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An Evaluation of the Physical Activity Levels and Body Compositions of University Students

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ABSTRACT The purpose of this study was to determine the physical activity levels of university students using the International Physical Activity Questionnaire (IPAQ) and to ascertain their body compositions. Students from the departments of coaching education, physical education and sports teaching, and sport management participated in the study. The physical fitness levels of the students were determined using the IPAQ. The weights, BMI and body fat percentages of the students were measured with the Tanita-brand electronic bio-impedance. Data is analyzed through descriptive statistics, variance analysis, the Scheffe Test and the Pearson Correlation Test. Significant differences between the weight and height measurements of the groups were seen in terms of the departments. Middle-level, positive and significant relations between weight and height, weight and fat percentage, and BMI and fat percentage were seen while the relation between weight and BMI was determined as high-level, positive and significant. On the other hand, the relations between height and BMI, and fat percentage and MET were found middle-level, negative and significant.

INTRODUCTION

Today, having high standards of living has become an issue as important as living long. Physical activity has an important role in growing older healthily and reducing age-related health risks through various methods. Getting into the habit of doing regular activities from childhood, making exercise a part of daily life and increasing the amount of daily physical activity at least for each individual plays an important role in protecting the individual's health and reducing possible health threats. Physical inactivity is proven by various studies to play a significant role in causing chronic diseases such as cardiovascular diseases, diabetes, and cancer (Blair 2009; Johnson et al. 2009). However, regular and sufficient physical activity (PA) has a preventive effect against such diseases (Bassuk 2005). Therefore, it is considered important to investigate people's physical activity levels, benefits of which are important at every age. Especially for children and youngsters who spend most of their time playing games, watching TV and sitting (Subrahmanyam et al. 2000; Hu et al. 2015).

Sedentary pursuits, such as watching television and using the computer, are believed to be an important environmental factor contributing to the fact that twenty five percent of children in the United States are overweight or obese (Hill and Peter 1996).

Most parents and educators agree that outdoor play and physical activity is a natural and critical part for a child's healthy development. Through freely chosen outdoor play activities children learn some of the skills necessary for adult life, including social competence, problem solving, creative thinking, and safety skills (Miller 1989; Rivkin 1995, 2000; Moore and Wong 1997).

Physical activity enables people to live more healthily and to feel good about their selves psychologically and physically. Having a high level of physical activity is the key element to being healthy. It is a serious problem in many countries wherein people do not do regular and enough physical activity. Therefore, enabling an active lifestyle is an important component of the suggestions related to national and international public health. According to the American College of Sports Medicine (ACSM) and the American Dieticians Association, adults must complete at least 30-minutes of mid-level intensity activity every day or at least most of the week (Pate et al. 1995). Moderate to vigorous intensity physical activity (MVPA) has consistently been associated with numerous physiological and psychological health benefits in children and adolescents (Biddle and Asare 2011; Steele et al. 2008).

Populations worldwide are increasingly facing lifestyle-related health risks associated with increasing prevalence of being overweight or

obese, physical inactivity, and sedentary behaviors (WHO 2009).

It is recommended that youth participate in a minimum of 60 minutes of MVPA per day (min MVPA/d) for maintenance of general health (WHO 2010). It is also emphasized that, mid-level and/or intense activities in their free time, is completed in order to improve the physical activity levels. It is stated about physical activity levels that, 600 MET-minute/week is considered inactive, 600-3000 MET-minute/week is said to be low physical activity level, while 3000 MET-minute/week is an adequate physical activity level (Craig et al. 2003).

However, before the physical activity itself, the physical activity levels should be identified and then suggestions related to physical activity levels can be made (Haskell 1996; Kriska and Caspersen 1997). Although there have been difficulties in literature, there were more than 30 methods to measure physical activity levels (Laporte et al. 1985). Many of the researchers prefer using questionnaires due to feasibility and cost-effectiveness and as a result, many questionnaires are developed (Kreska and Caspersen 1997). One of these questionnaires is the International Physical Activity Questionnaire (IPAQ), whose validity and reliability studies are conducted by Ozturk (2005).

Of major concern is the potential for lifelong health consequences in youth. It is, therefore, our responsibility to act to preserve healthy active lifestyle behaviors for the promotion and maintenance of health and wellness, among youths (Tremblay et al. 2010). For this reason, it is believed that physical activity levels and body compositions need to be determined and physical activity should be recommended according to the results. According to this idea, the primary objective of this study was to determine the physical activity levels and body compositions of the university students.

METHODOLOGY

Research Model

The research was conducted using a survey model for determining the physical activity levels and body compositions of students at a physical education and sport school (Buyukozturk et al. 2010).

Participants

The participants consist of 452 male volunteer students who were studying at Nigde University Physical Education and Sports School in the academic year 2013-2014. In terms of the departments they study in, the students in the research group consist of 148 male students from the Physical Education and Sports Teaching Department (PEST), 135 male students from the Coaching Education (CE) department and 169 male students from the Sport Management (SM) department.

Data Collection Tools

In the study, the International Physical Activity Questionnaire (IPAQ), whose validity and reliability studies were conducted by Ozturk (2005), was used as a data collection tool. The short form, including the last seven days, was used for the evaluation of the physical activity levels. The calculation of the total score of the short form includes the sum of the time (minutes) and frequency (days) of walking, mid-level activity and intensive activity. The evaluation of all the activities requires every single activity to be done for at least 10 minutes every time. A score in "MET-minute/week" is obtained by multiplying minute, day and MET (multiples of resting oxygen consumption) values. Physical activity levels are classified as physically inactive (<600 MET-minute/week), low level of physical activity (600-3000 MET-minute/week) and adequate physical activity (beneficial for health) (>3000 MET-minute/week). Each student is first informed about the content and objectives of the study and their written approval is obtained.

Data Analysis

The weight, BMI and body fat percentage of the students were measured with Tanita-brand electronic bio impedance (BC-418 Segmental Body Composition Analyzer) and their height was measured to the nearest 0.01cm using a precision stadia meter (Seca 213 portable stadia meter). The statistical analysis of the data was done using the SPSS 17.00 program. Variance analysis was done to determine the differences between the groups. Scheffe test was used to investigate the origins of the differences that became evident in variance analysis. The level

of significance was set at $p<0.05$. Pearson Correlation test was applied to identify the relationship between body composition and physical activity levels.

FINDINGS

The descriptive statistics of the various student groups in terms of weight, height, BMI, FAT and MET values are shown in Table 1.

In Table 1, the arithmetic mean and standard deviation values of the research group students are descriptively given considering their departments. A One-Way Anova test was conducted to see if there was a significant difference in terms of the departments in which the research group students study and their weight, height, BMI, FAT and MET values. The findings are shown in Table 2.

According to Table 2, considering the comparison of all three groups, a significant difference against PEST was ascertained in weight and height measurements between PEST and CE, and PEST and SM. Also, it was seen that there were significant differences between the height values of CE and SM, and between BMI and FAT

Table 1: The weight, height, BMI, % Body FAT and MET values of students in the research group

Variables	*Groups*	*n*	*Mean*	*Standard deviation*
Weight (kg)	Physical Education and Sports Teaching	148	68.28	8.46
	Coaching Education	135	72.57	8.59
	Sport Management	169	72.21	7.27
Height (cm)	Physical Education and Sports Teaching	148	1.75	.06
	Coaching Education	135	1.77	.06
	Sport Management	169	1.76	.05
BMI (kg/m2)	Physical Education and Sports Teaching	148	22.06	2.25
	Coaching Education	135	22.57	2.47
	Sport Management	169	22.90	2.35
FAT (%)	Physical Education and Sports Teaching	148	9.99	4.66
	Coaching Education	135	10.68	5.40
	Sport Management	169	11.98	5.05
MET (minute/week)	Physical Education and Sports Teaching	148	4739.41	4194.98
	Coaching Education	135	3909.04	2965.58
	Sport Management	169	4174.27	3118.75

Table 2: The comparison of the students 'Weight, Height, BMI, FAT% and MET values in terms of their departments

		Sum of squ.	*Sd*	*Mean of squ.*	*f*	*p*	*Origin of differ. (Scheffe)*
Weight (kg)	Intergroup	1673.45	2	836.73	12.813	.000**	PEST- CE
	In-Group	29321.63	449	65.30			PEST-SM
	Total	30995.09	451				
Height (cm)	Intergroup	.043	2	.022	5.333	.005**	PEST- CE
	In-Group	1.81	449	.004			PEST-SM
	Total	1.86	451				CE - SM
BMI (kg/m2)	Intergroup	55.75	2	2788	4.998	.007**	PEST-SM
	In-Group	2504.58	449	5.58			
	Total	2560.34	451				
FAT (%)	Intergroup	325.81	2	162.91	6.410	.002**	PEST-SM
	In-Group	11410.22	449	25.41			
	Total	11736.04	451				
MET(minute/ week)	Intergroup	51703938.11	2	25851969.06	2.150	.118	
	In-Group	5399445656.04	449	12025491.44			
	Total	5451149594.15	451				

** Correlation is significant at the $p<0.01$ level.* Correlation is significant at the $p<0.05$ level.

percentage values of PEST and SM, which was against PEST ($p>0.05$). On the other hand, no significant difference between groups in terms of MET values was seen.

Pearson Correlation Test technique was used to find out the relation between the departments in which the research group students' study and their weight, height, BMI, FAT percentage and MET values. Findings were shown in Table 3.

In Table 3, the relations between different variables are: mid-level, positive and significant relation between weight and height, high level, positive and significant relation between weight and BMI, mid-level, positive and significant relation between weight and fat, mid-level, negative and significant relation between height and BMI, and mid-level, positive and significant relation between BMI and fat. Positive relation shows a direct proportion between two variables whereas a negative relation means that a variable rises while the other decreases.

DISCUSSION

Physical activity and exercise have an increasing significance in today's world. In recent years, a great number of studies on this issue have been conducted. That regular and sufficient physical activity is not done in many countries is considered a vital problem. Therefore, increase in an active lifestyle constitutes an important component of national and international public health advisory. According to the guidelines of American College of Sports Medicine (ACSM) and American Dieticians Association, adults should do at least 30-minutes of moderate physical activity every day or most of the week (Savci et al. 2006). Sedentary lifestyle negatively affects human life.

Physical activity habits differ in accordance with cultural structure, socio-economical level, individual differences and health conditions. Social characteristics are also significant elements affecting physical activity habits (Paffenbarger et al. 1993). In this study, physical activity habits of students studying in different departments in Physical Education and Sport School at Nigde University were investigated.

When the three groups are compared, a significant difference against Physical Education and Sport Teaching Department in terms of weight and height measurement is observed in the study. In addition, besides a significant difference between Coaching Education and Sport Management departments in terms of height, it is also seen that there is a significant difference between Physical Education and Sport Teaching Department and Sport Management Department. The difference is against Physical Education and Sport Teaching Department ($p>0.05$).

When it comes to MET values, no significant difference is seen among the groups. The physical activity levels of the students at all three departments were high. However, it is ascertained that there are differences in the physical activity levels of students from different departments and that there is a mid-level, negative and significant relation between the BMI and body fat rates depending on their physical activity levels. Rangel (2014) conducted a study on college students and examined their health behavior in terms of physical activity and dietary habits. In the study, half of the students were found to be physically inactive. The study also revealed an association

Table 3: Correlation table that shows the relations among the variables

		Height	*BMI*	*FAT*	*MET*
Weight (kg)	r	.503(**)	.744(**)	.522(**)	.034
	p	.000	.000	.000	.466
	n	452	452	452	452
Height (cm)	r	1	-.099(*)	-.008	.050
	p		.035	.871	.285
	n		452	452	452
BMI (kg/m2)	r		1	.681(**)	-.040
	p			.000	.393
	n			452	452
FAT (%)	r			1	-.191(**)
	p				.000
	n				452

** Correlation is significant at the $p<0.01$ level (2-tailed).* Correlation is significant at the $p<0.05$ level (2-tailed).

between physical inactivity and excessive weight. This result fits the findings of this study that indicates a relation between physical activity and fat rate.

The ratio between fat and lean body mass is a result of physiology, ageing, energy intake, and physical activity (Cartwright et al. 2007; Heitmann et al. 2009). Ageing is characterized by loss of subcutaneous fat and ectopic fat deposition (Cartwright et al. 2007). However, due to the high correlation of BMI with body fat, BMI is generally considered a reasonable measure of obesity in epidemiological studies.

Watts et al. (2003) have found significant differences between the BMI values of 11-12-aged climbers who deal with various sports and those of inactive children. In addition, Bockous et al. (1990) have found significant differences between the BMI values of adolescents who do exercise regularly and of those who do not exercise regularly in their study, whose results are similar to our findings in terms of significance.

In the study conducted by Bas Aslan et al. (2007), a significant difference between female and male students was found in terms of total hours/week values of all the activities reported according to FAD questionnaire. Besides, some differences in how intense and mid-level activities are done are also determined in terms of gender. Intensive activities are found to be high among male students while mid-level activities are high in female students.

In the study at Athens Technology Institute of Education, a short form of physical activity questionnaire is applied to 218 healthy students between the ages of 19 to 29. The physical activity levels of the participants were found (0.84 - 0.93) to be high (Papathanasiou et al. 2009).

In the study, the results of the three groups (PEST - CE - SM) were found high as the same as this study. A study in which 479 university students participated was conducted in Sweden. In the study, the physical activity habits of the participants were evaluated with one single question and their health habits and motivations were also investigated. The results of the study showed no significant difference between the physical activity habits of males and females. The gender differences are discussed in relation to the impact of stress on female students' health, and the risk for male students in having unhealthy nutritional habits in combination with being physically inactive and drinking too much alcohol (Von Bothmer and Fridlund 2005).

Carol et al. (1992) investigated the effects of aerobics, dance and run-walk exercise on performance with 60 male and female participants whose ages varied from 24 to 48. The subjects were divided into two groups and one group was exposed to an 8-week aerobics dance program while the other group did run-walk exercises for 8 weeks. As a result, no significant difference between the weights of both groups was found**.** Leslie et al. (1999) found in the study they conducted with 2729 university students in Australia, that forty- seven percent of female students and thirty-two percent of male students were physically inactive.

In a study by Özkan et al. (2005), the International Physical Activity Questionnaire (IPAQ) was used to determine the physical activity levels of individuals. Findings of the study showed that weekly energy consumption of individuals were 2249.62 ±2253.91 MET-min/week on average. The participants of the study were office workers and this, according to the researchers of the study, explained the low physical activity levels of the individuals. In another study with similar results, Öztürk et al. (2005) found out that only 17.7 percent of the students participating in the study were very active while the rest of them were either little active or inactive. The participants of the study were students from various departments requiring no physical activity, which may explain the low or even no- physical activity levels. Hallal et al. (2000) found in their study that fifty-nine percent of individuals who were 20 or over 20 were active. In the study, physical activity levels of male individuals were found to be high, which is a similar result to the result of our study. In a study by Bergier et al. (2014), the physical activity levels of 2125 Ukrainian students were measured and the mean total physical activity level was found to be 3.560 MET. Dabrowska et al. (2013) conducted a study on 300 students from the schools of physical therapy, midwifery, nursing, pharmacy, cosmetology, and medicine at the Medical University of Silesia. In the study, the short form of the International Physical Activity Questionnaire (IPAQ) was used to evaluate physical activity levels. The findings of the study revealed that, although they were well trained regarding the benefits of physical activity, a large number of students did not meet the recommended level of physical activity. The participants of this study were physical education and sports school students and

this may explain high physical activity levels found in the study.

CONCLUSION

In order to encourage individuals to participate in physical activities, we need to determine the physical activity levels of the groups. The results of our study show that the students in all three departments have high physical activity levels and there was little difference among them. The physical activity levels of students in Physical Education and Sports Teaching, Coaching Education, and Sport Management are 4194.98, 2965.58 and 3118.75 respectively. PEST students are required to have the highest activity levels and grades in the school entrance exam and, during their four-year education, they also take classes which require more activity, which may be the reason why they have the highest activity levels. The study shows that there is an inverse correlation between physical activity levels and weight, height, BMI and FAT values.

REFERENCES

Bas Aslan U, Livanelioglu A, Aslan S 2007. The evaluation of physical activity level in undergraduate students by two methods. *Turkish J of Physthe and Reh*, 18(1): 11-19.

Bassuk SS, Manson JE 2005. Epidemiological evidence for the role of physical activity in reducing risk of type 2 diabetes and cardiovascular disease. *J Appl Phys*, 99(3): 1193-1205.

Bergier B, Tsos A, Bergier J 2014. Factors determining physical activity of Ukrainian students. *Ann Agric Environ Med*, 21(3): 613-616.

Biddle S, Asare M 2011. Physical activity and mental health in children and adolescents: A review of reviews. *Br J Sports Med*, 45: 886–889.

Blair SN 2009. Physical inactivity: The biggest public health problem of the 21st century. *Br J Sports Med*, 43(1): 1-2.

Bockous DD, Farrow JA, Friedl KE 1990. Assessment of maturity in boys and grip strength. *J Ado Heal Care*, 11(6): 497-500.

Buyukozturk S, Cakmak E, Akgun OE, Karadeniz S, Demirel F 2010. *Research Methods in Education*. Ankara: Pegem A Publication.

Carol EG, Julie S Mckinney MS, Richard A, Carleton MD 1992. Is aerobic dance an effective alternative to walk-jog exercise training. *The J of Sports Med and Physical Fit*, 32(2): 136–141.

Cartwright MJ,Tchkonia T, Kirkland JL 2007. Ageing in adiposities: Potential impact of inherent, depot-specific mechanisms. *Exper Gerontol*, 42(6): 463-471.

Craig C, Marshall A, Sjostrom M, Bauman A, Booth M, Ainsworth B, Pratt M, Ekelund U, Yngve A, Sallis J, Oja P 2003. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exer*, 35(8): 1381-1395.

Dabrowska-Galas M, Plinta R, Dabrowska J, Skrzypulec-Plinta V 2013. Physical activity in students of the Medical University of Silesia in Poland. *Phys Ther*, 93(3): 384-392.

Hallal PC, Victora CG, Wells JC, Lima RC 2000. Physical inactivity: prevalence and associated variables in Brazilian adults. *Med Sci Sports Exer*, 35: 1894-1900.

Haskel WL 1996. Physical activity, sport, and health: Toward the next century. *Res Quarterly for Exer and Sport*, 67(3): 37-47.

Heitmann BL, Hills AP, Frederiksen P, Ward LC 2009. Obesity, leanness, and mortality: Effect modification by physical activity in men and women. *Obesity*, 17(1): 136-142.

Hill JO, Peter JC 1998. Environmental contributions to the obesity epidemic. *Science*, 280: 1371-1374.

Hu B, Lin LF, Zhuang MQ, Yuan ZY, Li SY, Yang YJ, Lu M, Yu SZ, Jin L, Ye WM, Wang XF 2015. Reliability and relative validity of three physical activity questionnaires in Taizhou population of China: The Taizhou Longitudinal Study. *Public Health*, 1-7. doi: 10.1016/j.puhe.2015.03.024.

Johnsen NF, Tjonneland A, Thomsen BL, Christensen J, Loft S, Friedenreich C et al. 2009. Physical activity and risk of prostate cancer in the European Prospective Investigation into Cancer and Nutrition (EPIC) cohort. *Int J Cancer*, 125(4): 902-908.

Kriska AM, Caspersen CJ 1997. A collection of physical activity questionnaires for health related research. *Med and Sci in Sport and Exer Suppl*, 29(6): 1-205.

Laporte RE, Montoye HJ, Caspersen CJ 1985. Assessment of physical activity in epidemiological research: problems and prospects. *Pub Health Rep*, 100(2): 131-146.

Leslie E, Owen N, Salmon J, Bauman A, Sallis JF, Lo SK 1999. Insufficiently active Australian college students: Perceived personal, social, and environmental in fluencies. *Preven Med*, 28(20): 20-27.

Miller K 1989. *The Outside Play and Learning Book: Activities for Young Children*. Beltsville: Gryphon House.

Moore RC, Wong HH 1997. *Natural Learning: The Life History of an Environmental School Yard*. Berkeley: MIG.

Ozkan V, Serdar E, Nevin AG 2010. The relation of physical activity level and life quality at sedentary profession. *Spormetre J of Phys Educ and Sports Sci*, VIII(2): 69-75.

Ozturk M 2005. *The Validity and Reliability of International Physical Activity Questionnaire in University Students and the Determination of Their Physical Activity Levels*. Master's Thesis. Ankara, Turkey: Hacettepe University Institute of Medical Sciences.

Pafferberger RS, Blair SN, Lee IM 1993. Measurement of physical activity to assess health effects free living populations. *Med Sci Sports and Exer*, 25(1): 60-70.

Papathanasiou G,Georgoudis G, Papandreou M, Spyropoulos P, Georgakopoulos D, Kalfakakou V, Evangelou A 2009. Reliability measures of the short international physical activity questionnaire (IPAQ) in Greek young adults. *Hellenic J of Cardio*, 50: 283-294.

Pate R, Pratt M, Blair S, Haskell W, Macera C, Bouchard C, Buchner D, Ettinger W, Heath G, King A 1995. Physical activity and public health: A recommendation from the Centers for Disease Control and Prevention and the American College of Sports. *Med Phy Act and Pub Health*, 273(5): 402-407.

Rangel Caballero LG, Rojas Sánchez LZ, Gamboa Delgado EM 2014. Overweight and obesity in Colombian college students and its association with physical activity. *Nutr Hosp*, 31(2): 629-636.

Rivkin MS 1995. *The Great Outdoors: Restoring Children's Right to Play Outside*. Washington, DC: National Association for the Education of Young Children.

Rivkin MS 2000. Outdoor Experiences for Young Children. From <http://www.ericdigests.org/2001-3/children. htm> (Retrieved on 20 December 2014).

SavciS, Ozturk M, Arikan H, Ince DE, Tokgozoglu L 2006. The physical activity levels ofuniversity students. *Arch of the Turkish Soc of Cardi*, 34: 166-172.

Subrahmanyam K, Kraut RE, Greenfield PM, Gross EF 2000. The impact of home computer use on children's activities and development. *The Future of Children and Computer Technology*, 10(2): 123-144.

Steele R, Brage S, Corder K, Wareham N, Ekelund U 2008.Physical activity, cardiorespiratory fitness, and the metabolic syndrome in youth. *J Appl Physiol*, 105: 342–351.

Tremblay M, Onywera V, Adamo K 2010. A child's right to healthy, active living—building capacity in Sub-Saharan Africa to curb the impeding physical activity transition: The KIDS-CAN Research Alliance. In: S Bennett, M Pare (Eds.): *20th Anniversary of the Convention on the Rights of the Child*. Ottawa, ON: University of Ottawa Press, pp. 97–110.

Von Bothmer MI, Fridlund B 2005. Gender differences in health habits and in motivation for a healthy lifestyle among Swedish university students. *Nurs Health Sci*, 7: 107-118.

WattsPB, Joubert LM, Lish AK, Mats JD, Wilkins, B 2003. Anthropometry of young competitive sport rock climbers. *Bri J of Sports Med*, 37(5): 420-424.

World Health Organisation (WHO) 2009. *Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks*. Geneva, Switzerland: WHO.

World Health Organisation (WHO) 2010. *Global Recommendations on Physical Activity for Health.* Geneva: WHO Press.