

Full Length Research Paper

The relationship between physical activity level, body mass index, and body fat percentage in urban and rural elementary school students

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The purpose of this study is to compare the physical activity levels, physical activity types, Body Mass Index (BMI) and body fat percentage (BF%) values of elementary school students living in rural and urban. Body height (BH), body weight (BW), BF% and BMI data were measured. Physical activity questionnaire was conducted to determine the activity types and daily activity habits of the subjects. As a result of the study it was seen that the rural student were more active and fit than urban. In this study swimming was not preferred in either urban or rural areas. Team sports are most popular physical activity in our country.

Key words: Body mass index (BMI), body fat percentage (BF%), physical activity level, elementary school student.

INTRODUCTION

Technological developments have resulted in more comfortable and less physically demanding lifestyles in developed and developing societies (Robinson, 2001; King, 200; Lohman, 1999; Grund, 2001; Preboth, 2002; Faith, 2001). One of the most significant components of a healthy lifestyle is physical activity (Twiks, 2002). Some research has been carried out in an effort to emphasize the importance of physical fitness, physical activity and overall health (Gunnar, 1998; Dos Santos, 2014). A lifestyle of regular physical activity contributes to various systems functioning more efficiently, weight maintenance, reduced risk of mortality and overall improvement of quality of life (Bouchard and Shephard, 1994).

Many factors are associated with adopting and maintaining a physically active lifestyle, such as socio-

economic status, cultural influences, lifestyle, environmental factors, and health status (Seefeldt, 2002). School athletic opportunities are a most effective factor in increasing children's physical activity (Strauss, 2001). Nowadays, children and youths find watching television or playing video games more desirable and easier than physically participating in activities themselves. Even our school systems, because of limited financial resources, have contributed to a sedentary lifestyle by devoting fewer resources to physical activity instruction, playgrounds, and after-school sports programs (King, 2000). Physical education is one of the subjects that children are required to take in school. Physical fitness is not just a benefit in sports and physical education; it is also a major factor in leading a happier life (Rudolf, 2001; Thompson,

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2001). Reilly et al. (2004) published that young people spend 80% of their time in sedentary activities and that this early sedentary lifestyle is the basic leading risk factor for obesity (Reilly, 2004). Deheeger et al. found a positive correlation between time children spend in front of the TV and body weight (Deheeger, 1996). Klesges et al. have stated that spending too much time in front of the TV not only causes inactivity but also decreases basal metabolism and energy consumption (Klesges, 1993). Another study executed in the United States of America showed that the physical activity levels decrease in children and young people. They spend 75% of the day inactive (Reilly, 2004). İşler et al. performed a study on children in the 11-14 age group where they evaluate the physical activity levels based on differences in age and gender. They said that boys are more active than girls and also subjects have moderate level physical activity capacity (Kin-İşler, 2009). Özdirenç et al. classified children in the 9-11 age group according to their socioeconomic levels and then they compared their physical activity levels. As a result of the study BMI and skin curve thicknesses of the children living in rural areas is higher than the ones living in urban areas (Özdirenç, 2005).

There are a lot of studies in many countries, which evaluate the physical activity level of children and young people (Rowlands, 2008; Trost, 2003; Docherty, 1991; Rowland, 1991; Martin, 1996). However, there are few studies in our country that compare the physical activity levels of elementary school students living in rural and urban. Therefore, the purpose of this study is to compare the physical activity levels, physical activity types, BMI and BF% values of elementary school students living in rural and urban.

MATERIAL AND METHODS

The study included 11-13 age 1030 volunteers' elementary school students who were 527 boys and 503 girls. The average of BH and BW of the subjects were 154.4 ± 10.0 cm, 47.1 ± 12.4 kg; 153.9 ± 8.1 cm, 47.7 ± 11.8 kg, boys and girls respectively. Three schools were chosen among schools in the rural and urban areas of Turkey. The necessary permissions were obtained from the parents of the students before the measurements.

The height of the participants was measured with (SECA 285, UK) a stadiometer. BW, BF% and BMI were measured by the bioimpedance method with a body composition analyser (Tanita BC 418 Weight and Segmental Body Composition Analyser, Japan).

The physical activity data were collected with the questionnaire form by meeting with the students face to face. Physical activity questionnaire was composed of 10 questions. The data were collected during face to face interviews. The physical activity questionnaire was applied to all students participating in the study. The physical activity questionnaire was composed to measure the activity types, daily movement habits of the subjects, and to measure the types and frequencies of the activities done on weekdays and weekend. The interclass correlation coefficient was calculated using the SPSS 17.0 statistics package (SPSS Inc. Chicago, USA) to determine the reliability of the questionnaires [0.92 and 0.93]. Points out of 100 for the questionnaire of each

subject formed the questionnaire points. The assessment was conducted by giving 0 point for the option of "never", 1 point for the option of "sometimes" and 2 points for the option of "every day" in the questionnaire.

The statistical analysis was used to evaluate the questionnaire score, BF% and BMI measurements. Data obtained were described, compared and correlation analysis was done. In correlation analysis, Pearson correlation coefficient value and p value belonging to this coefficient was given and the significance of the statistical relationship was tested. From the aspect of BF% and BMI in identifying whether there is a difference between the male and female students independent samples t-test analysis has been used. In comparison of the rural and urban areas and in detection of whether there is a difference among genders SPSS for Windows Version 11.0 Pearson chi-square tests were used.

RESULTS

BMI of children who live in urban is lower than that of children who live in rural area. The PAQ scores of rural girls were found higher compared to the PAQ scores of urban girls. The PAQ scores of urban boys and rural boys were found similar (Table 1). The BF% and BMI values of the urban elementary school students were relatively low compared to those of the rural elementary school students (Table 2). Walking to school is a daily activity for the rural children (Figure 1). Urban boys were found to participate in school sports more often than rural boys. Rural girls were more active in school sports than urban girls (Figure 1). Rural boys and girls had more play with pets compared to the urban boys and girls. Bicycling to school was not a popular activity for either the rural or urban students (Figure 2 3). Swimming was the least preferred activity for both urban and rural students (Figure 3). The study found that rural boys and girls participated in team sports, such as football, volleyball, and basketball (Figure 1). Games such as jump rope, and other touch games were played by girls than boys, and also these games were more popular in rural than in urban children.

DISCUSSION

The result revealed the rural boys and girls were found to have lower BF% compared to urban boys and girls. However when PAQ scores were evaluated it was seen that the rural boys were more active than rural girls, urban boys and girls. When PAQ scores are reviewed it can be seen that generally rural areas are more active than the boys and girls who live in urban. Physical inactivity and lack of exercise result in many problems including threatening or limiting a healthy life. Although the rural children were found to be similar physically active, their BF% were high due to their diet. BF% can differ according to age, nutrition, race, environmental factors and gender (Docherty, 1991; Januszek, 2014). Golan et al. said that the type of nutrition, the variety of food at home, and the manner of eating will influence

Table 1. PAQ score, BMI and BF% values in elementary school students.

	Girls		Boys	
	Rural	Urban	Rural	Urban
BF%	23,513±4,63*	25,325±6,07*	18.118±5.15*	20,459±6,36*
BMI	19,229±3,00	20,403±4,28	19,141±3,20	19,947±3,71
PAQ score	63,35±10,09	68,82±9,83	70,82±11,21	69,44±14,23

P<0.001.

Table 2. The relationship between boys and girls PAQ score, BMI and BF% values in elementary school students.

	Rural-boys	Rural-girls	Urban-boys	Urban-girls
BF%	,616	,597	,013	,041
BMI	,821	,699	,017	,071
n	272	232	244	282

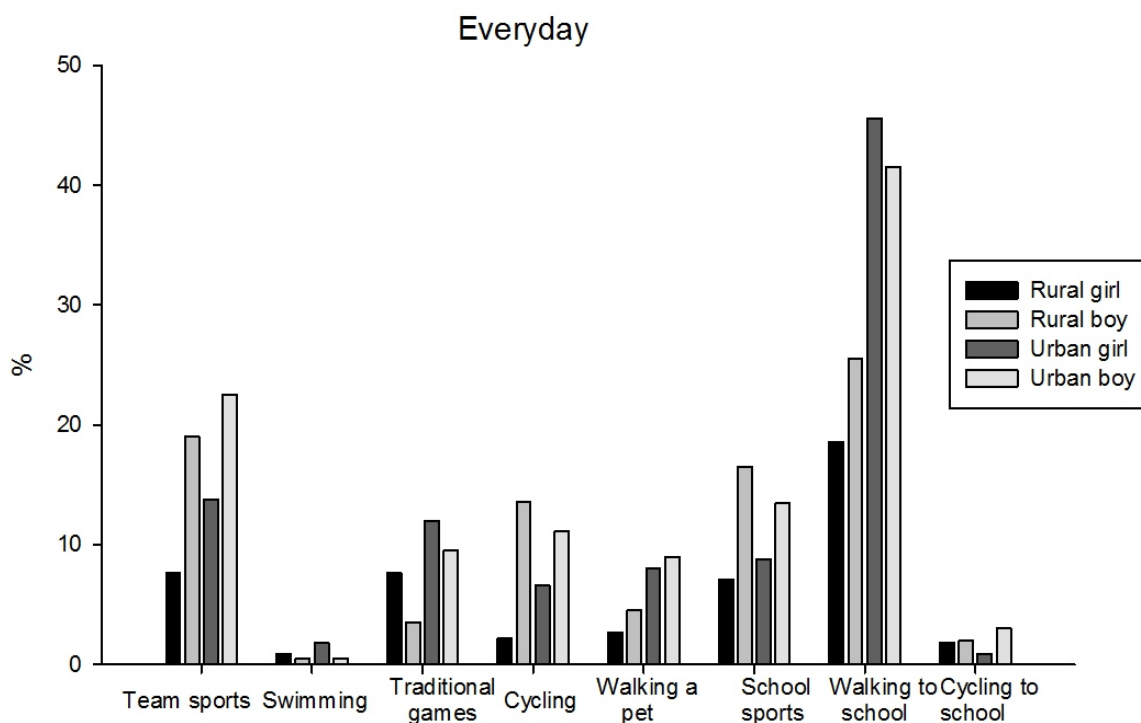


Figure 1. Rural boys and girls participated in team sports, such as football, volleyball, and basketball Every day.

BF% (Golan, 1998; Zarei, 2014). Another study found the reason for high body fat percentage to be due to the consumption of high fat content food (Birch, 2001).

Health and physical fitness improves quality of life (Seefeldt, 2002; Pate, 1990; Finn, 2002). This issue has been of great concern in recent years and it is a known fact that modern technology results in a sedentary lifestyle

(King, 2000; Seefeldt, 2002; Finn, 2002; Clark and Ferguson, 2002). It has been reported in recent studies that environmental factors, lifestyles, diet, family structure, cultural differences, and several other factors are closely related to physical fitness and physical activity. There are also contrary opinions about environmental and cultural factors (Rowlands, 2008; Finn, 2002). While some

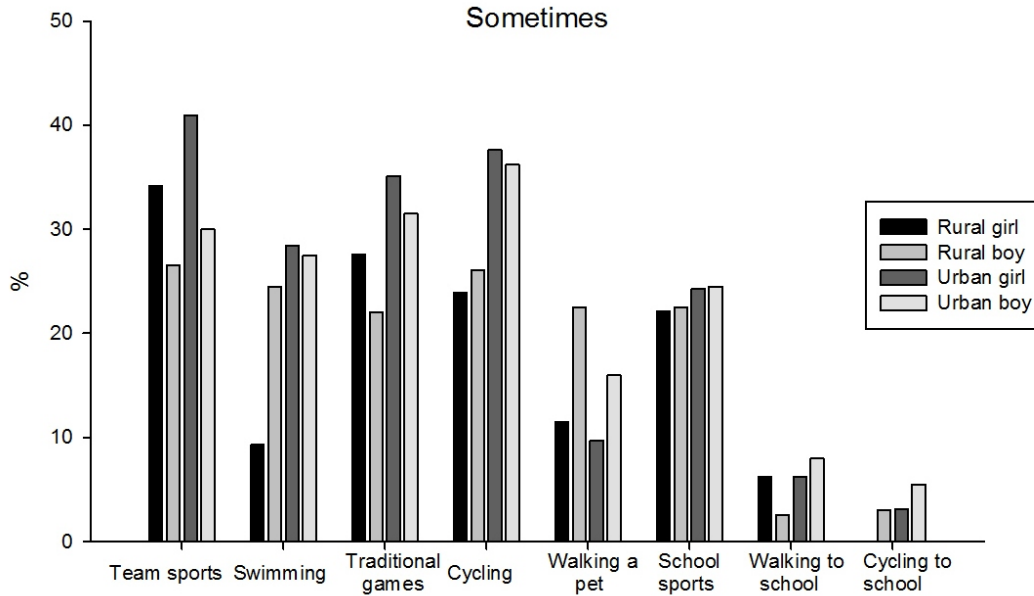


Figure 2. Rural boys and girls participated in team sports, such as football, volleyball, and basketball sometimes.

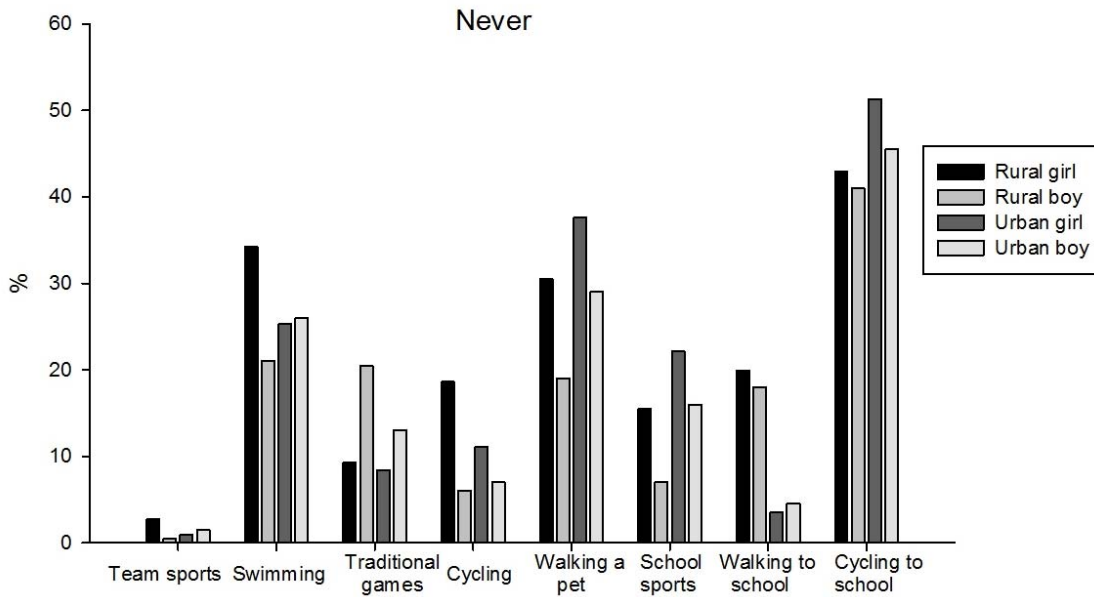


Figure 3. Rural boys and girls never participated in team sports, such as football, volleyball, and basketball.

researchers report that children living in rural areas are more inactive, it is also emphasized in other reports that urban lifestyle leads to inactivity (King, 2000; Pate, 1990). Reyes et al. indicate that changes in lifestyle will influence the physical fitness level of the people who live in regional areas (Reyes, 2003; Dos Santos, 2014). In many studies, it has been emphasized that a high rate of

BF% will influence physical activity levels in a negative way (Docherty, 1991; Rowland, 1991; Duncan, 2007). Tudor-Locke et al. found walking to school is among the most important daily physical activities (McDonald, 2008; Cooper et al, 2008). In one of the research, children walk to school to be more active than others (Tudor-Locke, 2001). Also within the frame of this study the findings

showed that the children who walk to school are more active.

This study indicates that boys living in rural participate in school sports more often than urban ones. Another study also showed that rural children participate more in school sports than urban children (Guinhouya, 2009). These results showed the lack of opportunities for external school sports activities for rural students. When the results of the current study were reviewed, it is thought that the rates of pet walking to be relatively high for the rural students. It is believed that this is influenced by rural lifestyle and environmental factors. Neither urban, nor rural children indicated a preference for bicycling to school. The physical conditions of life in rural and urban areas are thought to influence this, especially since there are no separate bicycle paths and the roads are not safe. Studies executed by McDonald and Cooper indicate that when bicycle and pedestrian roads are secure and children feel safe, they are more likely to walk or bike to school (McDonald, 2008; Cooper et al, 2008). In our country swimming was not preferred in either urban or rural areas in our investigation. The lack of sufficient facilities may influence these results. When the rates of playing of traditional games were reviewed, it was found that girls mostly played them. It can also be stated that the rural children preferred these activities more.

A study performed by Bounova et al. (2010) examined the physical activity levels of adolescents living in rural and semi-urban areas. They stated that both rural and suburban children play games, but the children who live in rural areas prefer this more. The existence of secure playing areas and good physical environmental conditions may influence this (Bounova et al, 2010). Therefore, the physical convenience levels of children are thought to differ as well. The environmental and living conditions of elementary school students may differ from country to country, or even from region to region within a country.

In our country, the physical activity opportunities may change according to the region. That urban children were found to be less active than their rural counterparts is a significant indicator of this disparity. Elementary school students more often absent from school due to weather conditions and lack of physical conditions in the villages. The state that the physical activities are measured is less. Emphasizing the significance of physical activity is the main purpose of this study. This is particularly important in urban areas where there are no sufficient areas and equipment for play, nor are there any plans to build sufficient play, sport areas and swimming pools. The lack of such areas combined with the technological developments that reduce physical activity are the factors that necessitate this subject to be taken into consideration.

As a result of this study, the elementary school children aged 11-13 may not be able to participate in sufficient physical activity in our country. However urban students were fitter than rural ones. Swimming was not preferred

in either urban or rural areas. Team sports are most popular physical activity among this aged group.

Conflict of Interests

The author has not declared any conflict of interests.

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