high school students were selected through convenience sampling method. Body mass was measured by digital bereru scale with accuracy of 0.1 kg, with a minimum clothes without shoes, and the height was measured using stadiometer

device 0.1 cm. Body mass index (BMI) for each subject was measured by the ratio of weight in kilograms to the square of height in meters. To determine the overweight, (BMI) percentiles of Centers for Disease Control (CDC) were used. BMI between 85 and 95 percentile was considered as overweight and more than 95 was considered as obese (15).

After completing the consent form prepared by the students and their parents, form of readiness to participate in the study was completed. Body fat percentage was measured by two point subcutaneous method (calf and triceps) with calipers and on the basis of Slater and colleagues' formula (39). The least waist circumference (between last future iliac crest) and widest part of the hip were measured by strap meter. General health score was determined using GHQ-28 questionnaire whose reliability and validity in Iranian society and Miandoab have been reviewed and approved (32). Thirty non-athlete boys out of the research filled out General Health Questionnaire (GHQ-28) and based on Cronbach's alpha coefficient its internal reliability was obtained as 0.75.

To assess the fitness levels of the test subjects the following test were used: sit-ups in one minute, to measure abdominal muscle strength; modified horizontal bar, to measure shoulder girdle muscle endurance; traction board to measure flexibility of posterior thigh and lower back muscles; 548 meter race to measure cardiorespiratory endurance, 4 in 9 meter race to measure agility, and 45 meter race to measure speed. To determine the correlation between the different factors, Pearson's correlation coefficient was used in this study. The minimum level of significance in this study was considered as (a<0.05). Statistical analysis was performed using SPSS version 20.

Findings

Study results showed a negative relationship between physical fitness and general health with its all subscales that was not statistically significant and a negative significant correlation between flexibility and physical symptoms and a significant positive correlation between cardio-respiratory endurance and symptoms of depression and general health (P<0.05).

The relationship between general health and body composition components was not significant. However, there was a significant correlation between fat-free mass, following general health with depression symptoms and body fat mass with social functioning and interpersonal symptoms and social and symptoms, social functioning, BMI and social functioning of the boys (P<0.05). There was a negative correlation between WHR with general health of boys, which was not statistically significant (P>0.05).

Anthropometric characteristics and body composition of the subjects by age are presented in Table 1*.*

Frequency	The mean and standard deviation	Indices / Variables
	0.95±16.59	Age (years)
	6.26±158.96	Height (cm)
	10.94±74.73	Body mass (kg)
	23.20±28.88	Body mass index (kg / m)
	7.88±102.50	Waist circumference (cm)
101	7.12 ±108.81	Hip circumference (cm)
	0.0341±0.9378	Waist-to-hip ratio (WHR)
	5.21 ±26.45	Triceps skinfold (mm)
	6.17±30.16	Subcutaneous fat calf (mm)
	7.00±39.54	Percent body fat
	8.23±30.13	Body fat mass (kg)
	77.70±44.43	Lean body mass (kg)

Table 1: Anthropometric characteristics and body composition of subjects

Frequency	The mean and standard deviation	Indices / Variable
	53.8 ±14.17	Sit-ups (number / minute)
	67.8 ±40.35	Flexibility (cm)
	43.1 ±66.13	4 in 9 m race (s)
101	41.1 ±27.13	45 meter race (s)
	92.4 ±04.5	Horizontal bar (number)
	56.0 ±59.3	548 meter race (minutes)
	30.1 ±00.10	Physical fitness score (20 points)

Table 2: The level of physical fitness of the subjects

Table 3: The general health scores of the subjects

Frequency	The mean and standard deviation	Indices / Variable
	57.3 ±21.5	The physical symptoms score
	07.4 ±70.5	The symptoms of anxiety and sleep disorders
101	89.2 ±44.7	The symptoms of social function
	90.4 ±37.5	The symptoms of depression
	72.11 ±60.23	Total score of general health

Results of the relationship between physical fitness and its components with subscales of general health of the subjects are given in Table 4.

Table 4: Results of Pearson Coefficient to determine the relationship between physical fitness and its components with subscales of general health

Predicting variable / Criterion variable		Physical readiness	Sit-ups	Flexibility	45 meter race	4in9 meter race	548 meter race	Modified Horizontal Bar
Physical symptoms	r	152.0-	051.0-	215.0-	008.0-	93	122	121.0-
	p	130	67	26	95	983	109.2	277.1
Symptoms of anxiety and sleep	r	053.0-	071.0-	152.0-	092.0-	001.0-	186	111
	p	602	617	150	98	119	856	588.1
The symptoms of social function	r	053.0-	149.0-	010.0-	017.0-	056.0-	134	007.0-
	p	600	365	34	41.1	983	249	320
Depression	r	074.0-	051.0-	171.0-	099.0-	6	205	46
	p	465	392	48.1	977	108	38	525
Symptoms of general health	r	106.0-	100.0-	187.0-	089.0-	19	217	21
	p	292	289	140	113	207	42	89

The results of the relationship between body composition and its factors with general health subscales of the subjects are provided in Table 5.

Table 5: Results of Pearson Coefficient to determine the relationship between body composition and its factors with general health subscales

Predicting variable / Criterion variable		Body composition	Body mass	BMI
Physical symptoms	r	145	127	99
	p	135	205	128
Symptoms of anxiety and sleep	r	178	150	139
	p	189	135	75
The symptoms of social function	r	257	165	208
	p	1	101	21
Depression	r	32	106	155
	p	294	294	763
Symptoms of general health	r	196	174	190
	p	81	81	57

Discussion

This study aimed to determine the relationship between body composition and physical and mental health of non-athlete boy high school in Miandoab. The findings suggest that the level of physical fitness with an average of 01±1.30 and its subscales are low. In addition, the level of physical fitness has a negative relationship with general health subscales. Most likely, the extra weight to be carried by students during physical activity reduces the physical capability and brings premature fatigue. This may lead to disappointment and frustration of physical activity and lack of participation in these sports and getting away from them (13). Reduction in physical activity and exercise reduces the level of physical fitness and leads to an increase in general health subscale scores showing the reduction of general health.

The results of this study similar to some other research findings (38,42,13) show that overweight and obesity have a reverse relationship with physical fitness, general health subscales, which is not a significant relationship and can be attributed to sampling error, but some findings have not shown this relationship precisely (3). Abdominal muscle endurance, shoulder girdle muscle endurance, agility, and flexibility are inversely related with general health and their subscale that shows the weakness

and disability of participants, and increases the general health and its subscales scores. Given the significant inverse relationship between flexibility, and physical symptoms and the negative relationship of this factor with symptoms of anxiety, sleep, depression, and general health, it can be concluded that overweight and obesity have decreased physical activity and thereby reduced flexibility. This reduction increases depression, anxiety, sleep and general health scores. It is expected that flexibility as one of the factors involved in the health and fitness help health.

Agility factor with signs and symptoms of anxiety and insomnia, and shoulder endurance factor with social functioning and physical symptoms have a negative relationship. In fact, the reduction of scores of factor such as agility and endurance of shoulder girdle increases the public health subscales scores. High score of 548-meter race, which is a sign of weakness associated with high cardiorespiratory endurance symptoms, is positively and significantly related to depression and general health.

Overweight and obesity have increased the time and the scores of these factors. This relationship may indicate poor cardiorespiratory endurance and respiratory system of the subjects. In fact, cardiorespiratory endurance can be considered as another factor effective in the health and fitness. Cardiorespiratory endurance and flexibility are considered as factors related to health and fitness, and the results of the relationship between these two factors with general health are in line with the findings of Glaougahi (2002) and Erinous et al (2005). In this survey, the results related to body composition and its subscales are similar to the findings of Mousijer (31) showing that the percentage of body fat, fat mass, lean mass are in high level. In this study, body fat percentage has a negative correlation with symptoms of anxiety and sleep, depression symptoms, and general health symptoms that shows the increased body fat percentage increased anxiety, depression and general health and reduced general health of the boys. High percentage of students' body fat stresses the need for a comprehensive prevention and control of obesity in this age group. In this study, fat-free mass with depression symptoms and general health and body fat mass with social functioning signs have significant positive relationship. In fact, high levels of fat mass and lower fat-free body mass of the subjects and social functioning symptoms, and general health are related indicating a reduction in the health of the subjects in this subscale.

In this study, abdominal obesity (WHR) for boys was as 0.8 safe, from 0.8 to 0.85 as medium risk and higher than 0.85 as high risk (42). Average abdominal obesity of the subjects studied was 0.9378±0.0341 that was considered as high-risk. Research suggests that abdominal obesity has a relationship with premature cardiovascular diseases and type two diabetes. In this study, the relationship between abdominal obesity and general health is negative, indicating that the rise in this index can reduce the general

health. In addition, body mass index has a significant positive relationship with symptoms of social function showing that as the person is overweight or obese, he will have weaker signs of social function. In this study, considering the cut-off score 23 to determine the general health status of students (32), their average general health score was more than cut-off score and also with respect to the mean scores for each scale and social function grade's being high shows inappropriateness of symptoms of general health of the subject.

Conclusion

In the past 10 years, despite the decline in received energy levels, the level of obesity in our country has increased by 15 percent. The main problem is reduced mobility and physical activity (9). Reduced physical activity leads to a reduction in physical fitness, the low level of physical fitness in adolescence is associated with obesity in adulthood and as the individual has high physical fitness in adolescence, he will have fitness higher fitness in adulthood (10). As shown in this study, the positive and meaningful relationship of flexibility and cardiovascular endurance with some general health subscales reflects the impact of these two physical fitness elements and general health of individuals. Therefore, considering the present results, we can suggest that fitness programs affecting fitness factors related to health, especially flexibility and cardio respiratory endurance be more emphasized for overweight and fat adolescents.

The significance of the relationship between fat mass and body mass index with social function symptoms can refer to the withdrawal and isolation signs of overweight and obese boys. Correlation between fat-free mass with depression symptoms and general health are of other physical evidence indicating the impact of physical status on general health.

Thus, we can suggest health-related physical fitness activities to reduce and control weight, using proper eating habits without having to go on wrong common diets, having an active lifestyle, and assessment of body composition to these people suggested so that through these we help them improve their level of health and ultimately help the community. Therefore, adolescence provides an excellent opportunity for improving the wellbeing, nutrition and health (40).

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