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The Relationship between Exercise Addiction, Physical Activity Level and Body Mass Index of the Students Who are Studying at Physical Education and Sports College

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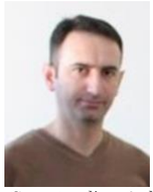
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Abstract

Context: The aim of the study was to identify the relationship between exercise addiction (EA) and physical activity levels (PAL) and body mass index (BMI) of students of Physical Education and Sports College (PESC). Methods: The study consists of 204 male and 101 female from Erzincan University PESC. Personal Information Form, Exercise Dependence Scale-21 and Physical Activity Survey were used. The data were analyzed in SPSS22.0 for windows. Kruskal-Wallis-H, Mann-Whitney-U and Spearman Correlation tests were used. Results: It was detected that % 13,2 of male students of PESC, % 15.8 of female students and % 14.1 of students in general were exercise addicted, while there was no significant difference between BMI according to the EA status of male students of PESC, the PAL of exercise addicted and candidate of addiction was statistically significantly higher in comparison with non-addict, according to the EA status of female students of PESC there was no significant difference between neither MBI nor PAL, the BMI of male students of PESC is significantly higher, the PAL values of candidates of EA is significantly higher, there was no significant differences between BMI and PAL values of the students according to the family economic level, there was no significant relationship neither male nor female students between BMI and PAL according to the EA levels. Conclusion: It was extrapolated that, few of the students are EA; the students who are high in EA are also high in PAL values, the family economic, level on the students' EA level is not an effective factor, and also there was no significant relationship between BMI and PAL according to the EA status.

Keywords: Addiction, Body mass index, Exercise, Exercise addiction, Physical activity, Physical education.
JEL Classification: Z29.

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1. Introduction

Physical activity is defined as body movements which arise from the contraction of skeletal muscles and increase the energy consumption above the basal level (Baranowski *et al*., 1992; Pate *et al*., 1995). Though they are close to each other, exercise and physical activity have different meanings. Physical activity includes our daily muscle movements such as sitting, standing up, walking and having a shower; but exercise consists of specific, continuous and planned muscle movements which can be seen under a sport activity (Ersoy, 1995).

Addiction can be defined as situation of temporary feeling good as a result of people's intake of a substance or service for a long time (Seferoglu and Yildiz, 2013). Addiction is usually categorized as substance addiction and behavioral addiction. Exercise addiction is also one of the behavioral addictions. In the exercise addiction, one loses his/her control over the exercise, s/he consistently increases the duration, frequency and heaviness of the exercise, s/he cannot spare time to his/her family and friends just because the exercise, s/he spends all his/her time on doing exercises, s/he prefers doing exercise instead of attending other social activities and s/he programs his/her entire life according to the exercises (Zmijewski and Howard, 2000; Adams and Kirkby, 2002). For Hausenblas and Downs (2002) the exercise addiction is a severe desire that causes the physical and psychological symptoms, results in one's losing his/her control and doing exercises too much. It is commonly stressed that as a result of doing exercise too much, it becomes addiction and has negative effects on one's health (Adams, 2001; Blaydon *et al*., 2002; Heather *et al*., 2002; Hausenblas and Giacobbi, 2003). Its psychological and physical symptoms are as such; anxiety, unable to remain motionless, feeling of guilt which stems from not doing exercise, aggressiveness, laziness, lack of appetite, sleeplessness and headache. Criteria of exercise addiction are tolerance, effects of interrupting exercise, intend effect, loss of control, time, reduction of other activities and continuity (Hausenblas and Downs, 2002; Heather *et al*., 2002; Aidman and Woollard, 2003; Bamber *et al*., 2003). The aim of this study was to see whether PESC students suffer from the exercise addiction, which negatively affects the human life just like other types of addictions. If they suffer, another aim of this study is to determine its level.

2. Material and Method

This study was carried out with 26.10.2017 dated and 08-05 protocol numbered Ethics committee approval and with voluntarily attendance of PESC students.

2.1. Research Group

Population of the study consists of students of Physical Education and Sports College of Erzincan Binali Yildirim University in 2017-2018 academic year. Also, the sample group includes 204 male (their age 21.92± 4.07 year, their body mass indices 22.74±3.07 kg/m2 and their level of physical activity 3801.213±3063.78 MET) and 101 female (their age 20.25±2.21 year, their body mass indices 20.60±2.26 kg/m2 and their physical activity level 3265.10±3855.01 MET); total 305 students.

2.2. Data Collection Tools

Exercise Addiction Scale-21 was developed by Heather, Hausenblas and Downs in 2002. The scale can be applied to those who are 18 and older as individually or in a group. The responds were designed as never (1) and all the time (6) according to six point Likert Scale. The Exercise Addiction Scale-21 which consists of 21 questions was designed based upon Substance addiction criteria of DSM –IV and it gives the following information: In the Exercise Addiction Scale 7 dependence criteria were used as base. These are; tolerance, interrupting exercise, intend effect, loss of control, time, reduction of other activities and continuity. Individuals who show at least 3 of these criteria are categorized as exercise addicted. Addiction space is determined according to 5 or 6 points of items which constitute the criteria. Individuals who give 3-4 points to these items are categorized as symptomatic and theoretically these individuals can be regarded as carrying the risk of exercise addiction. Lastly, individuals who give 1-2 points to the items are categorized as non-addict asymptomatic. In scale test-retest study $P<0.001$ was found significant and Cronbach was calculated as $a=0.95$ which means that alpha value was perfect. Turkish validity and reliability study of the Exercise Addiction Scale was carried out by Yeltepe (2005). In Pearson correlation analyses, which were done during the test-retest applications, significant relation was found on the level of .001 for each of the items. When the reliability analysis result was examined Cronbach alpha coefficient was calculated as 0.96 in the first application and it was calculated as 0.97 in the second application (Heather *et al*., 2002; Yeltepe, 2005).

Physical Activity Questionnaire: In this study, International Physical Activity Questionnaire (IPAQ) was employed to evaluate students' level of physical activity. Physical activity questionnaire is a community-based questionnaire which provides the calculation of physical activities appropriate to international forms and the recording of the duration of the recent week physical activities. Data obtained during the evaluation level are calculated by turning them into their metabolic values (MET) (Savcı *et al*., 2006; Hurtig-Wennlöf *et al*., 2010).

Calculation of Body Mass Index: Body mass index (BMI) is defined as the division of an individual's body mass into the square of his/her height. In other words, it is the proportion of the square of height to body weight (Heyward and Stolarczyk, 1996).

2.3. Statistical Analysis

After PESC students' frequency and percentage calculation was made in order to examine their demographic characteristics, situation of each of students as exercise addicted, candidate for being addicted or non-addict were determined and they were divided into groups. All data were analyzed using SPSS 22.0 for Windows. According to obtained results, it was found that the data did not spread normally. Therefore; Kruskal Wallis H and Mann Whitney U tests were used. Spearman Correlation test was also applied to determine the relation between PESC students' body mass indices according to their exercise addiction situation and their level of physical activity. The level of significance for all tests was accepted as .05.

3. Results

Table-1. Average Values of Age, Height, Weight, BMI and PAL According to PESC Students' Gender

Gender	Variable	N	Minimum	Maximum	X	ss
Male	Age (year)	204	16	48	21.92	4.07
	Height (cm)		120	198	177.96	8.58
	Body Weight (kg)		52	105	71.83	9.23
	BMI (kg/m²)		17.27	41.67	22.74	3.07
	PAL (MET)		483	15726	3801.21	3063.78
Female	Age (year)	101	16	28	20.25	2.21
	Height (cm)		153	197	167.70	7.23
	Body Weight (kg)		45	80	57.95	7.32
	BMI (kg/m²)		16.04	27.06	20.60	2.26
	PAL (MET)		483	20808	3265.10	3855.01

Source: Authors' field work

Table 1 shows that male PESC students who attended the research had average age 21.92±4.07 year, average height 177.96±8.58 cm, average body weight 71.83±9.23 kg, average body mass index 22.74±3.07 kg/m2 and physical activity level 3801.213±3063.78 MET, also female PESC students who attended the research had average age 20.25±2.21 year, average height 167.70±7.23 cm, average body weight 57.95±7.32 kg, average body mass index 20.60±2.26 kg/m2 and physical activity level 3265.10±3855.01 MET.

Table-2. According to Their Gender, Frequency and Percentage Dispersion of Exercise Addiction Situations of PESC Students

Gender	Exercise Addiction Situation	f	%
Male	Addicted	27	13.2
	Candidate for Being Addicted	126	61.8
	Non-Addicted	51	25.0
	Total	204	100
Female	Addicted	16	15.8
	Candidate for Being Addicted	53	52.5
	Non-Addicted	32	31.7
	Total	101	100
General	Addicted	43	14,1
	Candidate for Being Addicted	179	58,7
	Non-Addicted	83	27,2
	Total	305	100

Source: Authors' field work

In Table 2 it is found that 13.2% of PESC male students and 15.8% of female students and 14.1% of in general were exercise addicted.

Table-3. According to Their Addiction Situation, Comparison of BMI and PAL of Male and Female PESC Students

Gender	Situation of Addiction	N	Body Mass Index (kg/m²)				Physical Activity Level (MET)				Different Groups
			Mean Rank	Med	X²	P	Mean Rank	Med	X²	P	
Male	Addicted	27	103.26	22.71	.659	.719	123.59	4323	9.267	.010*	1-3* 2-3*
	Candidate for Being Addicted	126	104.67	22.6			105.77	3310.5			
	Non-Addicted	51	96.75	22.13			83.25	2112			
Female	Addicted	16	47.72	19.83	4.582	.101	58.94	2965.5	1.505	.471	
	Candidate for Being Addicted	53	46.47	20.37			50.30	2004			
	Non-Addicted	32	60.14	20.83			48.19	1911			

*p<.05; **Source:** Authors' field work

In Table 3, it is seen that there was no significant difference among PESC students' BMI according to their exercise addiction situation. However, Table 3 also shows that the PAL level of exercise addicted students and candidate for being addicted students were significantly higher than non-addicted students. Also, the table demonstrates that, according to their exercise addiction situation, there was no significant difference among the female PESC students both in terms of BMI and PAL.

Table-4. According to gender variable, the comparison of the level of BMI and PAL of exercise addicted, candidate for being addicted and non-addicted PESC students

Exercise Addiction Situation	Gender	N	Body Mass Index (kg/m²)				Physical Activity Level (MET)			
			Mean Rank	Med	Z	P	Mean Rank	Med	Z	P
Addicted	Male	27	26.04	22.71	-2.739	.006*	22.98	4323	-.666	.505
	Female	16	15.19	19.83			20.34	2965.5		
Candidate for being Addicted	Male	126	103.83	22.6	-5.507	.000*	96.25	3310.5	-2.493	**.013***
	Female	53	57.11	20.37			75.13	2004		
Non-Addicted	Male	51	46.42	22.13	-2.110	.035*	43.61	2112	-.768	.442
	Female	32	34.95	20.83			39.44	1911		

*p<.05; **Source:** Authors' field work

Table 4 shows that when BMI was compared according to the gender variable of PESC students, it was found that male students' values were significantly higher in all groups; also, when PAL was compared it was found that only male candidate for being addicted students' values were significantly high.

Table-5. The Comparison of BMI and PAL according to the variable of Exercise Addiction Situation of PESC Students who do sports regularly and who do not do sports regularly

Situation of Doing Sports Regularly	Addiction Situation	N	Body Mass Index (kg/m²)				Physical Activity Level (MET)			
			Mean Rank	Med	X^2	P	Mean Rank	Med	X^2	P
Those who do sports	Addicted	40	103.30	21.91	.517	.772	111.83	4462.5	4.685	.096
	Candidate for being Addicted	121	100.69	22.21			101.12	3627		
	Non-Addicted	38	94.33	21.26			83.97	3304.5		
Those who do not do sports	Addicted	3	30.00	20.66	1.958	.376	38.00	1086	1.564	.457
	Candidate for being Addicted	58	53.14	22.12			56.30	1956		
	Non-Addicted	45	55.53	22.34			50.92	1416		

Source: Authors' field work

In Table 5 no significant difference was seen when the values of BMI and PAL were compared according to exercise addiction situation of PESC Students who do sports regularly and who do not do sports regularly.

Table-6. According to the variable of doing sports regularly, the comparison of BMI and PAL level of PESC students who are exercise addicted, candidate for being addicted and non-addicted

Exercise Addiction Situation	Situation of Doing Sports Regularly	N	Body Mass Index (kg/m²)				Physical Activity Level (MET)			
			Mean Rank	Med	Z	P	Mean Rank	Med	Z	P
Addicted	Do sports	40	22.41	21.91	-.787	.431	23.05	4462.5	-2.003	.045*
	Don't do sports	3	16.50	20.66			8.00	1086		
Candidate for being Addicted	Do sports	121	86.78	22.21	-1.201	.230	100.28	3627	-3.839	.000*
	Don't do sports	58	96.72	22.12			68.55	1956		
Non-Addicted	Do sports	38	36.25	21.26	-1.997	.046*	48.76	3304.5	-2.352	.019*
	Don't do sports	45	46.86	22.34			36.29	1416		

*p<.05 ; **Source:** Authors' field work

It is shown in Table 6 that when PESC students were compared according to the variable of doing sports regularly it was found that BMI values of non-addicted students, who do sports regularly, were significantly low. Also, in all groups PAL values of those who do sports regularly were significantly high.

Table-7. The relation between Body Mass Indices and Physical Activity Level of PESC students who are Exercise Addicted, Candidate for Being Addicted and Non-Addicted

	Exercise Addiction Situation		Physical Activity Level (r)
Male	Addicted	Body Mass Index	.320
	Candidate for being Addicted		-.110
	Non-Addicted		-.182
Female	Addicted	Body Mass Index	-.071
	Candidate for being Addicted		-.122
	Non-Addicted		-.004

Source: Authors' field work

Table 7 shows that, in any of the addiction level, there was no significant relation between male and female PESC students' body mass indices and physical activity levels.

4. Discussion

Although regular physical activities are very important for health, doing these activities in addiction level which negatively affect people's lifestyle are regarded as a health problem. Exercise addiction (EA), just like other addiction types, causes a set of health and vital difficulties for people. As addiction usually starts at early ages, it is crucial to determine the young people's exercise addiction situations. Therefore, the main aim of this paper is to study the relation between PESC students' exercise addiction and physical activity and body mass index.

In this study it was found that; male PESC students' body mass indices were 22.74±3.07 kg/m2 and female PESC students' body mass indices were 20.60±2.26 kg/m2 (Table 1). In a research which was done on PESC students the following results were found; students' body mass indices values were 20,31±3,51 kg/m2 in physical education and sports teaching department, 20,71± 2,43 kg/m2 in coaching department and 20,52±2,59 kg/m2 in department of sport management. Besides, there was no difference among the groups (Borazan, 2015). In a study done by Koc (2017) it was concluded that 17% of classroom teacher candidates were inactive, 69% of them were minimal active and only 14% of them were physically active enough. It was also found that in the sections of Koç's study where physical activity was done much, BMI values were close to the results of our study.

It was detected in this study that 13.2% of male students, 15.8% of female students and in general 14.1% of the students were exercise addicted. Also, 65.8% of male students, 52.5% of female students and in general 58.7% of the

students were candidate for being addicted (Table 2). Even though the addiction level of both female and male students' was low, it was seen in the study that the possibility of becoming candidate for being addicted is quite high for the students. In the literature a study which was done to compare the exercise addiction and gender variable, it was found that 60 of 313 female participants of 61 of 464 participants carried the exercise addiction risk. Though the number of female participants was fewer than the male ones, the number of female carrying the exercise addiction risk was close to number of male participants. In the studies, the exercise addiction varied according to the gender variable. In some of these studies it was stated that male carried the exercise addiction risk and in some other it was underlined that female did (Diekhoff, 1984; Davis, 1990). Yeltepe (2005) found in his study that there was no significant difference in the exercise addiction level in terms of the gender. Similarly, in his studies, Vardar (2012) did not detect a significant difference between the genders. The results of these studies show similarity with ours.

When students' addiction situation was examined with their body mass indices and physical activity levels, it was detected that there was no significant difference among male students' body mass indices according to their exercise addiction situation but exercise addicted and candidate for being addicted students' physical activity levels were statistically and significantly higher than non-addicted students'. Further, there was no significant difference among both their body mass indices and physical activity levels according to their exercise addiction situation. In all addiction levels male students' body mass indices were significantly higher than female students' and male candidates for being addicted students' physical activity levels were significantly higher than female students' (Table 3-4).

In the studies which were carried out about the university students' physical activity situation, it was reported that male university students' physical activity levels were significantly higher than female students (Baş, 2003; Savcı *et al*., 2006; Tekkanat, 2008; Fişne, 2009; Vardar, 2012; Özüdoğru, 2013). Ergün (2013) in his study found that, in terms of average physical activity points, male students' average points were higher than female students' average points (Ergün, 2013). These results in the literature supported our research results. There are some reasons why men are more active than women in daily life. Some of these reasons are such; man's sports and sports facilities for men are much more than women's, also men's environment is more suitable compared to women's (Crocker *et al*., 1995).

In the result of the study it was found that; according to students who do sports regularly and who do not, there was no significant difference between their body mass indices and physical activity levels in all addiction levels. BMI values of those who are non-addicted and do sports regularly are significantly lower than those who do not do sports regularly. Further, in all groups, physical activity values of those who do sports regularly are significantly higher than those who do not do sports regularly (Table 5-6).

In studies which were done for physical activity levels it was detected that in a study, which was carried out in TOBB Economy and Technology University, the weight, height, age, strength of left and right paws, reaction times, leg strength, back strength, flexibility, power of aerobic respiration and academic success of students in 1st and 2nd grade were measured and it was concluded that in terms of variables that show physical activities, there was significant difference between university students who do sports regularly and who do not, in favour of those who do sports regularly (Er, 2010). Also, in another study which was carried out on the students of physical education and sports teaching, coaching and sports management it was reported that the situation of physical fitness of teaching and coaching students was in high level, but in sports management students it was in medium level (Borazan, 2015).

As a result of the study, it was detected that, both separately and totally, there was no statistically significant difference in all addiction groups between male and female students' body mass indices and physical activity levels (Table 7). In literature no studies were found directly regarding the determination of exercise addicted people and the relation between physical activity level and body mass indices. However; apart from exercise addiction, there were some researches which examined physical activity and body mass indices together. In one of these studies it was reported that 20.4% of teachers whose body mass index was less than 25 kg/cm2 were physically inactive but this percentage is 15.2% for those whose body mass indices were 25 kg/cm2 or higher (Şanlı and Atalay, 2009). In another study university students were categorized according to their body mass indices and it was found that there was no significant difference between students whose body mass indices were lower than 25 kg/cm2 and higher than 25 kg/cm2 according to the time of sitting, total physical activity, medium severe activity, severe activity and walking activity of them (Savcı *et al*., 2006).

5. Conclusion and Recommendations

The following results were found in this study; only very few of the students of Physical Education and Sports College were exercise addicted, the PAL values of male students, whose addiction levels were high, were also high, the economic level of families was not an important factor on students' exercise addiction, also there was no significant difference between students' body mass indices and physical activity level according to their exercise addiction situation.

Because of the fact that exercise addiction should be taken as serious as other types of addiction, it is recommended that, this subject should also be studied for other students in different departments and for other individuals of different age groups.

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