Eurasian Journal of Educational Research, Issue 65, 2016, 217-238

The Four-Year an Investigation of Physical and Physiological Features of Students in a Physical Education and Sports Department

Yucel OCAK*

Suggested Citation:
Ocak, Y. (2016). The four-year an investigation of physical and physiological features of students in a physical education and sports department. *Eurasian Journal of Educational Research*, 65, 217-238
10.14689/ejer.2016.65.13

Abstract

Problem Statement: Student candidates who want to be a Physical Education Teacher in Turkey should take special ability exams of Physical Education and Sports Schools. In this exam, it is required to have a high physical capability apart from a high level of special branch skills. For this reason, the students who pass and start their education at physical education and sports schools either have a good history of sports or they are active sportsmen or they have passed through a good training period. In other terms, they have high levels of physical and physiological capacity. But, the density of the curriculum at physical education teaching departments at Physical Education and Sports Schools, redundancy of theoretical courses which are defined and forced by Higher Education Council in Turkey to all the Physical Education and Sports Schools and from time to time the obligation to make a choice between school and active sportsmanship pull students away from active sportsmanship and regular training. After a dense curriculum program, the majority of students prefer education instead of sport activities and thus, when they reach their final year, they turn into sedentary people. This contradiction in the education of physical education teachers which is a model for the community and carries the task of selecting gifted people and directing people to sports for sustaining a healthy and quality life is thought-provoking.

Purpose of Study: In this study, it is aimed to measure and evaluate some physical and physiological parameters of students attending physical education and sports schools from the first year on until the fourth year by taking the arguments given above.

* Corrsponding author: Afyon Kocatepe University, School of Physical Education and Sports, Afyonkarahisar, Turkey. yocak@aku.edu.tr.

Methods: 70 male, 50 female and in total 120 students attending to Afyon Kocatepe University School of Physical Education and Sports took part in this study. Some physical and physiological parameters of the students were measured for three years in the Fall semester in November beginning from the first year on and in their final year, the measurements were made in the Spring term in May. Their weights, heights, body fat percentages, body mass indices and flexibilities, vertical jumps, anaerobic powers and aerobic capacities were identified with these measurements. Repeated measures analysis was used for statistical evaluation. The results were evaluated between 0,01 and 0,05 levels.

Findings and Results: Body weights, BMIs, body fat percentages, flexibility levels, anaerobic powers and aerobic capacities of students who go through an intense and difficult exam to matriculate School of Physical Education and Sports are at levels of sportsmen. These performance levels of students decrease each passing year. These traits decline even to the levels of sedentary people in the fourth year.

Conclusions and Recommendations: The students of School of Physical Education and Sports have an intense syllabus and the excess of theoretical courses prevent from regular training. Also, students in our country have to prepare for a tough theoretical exam after graduating university in order to be a teacher. This obligation moves them away from sporting activities in their free times remaining form school. In the light of this result, it is necessary to revise curriculums of Physical Education and Sports Schools in our country which train students to be teachers both for students, sportsmen and teaching staff.

Keywords: Physical education and sports, teacher, performance, physical, physiological

Introduction

At base, education aims to transfer the values of a society to individuals so that they can become competent, balanced, productive members of the community and, in turn, sustain their personal integration into society. Though each country establishes educational aims, content, and duration according to its own social and educational policies (Hofman 1993; Oz 2011),in general physical education (PE), as both a complementary and inseparable component of general education, involves the teaching and learning of personality that promotes each person's development as a complete individual (Tamer 2001; Gulay 2010).In this context, PE teachers are perhaps the most important means of achieving the aims of PE, as well as promoting physical activity as not merely a school lesson, but a learned lifestyle(Cicek 1998).

In Turkey, the goals of PE and sports schools and university departments are to make PE future teachers, trainers, and managers competent in terms of human anatomy and body function, the branches of sports, the use of sports technology, the

knowledge and skills of behavioral sciences, the psychosocial aspects of humans, skills related to fine arts, and sports planning and management, as well as promote the attendance of sporting events. From this perspective, PE schools and departments use sports and PE to promote public health and social bonding. The physical, social, and intellectual traits of good PE teachers, their relationships with students, and their attitudes and behaviors toward students are thus crucial to their roles as models in teaching, guiding, and preparing students as members of society and potentially as future PE teachers.

Candidates interested in becoming PE teachers in Turkey must first complete a special ability examination designed for PE and sports schools, which requires examinees to have a certain level of physical capability and a high level of special branch skills. For this reason, students who pass the exam and commence their education in a university PE and sports program should have a clear history of sports participation, be active sportsmen or sports women upon entering university, and/or have completed an adequate training program.

Once matriculated, however, students who encounter the typically heavy workload of PE curriculum, the redundancy of theoretical courses, and at times the obligation to prioritize academics above active sportsmanship may gradually abandon their previously sports activity and regular training and, as a result, come to adopt primarily sedentary lifestyles.

Yoncalık, in a study which focused on defining the physical activity levels of teacher candidates, mentioned that the physical activity levels are very low (Yoncalık2016). In a similar study, Dogustas emphasized that teacher candidates are not satisfied with the education they get and their readiness levels (Dogustas 2016, Süral 2015).

In response to this possibility, the aim of this study was to measure and evaluate specific physical and physiological parameters of students attending PE and sports schools, beginning with their first year of study and ending in their fourth.

Method

Research Design

In this study, some physical and physiological features of students, who study at Physical Education and Sports Teaching Department have been measured and evaluated during their four years of study. From the beginning of the first year, their body weights, body fat percentages, vertical jumps, flexibility values, anaerobic and aerobic powers have been measured at the end of the first term for four years.

Participants

After volunteering their consent, 120 university students 70 male and 50 female in the School of Physical Education and Sports at Afyon Kocatepe University were recruited to be measured for a set of physical and physiological parameters over four years. Measurements were taken and assessed in November of the Fall Semester and

May of the Spring Semester for each year, beginning with their first year of study and culminating with their fourth.

Research Instrument and Procedure

Height. Height was measured with a weighing scale with an accompanying digital height rod. The anatomic position during height measurement was with bare feet during deep inhalation. Body heights were evaluated to1 mm.

Body weight. Body weight was measured with each participant on an empty stomach wearing shorts, a T-shirt, and no footwear. Weight was calculated using a weighing scale with a digital height rod at a level of sensitivity of 100 g.

Body fat percentage. Participants' body fat percentages were obtained using a skinfold caliper measure from four regions of the body. Skin fold values were then calculated with the Yuhasz formula (Zorba 1995), in which fat percentage equals 5.783 + 0.153(tr +ss +si +ab). Skinfold measurement from each student was obtained every year by a trained specialist with ISAK certification.

Body mass index. Body mass index (BMI) is determined by dividing body weight by height squared: BMI = weight (kg) / height $(m)^2$. Values gathered from participants were evaluated following the criterion of the World Health Organization (WHO) (2010). There are four categories of BMI underweight (<18.5 kg), normal weight (18.5–24.9 kg), overweight (25–29.9 kg), and obesity (≥30 kg).

Flexibility. After warming up for 15-20 minutes, the subjects sat on a table in bare feet and touching both edges of the table. They were asked to push a moving rod which was lying horizontally on the table with the tips of their fingers without bending their knees. Their values were checked using a ruler placed on the table. This procedure was repeated three times by each participant and their highest value accomplished was recorded in centimeters.

Vertical jump height. The vertical jump heights of participants were measured with a Newtest 300. Participants were asked to jump vertically five separate times and rest between each vertical jump as they deemed adequate. Measurements of the vertical jumps were recorded in centimeters. The highest and lowest values of each participant were discarded, and the average of the remaining three values was recorded as their final vertical jump height.

Anaerobic power. The anaerobic power of participants were calculated by using the Lewis formula for the Sargent Jump test by using each participant's vertical jump value and their body weight (Tamer 2000).

P= (√ 4.9 weight √ D) kg/m/s

D= Vertical jump distance (in meters)

Aerobic power (Max VO_2). Participants' aerobic power was determined with a Shuttle Run test of 20 m whose pace was established by signal sounds at certain time intervals. Each participant started running at the first signal and was asked to reach the other line by the second signal and then return to the starting

line. Participants continued to perform the test following the signal cues and adjusted their rhythm in order to complete the distance of 20 m. between the two sound signals. The pace started slowly and increased every 10 s. Participants continued to take the test if they missed one signal but reached the other. The test terminated when the participant missed two signals in succession.

Data Analysis

Repeated measures analysis was used for statistical evaluation and results were evaluated between the *p* level of .01–.05.

Results

Table 1 presents the age and height calculations of participants in the first year of study. For other parameters, calculations over the four years and averages according to years are displayed.

Table 1.

Evaluation of Participant Measurements over the Course of Our Years of Study

Parameter	Male Female	N	1st Year Measurement Ave. ± Stn. D.	2nd Year Measurement Ave. ± Stn. D.	3rd Year Measurement Ave. ± Stn. D.	4th Year Measurement Ave. ± Stn. D.
Age	M	70	20,01 ± 1,26	-	-	-
(year)	F	50	19,12 ± 1,06	-	-	-
Height	M	70	179,83 ± 6,25	-	-	-
(cm)	F	50	167,37 ± 6,05	-	-	-
Body Weight	M	70	68,61 ± 7,13	71,37 ± 6,65	72,77 ± 6,65	76,92 ± 6,76
(kg)	F	50	51,66 ± 6,44	54,48 ± 6,41	56,77 ± 6,41	60,56 ± 6,28
BMI	M	70	21,22 ± 2,26	22,08 ± 2,22	22,52 ± 2,21	23,80 ± 2,24
	F	50	18,40 ± 1,87	19,41 ± 1,84	20,23 ± 1,89	21,59 ± 1,85
BFP	M	70	12,22 ± 1,61	13,47 ± 0,98	14,56 ± 1,43	15,96 ± 1,43
(%)	F	50	14,54 ± 2,13	15,64 ± 1,61	16,74 ± 1,85	18,54 ± 1,85
Flexibility	M	70	29,59 ± 7,60	27,84 ± 7,37	26,56 ± 7,23	23,84 ± 6,95
(cm)	F	50	32,56 ± 5,51	30,70 ± 5,26	29,84 ± 5,12	25,16 ± 4,92

Table 1 Continue

Parameter	Male Female	N	1st Year Measurement Ave. ± Stn. D.	2nd Year Measurement Ave. ± Stn. D.	3rd Year Measurement Ave. ± Stn. D.	4th Year Measurement Ave. ± Stn. D.
Vertical Jump (cm)	M	70	61,19 ± 5,11	59,46 ± 5,22	57,79 ± 5,10	52,45 ± 5,21
	F	50	49,74 ± 6,60	46,614± 5,83	43,22 ± 5,55	38,77 ± 5,41
Anaerobic Power (kg.m/sec.)	M	70	118,66 ± 12,98	121,68 ± 12,41	122,32 ± 12,29	123,15 ± 12,38
	F	50	80,24 ± 9,82	81,97 ± 9,82	82,29 ± 9,71	83,13 ± 9,52
Aerobic Power (maxVO2) (ml/kg/min)	M	70	59,39 ± 1,99	55,83 ± 1,96	52,97 ±1,94	49,24 ± 1,99
	F	50	47,88 ± 4,81	45,03 ± 4,65	42,67 ± 4,81	39,26 ± 4,03

Body weight measurements in Table 2 show the difference in students' weights over the four-year study period.

Table 2.

Variance Analysis Evaluation of the Repeated Measurement Levels of Body Weight

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Body Weight	Sphericity Assumed	4554,014	3	1518,005	2535,911	,000
	Greenhouse-Geisser	4554,014	2,019	2255,961	2535,911	,000
	Huynh-Feldt	4554,014	2,071	2198,564	2535,911	,000
	Lower-bound	4554,014	1,000	4554,014	2535,911	,000
Body Weight * group	Sphericity Assumed	17,724	3	5,908	9,870	,000
	Greenhouse-Geisser	17,724	2,019	8,780	9,870	,000
	Huynh-Feldt	17,724	2,071	8,557	9,870	,000
	Lower-bound	17,724	1,000	17,724	9,870	,002
Error (kilo)	Sphericity Assumed	211,906	354	,599		
	Greenhouse-Geisser	211,906	238,202	,890		
	Huynh-Feldt	211,906	244,420	,867		
	Lower-bound	211,906	118,000	1,796		

$p<.01$

According to these data, there is a year-by-year increase from the first year onward. The average of body weight increase at the end of four years was 8.31 kg for males and 8.90 for females, a difference that is significant at a*p* level of <.01.

Table 3.

Variance Analysis Evaluation of the Repeated Measurement Levels of Body Mass Index

Source		Type III sum of Squares	df	Mean Square	f	Sig.
BMI	Sphericity Assumed	512,633	3	170,878	2127,587	,000
	Greenhouse-Geisser	512,633	1,771	289,404	2127,587	,000
	Huynh-Feldt	512,633	1,812	282,971	2127,587	,000
	Lower-bound	512,633	1,000	512,633	2127,587	,000
BMI *group	Sphericity Assumed	7,612	3	2,537	31,590	,000
	Greenhouse-Geisser	7,612	1,771	4,297	31,590	,000
	Huynh-Feldt	7,612	1,812	4,202	31,590	,000
	Lower-bound	7,612	1,000	7,612	31,590	,000
Error (BMI)	Sphericity Assumed	28,432	354	,080		
	Greenhouse-Geisser	28,432	209,018	,136		
	Huynh-Feldt	28,432	213,770	,133		
	Lower-bound	28,432	118,000	,241		

p<.01

Table 3 shows differences in the calculations of BMI values over the four-year period, which also increased year after year. The average values for males were calculated to be 21.22 ± 2.26 kg/m²inthe first year, 22.08 ± 2.22 kg/m²in the second, 22.52 ± 2.21 kg/m²inthe third, and 23.80 ± 2.24 kg/m²inthe fourth; and for females to be18.40 ± 1.87 kg/m² in the first year, 19.407 ± 1.84 kg/m² in the second, 20.229 ± 1.89kg/m² in the third, and 21.589 ± 1.85 kg/m² in the fourth. These differences are statistically significant at a *p* level of<.01. According to these data, yearly changes in body weight naturally affect BMI.

Table 4.

Variance Analysis Evaluation of the Repeated Measurement Levels of Body Fat Percentage

Source		Type III Sum of Squares	df	Mean Square	f	Sig.
BFP	Sphericity Assumed	947,823	3	315,941	363,192	,000
	Greenhouse-Geisser	947,823	1,351	701,316	363,192	,000
	Huynh-Feldt	947,823	1,373	690,241	363,192	,000
	Lower-bound	947,823	1,000	947,823	363,192	,000
BFP * group	Sphericity Assumed	3,148	3	1,049	1,206	,307
	Greenhouse-Geisser	3,148	1,351	2,330	1,206	,288
	Huynh-Feldt	3,148	1,373	2,293	1,206	,289
	Lower-bound	3,148	1,000	3,148	1,206	,274
Error (BFP)	Sphericity Assumed	307,945	354	,870		
	Greenhouse-Geisser	307,945	159,476	1,931		
	Huynh-Feldt	307,945	162,035	1,900		
	Lower-bound	307,945	118,000	2,610		

$p<.01$

Table 4 displays changes in body fat percentages of participants over the four years of study. For male participants, body fat percentages were estimated as 12.22 ± 1.61% in the first year, 13.47 ± 0.98%in the second, 14.56 ± 1.43%in the third, and 15.96 ± 1.43% in the fourth. For female students, the calculations were 14.54 ± 2.13%in the first year, 15.64 ± 1.61%in the second, 16.74 ± 1.85%in the third, and 18.54 ± 1.85%in the fourth. At the end of their education, body fat percentages on average increased by3.74% for males and by 4%for females. The differences over years show a statistical significance at a *p* level of.01.

Table 5 displays the changes in flexibility of participants over the four-year study period. Flexibility values for male students were estimated to be29.59 ± 7.60%in the first year, 27.84 ± 7.37%in the second, 26.56 ± 7.23%in the third, and 23.84 ± 7.23%in the fourth. Calculations for female students were recorded as 32.56 ± 5.51% in the first year, 30.70 ± 5.26% in the second, 29.84 ± 5.12% in the third, and 25.16 ± 5.12% in the fourth. Values for both male and female students in our study declined year after year for all four years. At the end of the period, flexibility for male participants decreased by 5.75 cm and by 7.40 cm for female participants. These differences in years show a statistical significance at the.01 level.

Table 5.

Variance Analysis Evaluation of the Repeated Measurement Levels of Flexibility

Source		*Type III sum of squares*	*df*	*Mean square*	*f*	*p*
Flexibility	Sphericity Assumed	2,690.167	3	896.722	1,561.897	.000
	Greenhouse–Geisser	2,690.167	1.923	1,399.032	1,561.897	.000
	Huynh–Feldt	2,690.167	1.971	1,365.129	1,561.897	.000
	Lower-bound	2,690.167	1.000	2,690.167	1,561.897	.000
Flexibility * Group	Sphericity Assumed	67.713	3	22.571	39.314	.000
	Greenhouse–Geisser	67.713	1.923	35.214	39.314	.000
	Huynh–Feldt	67.713	1.971	34.361	39.314	.000
	Lower-bound	67.713	1.000	67.713	39.314	.000
Error (flexibility)	Sphericity Assumed	203.240	354	.574		
	Greenhouse–Geisser	203.240	226.900	.896		
	Huynh–Feldt	203.240	232.535	.874		
	Lower-bound	203.240	118.000	1.722		

$p<.01$

Table 6.

Variance Analysis Evaluation of the Repeated Measurement Levels of Vertical Jump

Source		*Type III sum of squares*	*df*	*Mean square*	*f*	*p*
Vertical jump	Sphericity assumed	6,216.017	3	2,072.006	1,537.544	.000
	Greenhouse–Geisser	6,216.017	1.683	3,693.110	1,537.544	.000
	Huynh–Feldt	6,216.017	1.719	3,615.560	1,537.544	.000
	Lower-bound	6,216.017	1.000	6,216.017	1,537.544	.000
Vertical jump * group	Sphericity Assumed	153.017	3	51.006	37.849	.000
	Greenhouse–Geisser	153.017	1.683	90.912	37.849	.000
	Huynh–Feldt	153.017	1.719	89.003	37.849	.000
	Lower-bound	153.017	1.000	153.017	37.849	.000
Error(vertical jump)	Sphericity assumed	477.053	354	1.348		
	Greenhouse–Geisser	477.053	198.610	2.402		
	Huynh–Feldt	477.053	202.870	2.352		
	Lower-bound	477.053	118.000	4.043		

$p<.01$

Table 6 displays changes in vertical jump values of participants over the four-year period. Vertical jump values for male students were estimated on average to be61.19 ± 5.11% in the first year, 59.46 ± 5.22% in the second, 57.79 ± 5.10% in the third, and 52.45 ± 5.10% in the fourth. For female students, values were estimated on average to be49.74 ± 6.60% in the first year, 43.22 ± 5.55% in the second, 38.77 ± 5.41% in the third, and ± 5.41% in the fourth. Values for both male and female students participating in the study decreased year by year for all four years, after which vertical jump values for male students decreased on average by 8.74 cm and for females by 10.97 cm. These differences in years show statistical significance at the.01 level.

Table 7.

Variance Analysis Evaluation of the Repeated Measurement Levels of Anaerobic Power

Source		*Type III sum of squares*	*df*	*Mean square*	*f*	*p*
Anaerobic power	Sphericity assumed	876.770	3	292.257	123.803	.000
	Greenhouse–Geisser	876.770	1.783	491.639	123.803	.000
	Huynh–Feldt	876.770	1.824	480.631	123.803	.000
	Lower-bound	876.770	1.000	876.770	123.803	.000
Anaerobic power * group	Sphericity assumed	51.582	3	17.194	7.284	.000
	Greenhouse–Geisser	51.582	1.783	28.924	7.284	.001
	Huynh–Feldt	51.582	1.824	28.276	7.284	.001
	Lower-bound	51.582	1.000	51.582	7.284	.008
Error (anaerobic power)	Sphericity assumed	835.676	354	2.361		
	Greenhouse–Geisser	835.676	210.437	3.971		
	Huynh–Feldt	835.676	215.256	3.882		
	Lower-bound	835.676	118.000	7.082		

$p<.01$

Table 7 shows changes in the anaerobic power of participants over the four-year period. Anaerobic power was calculated for males to be118.66 ± 12.98 kg/m/s in the first year, 121.68 ± 12.41kg/m/s in the second, 122.32 ± 12.29kg/m/s in the third, and 123.15 ± 12.38kg/m/s in the fourth. For females, these values were 80.24 ± 9.82kg/m/s in the first year, 81.97 ± 9.82kg/m/s in the second, 82.29 ± 9.71kg/m/s in the third, and 83.13 ± 9.52kg/m/s in the fourth. Anaerobic power levels for both male and female students increased every year starting with the first and continuing for four years. These differences in years show statistical significance at the .01 level.

Table 8.

Variance Analysis Evaluation of the Repeated Measurement Levels of Aerobic Power

Source		*Type III sum of squares*	*df*	*Mean square*	*f*	*p*
Aerobic power	Sphericity assumed	5,541.305	3	1,847.102	2,865.94	.000
	Greenhouse–Geisser	5,541.305	1.907	2,906.341	2,865.94	.000
	Huynh–Feldt	5,541.305	1.954	2,836.519	2,865.94	.000
	Lower-bound	5,541.305	1.000	5,541.305	2,865.94	.000
*Aerobic power * group*	Sphericity assumed	38.813	3	12.938	20.074	.000
	Greenhouse–Geisser	38.813	1.907	20.357	20.074	.000
	Huynh–Feldt	38.813	1.954	19.868	20.074	.000
	Lower-bound	38.813	1.000	38.813	20.074	.000
Error (aerobic power)	Sphericity assumed	228.153	354	.645		
	Greenhouse–Geisser	228.153	224.982	1.014		
	Huynh–Feldt	228.153	230.520	.990		
	Lower-bound	228.153	118.000	1.934		

$p<.01$

Lastly, Table 8 displays changes in aerobic power of participants over the same four years. The aerobic power was estimated for male students to be39 ± 1.99 ml/kg/min in the first year, 55.83 ± 1.96 ml/kg/min in the second, 52.97 ±1.94 ml/kg/min in the third, and 49.24 ± 1.99 ml/kg/min in the fourth. For female students, the figures were 47.88 ± 4.81 ml/kg/min in the first year, 45.03 ± 4.65 ml/kg/min in the second, 42.67 ± 4.81 ml/kg/min in the third, and 39.26 ± 4.03 ml/kg/min in the fourth. The aerobic power of both male and female students decreased every year for four years. These differences in years show statistical significance at the.01 level.

Discussion and Conclusion

In this study, specific physical and physiological features of PE and sports students were examined over a four-year period beginning with their first year of university study and culminating with their fourth. The average age of participants was 20.01 years for male sand 19.12 years for females during the first year. The average height for participants was 179.83 cm for males and 167.37 cm for females. When body weight was inspected, for males the average weight was 68.61 ± 7.13 kg

for the first year, 71.37 ± 6.64 kg for the second, 72.77 ± 6.65 kg for the third, and 76.92 ± 6.76 kg for the fourth. For females, body weight average was 51.66 ± 6.44 kg for the first year, 54.48 ± 6.41 kg for the second, 56.77 ± 6.41 kg for the third, and 60.56 ± 6.28 kg for the fourth. Body weights for both males and females thus increased year after year from the first year onwards. The average weight increase at the end of four years of study was 8.31 kg for males and 8.90 kg for females, both of which are significant at a level of $p<.01$.

A similar study of the body weights and heights of students from similar age groups showed that the average weight for males was 70.1 ± 8.1 kg and for females 58.7 ± 11.9 kg (Karakus, 2005). More recently, Tuncel et al. (2009) showed that the average weight for males is 75.08 kg and for females 56.37 kg. Gunay et al. (2004) calculated the average body weights of male soccer players to be 70.25 ± 5.66 kg. For participants of similar age and height leading sedentary lifestyles, Dover et al. (2005) found body weights for females to be59.50 ± 6.57 kg, while Revan et al. (2008) found male weight to be73.1 ± 7.6 kg in a similar study of sedentary students. In another study conducted with elite tennis players in France, Flaire et al. (2009) reported that the body weight for female tennis players was 55.2 ± 2.7 kg. In the present study, while body weights showed similarities during the first years of education, students' body weights reached a level characteristic of sedentary people by their fourth year. This situation demonstrates that students down shifted from active lifestyles during their four years of education into sedentary ones. The findings of related literature thus support ours regarding the body weight values of active and sedentary students.

Annual changes in body weight naturally affect BMI, which in this study increased year after year. The average values for males' MBI were calculated to be 21.22 ± 2.26 kg/m²for the first year, 22.08 ± 2.22 kg/m² for the second, 22.52 ± 2.21 kg/m² for the third, and 23.80 ± 2.24 kg/m² in the fourth. For females, average BMI values were calculated to be18.40 ± 1.87 kg/m² for the first year, 19.407 ± 1.84 kg/m² for the second, 20.229 ± 1.89 kg/m² for the third, and 21.589 ± 1.85 kg/m² for the fourth. These increases are statistically significant at a level of $p<.01$. Among related research, Hingorjo et al. (2009) calculated BMI values for university students in Karachi to be23.82 ± 3.88 kg/m² for males and 20.98 ± 4.12 kg/m² for females, while Kitano et al. (2001) revealed that the BMI values for female university students in Japan were 20.1 ± 0.3 kg/m². Meanwhile, Arroyo et al. (2005) reported the BMI values of 653 university students in Spain to be21.8 ± 6.8 kg/m², Tang (2006) found that BMI values for students aged from 9 to 22 years to be 24.2 ± 2.1 kg/m² and Grigoris et al. (2008) found BMI values for female volleyball players to be 22.1 ± 1.8 kg/m². As such, findings regarding BMI from our review of related literature show similarities with our findings. Perhaps more striking, although there was a meaningful increase in BMI values over a four-year period among participants studying at the School of Physical Education and Sports, their BMI values remained inside a range (18.5–24.5 kg/m²) considered to be normal by WHO standards (WHO 2010).

Body fat percentages for male students were estimated to be 12.22 ± 1.61% in the first year, 13.47 ± 0.98% in the second, 14.56 ± 1.43% in the third and 15.96 ± 1.43% in the fourth. For female students, calculations were 14.54 ± 2.13% in the first year, 15.64 ± 1.61% in the second, 16.74 ± 1.85% in the third, and 18.54 ± 1.85% in the fourth. Body fat percentages both for male and female students thus showed an increase from the first year that continued year after year. As such, differences among years showed statistical meaningfulness at a level of 0.01. At the end of these students' education, body fat percentages had increased on average by 3.74% for males and 4% for females. Senel et al. have (2009) calculated body fat percentages for male wrestlers studying at the same School of Physical Education and Sports to be 12.21 ± 2.95%. Meanwhile, Saka et al. (2008)found body fat percentages for male university sportsmen of 11.2 ± 3.1%, while earlier Tamer et al. (1991) calculated body fat percentages of students studying at METU Preparatory School to be 14.9% regardless of sex. Yuksek and Cicioglu (2004) studied elite female judokas whose body fat percentages were determined to be 20.12 ± 3.90% for Turkish judokas and 20.23 ± 5.99% for Russian ones. Kiss et al. (2009) also determined body fat percentages for 1,560 female university students in Budapest that fellbetween18.34% and 25.37%. By extension, Agopyan (2015) has reported that exercise and eating habits of university students affect their body composition.

The inspection of body fat percentages in this study's similarly aged group indicated that percentages during students' first year were similar to those of an active sports population, yet during their fourth year had increased to levels comparable to those of sedentary people. This result demonstrates that students in the research group shifted from active, sports-oriented life styles to ones that are more sedentary.

Flexibility values for male students were estimated to be29.59 ± 7.60% for the first year, 27.84 ± 7.37% for the second, 26.56 ± 7.23% for the third, and 23.84 ± 7.23% for the fourth. For female students, these values were 32.56 ± 5.51% for the first year, 30.70 ± 5.26% for the second, 29.84 ± 5.12% for the third, and 25.16 ± 5.12% for the fourth. Flexibility values for both male and female students in our study thus decreased every year after the first, a value decline that continued for all four years. These year-to-year differences show a statistical significance at a*p* level of.01. At the end of four years, flexibility levels for male participants had decreased by 5.75 cm and by 7.4 cm for female participants. Pamuk et al. (2009) conducted a study with male basketball players in a second-tier league and found that their flexibility was 27± 7.38 cm; by contrast, regional-league players' flexibility was 23.6 ± 5.61 cm. In other studies of flexibility, Duncan et al. (2006) reported flexibility values for elite male volleyball players to be37± 10.7 cm, while Dawson et al. (2005) reported flexibility levels for soccer players to be23.3 ± 9.2 cm. Though the flexibility levels of students in our research during their first year were similar to other findings in the literature, their flexibility clearly decreased over the course of the following four years.

Vertical jump values for male students were estimated on average to be 61.19 ± 5.11% for the first year, 59.46 ± 5.22% for the second, 57.79 ± 5.10% for the third and 52.45± 5.10% for the fourth. For female students, values on average were estimated to be 49.74 ± 6.60% for the first year, 46.61 ± 5.83% for the second, 43.22 ± 5.55% for the third, and 38.77 ± 5.41% in the fourth. Vertical jump values for both male and female students thus decreased year after year for all four years at a significance level of 0.01. At the end of the four years, the vertical jump values for male shad decreased on average by 8.74 cm and for females by 10.97 cm.

Koc et al. (2007) measured vertical jump levels for university handball players to be 46.4± 8.9 cm, for university volleyball players to be 37.8 ± 4.1 cm, and for sedentary university students to be34.0 ± 4.3 cm. In another study, Gelen (2008) inspected the influence of different warm-up techniques on vertical jump levels and measured these levels of sedentary males who had used one of three differing warm-up techniques to be 29.53 ± 0.3 cm, 35.14 ± 0.2 cm, and 32.51 ± 0.1 cm, respectively. While the vertical jump levels of students participating in the present paper display similarities to those of athletes studied in related literature, the values during subsequent years clearly decreased.

The anaerobic power of participants were calculated for males to be118.66 ± 12.98 kg/m/s for the first year, 121.68 ± 12.41 kg/m/s for the second, 122.32 ± 12.29 kg/m/s for the third and 123.15 ± 12.38kg/m/s for the fourth. For females, the measurements were 80.24 ± 9.82 kg/m/s for the first year, 81.97 ± 9.82 kg/m/s for the second, 82.29 ± 9.71 kg/m/s for the third, year and 83.13 ± 9.52 kg/m/s for the fourth. The anaerobic power of both male and female students in this study increased year after year beginning with the first year of study for all four years, differences that are statistically significant at a*p* level of 0.01.

In research conducted by Albay et al. (2008), anaerobic power for male university student athletes was found to be 146.05 ± 16.67kg/m/s for volleyball players, 119.06 ± 13.26 kg/m/s for soccer players and 133.39 ± 15.41 kg/m/s for handball players. Karakollukcu and Aslan (2008) stated that anaerobic power for male gymnasts was129.48 ± 15.10 kg/m/s, while Goral(2008) calculated anaerobic power levels of university tennis players to be 149.41 ± 17.47 kg/m/s. Meanwhile, Aslan (2008) measured the anaerobic power of sportswomen aged 21 years to be91.82 ± 8.89kg/m/s, of sedentary females in their twenties to be75.16 ± 11.72 kg/m/s, and sedentary females in their thirties to be 87.66 ± 15.62kg/m/s. In our study, though many parameters of performance show decline, anaerobic power increased among the participating students. In this sense, body weight is an important factor for the formula used to calculate anaerobic power, since more power is needed for jumping with a heavier body.

As such, the anaerobic power of our participants increased, given their increased body weight.

The aerobic power ($MaxVo_2$) of male students in the study was found to be 39 ± 1.99 ml/kg/min for the first year, 55.83 ± 1.96 ml/kg/min for the second, 52.97 ±1.94

ml/kg/min for the third and 49.24 ± 1.99 ml/kg/min for the fourth. For female students, these values were 47.88 ± 4.81 ml/kg/min for the first year, 45.03 ± 4.65 ml/kg/min for the second, 42.67 ± 4.81 ml/kg/min for the third and 39.26 ± 4.03 ml/kg/min for the fourth. The aerobic power levels of students of both sexes in the study thus decreased every year during the four-year period, the year-to-year differences of which are statistically significant at a*p* level of 0.01.

Albay et al. (2008) calculated the anaerobic power of male university volleyball players to be 45.72 ± 2.21 ml/kg/min, of soccer football athletes to be 49.91± 3.33 ml/kg/min, and of handball players to be 49.95± 3.84 ml/kg/min. Yaprak and Aslan (2008) evaluated the aerobic powers of students of the same School of Physical Education and Sports who were also members of the badminton team to be 52.70 ± 10.02 ml/kg/min and of students who leading sedentary life styles to be 51.06 ± 7.19 ml/kg/min. Meanwhile, Pamuket al. (2008) calculated the aerobic powers of second-league basketball players to be50.81 ± 11.57 ml/kg/min and of regional-league players to be 46.65 ± 3.98 ml/kg/min. Nasis et al. (2009) calculated the aerobic powers of soccer players who completed a 20 m shuttle run to be56.5 ± 9.6 ml/kg/min, while Casajus and Castagna (2007) calculated the aerobic power levels of elite soccer referees in Spain to be54.9 ± 3.9 ml/kg/min.

Conclusion

As with other parameters, the aerobic capacities of participants in our study decreased over the period of four years. While $MaxVo_2$ values were at the levels of sports athletes when they first started school, these values decreased to those of sedentary people by the end of the study period. As a result, it was determined that the body weight, BMI, body fat percentage, flexibility, anaerobic power, and aerobic capacities of students who pass the difficult entrance examination for the School of Physical Education and Sports are at levels similar to those of sports athletes. It was also determined that the performance levels of these students decreased with each passing year to reach the level of sedentary people by the end of the fourth year of university study.

As a result, the main and indispensible aim of physical education and sports teacher training departments should be to train qualified and professional teacher candidates who will be responsible for raising the future generations. At this point, evaluating the situation and taking the necessary precautions are important for defining and filling the gaps immediately.

Recommendations

The situation described by the above results can be explained by the fact that students attending the School of Physical Education and Sports have an intense course load and potentially an excess of theoretical courses, which may ultimately prevent them from participating in regular sports training. Furthermore, students in Turkey are responsible for preparing for a rigorous, theoretically based examination upon graduating from university in order to become PE teachers. The obligation of

exam preparation often dominates these students free time outside normal university class responsibilities and thereby limits their time and opportunity to participate in sports and fitness activities.

In light of these findings, it is recommended that there be a thorough review and revision of the curriculum for PE and sports schools in Turkey. Future PE curriculum and instruction should emphasize training PE teachers to be healthy, knowledgeable, and prepared teachers for their students, other athletes, and fellow teachers. By extension, this study can be repeated with multiple groups and students from regions with different socioeconomic and cultural structures.

References

Agopyan, A. (2015). Comparison of body composition, cardiovascular fitness, eating and exercise habits among university students. *Anthropologist*, *19*(1), 145–156.

Albay, M.D., Tutkun, E., Agaoglu, Y.S., Canikli, A., & Albay, F. (2008). The investigation of some motor values and anthropometric characteristics of handball, volleyball and football university teams. *Spormetre Journal of Physical Education and Sport Sciences,* VI(1), 13–20.

Arroyo, M., Rocandio, A.M., Ansotegui, L., Herrera, H., Salces, I., & Rebato, E. (2004). Comparison of predicted body fat percentage from anthropometric methods and from impedance in university students. *British Journal of Nutrition,* 92, 827–832.

Aslan, C.S. (2008). Effects of doing exercise on physical and physiological negativeness depends on aging. *10thInternational Sport Sciences Congress,* Bolu. Turkey. 23–25 October**,** 639–641.

Dogustas, A. (2016). Teacher candidates' perceptions of standards in an education program at a university in Turkey. *Eurasian Journal of Educational Research, 63,* 1-20.

Dawson, B., Gow, S., Modra, S., Bishop, D., & Stewart, G. (2005). Effects of immediate post-game recovery procedures on muscle soreness, power and flexibility levels over the next 48 hours. *J Sci. Med. Sport,* 8(2), 210–221.

Casajus, JA. & Castagna, C. (2007). Aerobic fitness and field test performance in elite Spanish soccer referees of different ages. *Journal of Science and Med. in Sport,* 10, 382–389.

Cicek, S., Kirazci, S., & Kocak, S. (1998). Physical education teacher profile in Turkey. *Hacettepe University. Journal of Sport Sciences,* 9(3), 32–42.

Dover, E., Kurkcu, R., Yeniceri, M., & Can, S. (2005). The effects of dynamic stretching exercises to the flexibility of the females 18–25 age groups. *Ataturk University Journal of Physical Education and Sport Sciences,* 7(1), 15–21.

Duncan, M.J., Woodfield, L., & Al-Nakeeb, Y. (2006). Anthropometric and physiological characteristics of junior elite volleyball players. *British Journal of Sports Medicine,* 40(7), 649–651.

Gelen, E. (2008). Acute effects of different warm-up protocols on vertical jump performance. *Spormetre, Journal of Physical Education and Sport Sciences,* VI(4), 207–212.

Goral, K. (2008). Comparison of some physical aptitude characteristics of male university tennis players and male university volleyball players. *10th international Sport Sciences Congress, Bolu Turkey. 23-25 October*, pp. 862-864.

Gulay, O., Mirzeoglu, D., & Celebi, M. (2010). Effects of cooperative games on social skill levels and attitudes toward physical education. *Eurasian Journal of Educational Research,*(40), 77–92.

Gunay, M., Erol, A.E., & Savas, S. (1994). The relationship of strength, flexibility, and anaerobic power with body height–weight and some anthropometric parameters in soccer players. *Journal of Sport Science,* 5(4), 3–11.

Hingorjo, M.R., Syed, S., & Qureshi, M.A. (2009). Overweight and obesity in students of a dental college of Karachi: Lifestyle influence and measurement by an appropriate anthropometric index. *J Pak Med Assoc,* 59(8), 528–532.

Hofman, A. (1993) . *Tatsachen uber Deutschland*. Frankfurt/Main: Societäts –Verlag.

Karakollukcu, M., & Aslan, C.S. (2008).The effect of trampoline exercises on selected physical and physiological characteristics of men gymnasts. *10thInternational Sports Sciences Congress.* Bolu Turkey. 23–25 October, 396–398.

Karakus, S. (2005). The research on the correlation between the physical health and leisure time-smoking in the students attending the school of physical education and sports. *Kirsehir Journal of Education,* 6(2), 1–13.

Kiss, K., Mészáros, Z., Mavroudes, M., Szmodis, M., Zsidegh, M., Ng, N., & Mészáros, J. (2009). Fitness and nutritional status of female medical university students. *Acta Physiologica Hungarica*, *96*(4), 469-474.

Kitano, T., Kitano, N., Inomoto, T., & Futatsuka, M. (2001). Evaluation of body composition using dual-energy X-ray absorptiometry, skinfold thickness and bioelectrical impedance analysis in Japanese female college students. *Journal of nutritional science and vitaminology*, *47*(2), 122-125.

Koc, H., Ozcan, K., Pulur, A., & Ayaz, A. (2007). Comparison of some physical and physiological parameters of elite woman handball and volleyball players. *Spormetre, Journal of Physical Education and Sport Sciences,* V(3), 123–128.

Oz, A.S., Gumus, S.S., & Kirimoglu, H. (2011). An investigation of special and physical education pre-service teachers' vocational self-esteem. *Eurasian Journal of Educational Research,*11(45), 107–125.

Pamuk, O., Kaplan, T., Taskin, H., & Erkmen, N. (2008). Examination of the some physical and physiological parameters on basketball players according to different leagues. *Spormetre, Journal of Physical Education and Sport Sciences,* VI (3), 141–144.

Revan, S., Balci, S.S., Pepe, H., & Aydogmus, M. (2008). Effects of continuous and intermittent running training on body composition and aerobic capacity. *Spormetre, Journal of Physical Education and Sport Sciences,* VI (4), 193–197.

Saka,T., Yildiz, Y., Tekbas, O.F., & Aydin, T. (2008). Effects of sports school on some anthropometric and functional tests of young adult men. *Nigde Journal of Physical Education and Sport Sciences,* 1(2), 1–8.

Senel, O., Tas, M., Harmanci, H., Akyuz, M., Ozkan, A., & Zorba, E. (2009). Determination of the relationship between body composition, anaerobic performance, knee and back strength in wrestlers. *Gazi Journal of Physical Education and Sport Sciences,* XIV(2), 13–22.

Sural, S. (2015). The opinions of primary candidate teachers requirements and job-utiliy of the courses offered ın elementary teacher education programs. *Trakya University Journal of Education,* 5(1), *34-43*

Tamer, K., & Pulur, A. (2001). *Instruction methods in physical education and sport.* Ankara: Ada Printing Office.

Tamer, K., Zorba, E., & Baltaci, G. (1991). Calculation and evaluation of METU English Preparatory School male students' several physiological characteristics and capacities. *Ege University Journal of Sports Medicine,* 26(3), 87.

Tamer, K. (2000). *Measurement and evaluation of physical–physiological performance in sports.* Ankara: Bagirgan Publishing.

Tang, F.C. (2006). Influence of branched-chain amino acid supplementation on urinary protein metabolite concentrations after swimming. *J Am Coll Nutr,* 25(3), 188–194.

Tuncel, S.D., & Tuncel. F. (2009). Determining the health-exercise/physical activity levels of Turkish university students: Celal Bayar University School of Physical Education and Sports. *Journal of Physical Education and Sport Sciences,* 4(1), 51–58.

World Health Organization [WHO]. (2010, March 29). BMI Classification: The International Classification of Adult Underweight, Overweight and Obesity According to BMI. From<http://apps.who.int/bmi/index.jsp?introPage= intro_3. html.>

Yaprak, Y., & Aslan, A. (2008). Compare the measurements of cardiac output, VO_2Max and pulmonary function tests in university badminton players. *Spormetre, Journal of Physical Education and Sport Sciences,* VI (2), 69–74.

Yoncalık, MT. (2016). Determination of the physical activity levels of candidate Teachers. *Nigde University Journal of physical Education and Sport Sciences*. 10(1), 40-50.

Yuksek, S., & Cicioglu, I. (2004). Comparison of some physical and physiological parameters of Turkish and Russians junior national judo teams. *Spormetre, Journal of Physical Education and Sport Sciences,* II (4), 139–146.

Zorba, E., & Ziyagil, MA. (1995). *Body composition and measurement methods.* Trabzon: GEN Publishing.

Beden Eğitimi ve Spor Öğretmenliği Bölümünde Okuyan Öğrencilerin Dört Yıllık Eğitim Sürecindeki Fiziksel ve Fizyolojik Özelliklerinin İncelenmesi

Atıf:
Ocak, Y. (2016). The four-year an investigation of physical and physiological features of students in a physical education and sports department. *Eurasian Journal of Educational Research*, 65, 217-238
10.14689/ejer.2016.65.13

Özet

Problem Durumu: Özel yetenek sınavlarıyla Beden eğitimi ve Spor Yüksekokullarına giren öğrenciler ya iyi bir spor özgeçmişine, ya da çok iyi bir ön hazırlığa ihtiyaç duymaktadırlar. Bir başka ifadeyle Beden Eğitimi ve Spor Bölümlerine giren öğrencilerin fiziksel ve fizyolojik özellikleri, elit sporcuların profilleriyle benzerlik göstermektedir. Fakat özellikle Yüksek Öğretim Kurumu tarafından belirlenen ve tüm Beden Eğitimi ve Spor Öğretmenliği bölümlerinin zorunlu olarak uyguladığı ders programlarındaki teorik derslerin fazlalılığı ve yoğun bir müfredat programı sonrasında öğrenci, okul ya da spor arasında bir tercih yapmak zorunda kalmaktadır.

Büyük bir çoğunluğu gelecekte iyi bir mesleğe sahip olabilmek için okulu tercih ederek spordan uzaklaşmaktadırlar. Son sınıfa gelindiğinde de ise öğrencilerin büyük çoğunluğu sedanter bir insan profiline dönüşmektedir. İnsanlarımızın sağlıklı ve kaliteli bir yaşam sürdürebilmeleri için spora yönlendirilmesinde, yetenekli insanların tespit edilmesinde önemli bir görev üstlenen, öğrencilerine ve topluma model olan beden eğitimi öğretmenlerinin yetiştirilmesindeki bu çelişki düşündürücüdür.

Araştırmanın Amacı: Yukarıda bahsedilen problemlerden yola çıkılarak, beden eğitimi ve spor öğretmenliği bölümünde okuyan öğrencilerin okulu kazandıkları ilk yıldan itibaren dört yıl boyunca her yıl bazı fiziksel ve fizyolojik parametlerinin ölçümlerinin yapılması ve değerlendirilmesi amaçlanmıştır.

Araştırmanın Yöntemi: Afyon Kocatepe Üniversitesi Beden Eğitimi ve Spor Yüksek Okulunda, Beden Eğitimi Öğretmenliği Bölümünde okuyan 70 erkek, 50 kadın, toplam 120 öğrenci katılmıştır. Öğrencilerin okulu kazandıkları ilk yıldan itibaren dört yıl boyunca ilk yıl güz yarıyılında kasım ayında, diğer üç yılda bahar yarıyılında mayıs ayında, bazı fiziksel ve fizyolojik parametlerinin ölçümleri yapıldı. Ölçümlerde, vücut ağırlıkları, boy uzunlukları, vücut yağ yüzdeleri, vücut kitle indexleri, esneklikleri, dikey sıçramaları, anaerobik ve aerobik güçleri tespit edildi. İstatistiksel değerlendirmelerde, repeated measures analizi kullanıldı. Sonuçlar 0,01 ve 0,05 seviyesinde değerlendirildi.

Araştırmanın Bulguları: Araştırmaya katılan öğrencilerin dört yıllık ölçümleri sonucunda, tüm yıllarda bir önceki yıla göre vücut ağırlıkları, vücut yağ oranları ve anaerobik güçleri artmış, dikey sıçramaları mesafeleri, esneklik değerleri ve aerobik güçleri de azalmıştır. Tüm bu değişiklikler istatistiki olarak 0,01 düzeyinde de anlamlılığı ifade etmektedir.

Araştırmanın Sonuçları ve Öneriler: Beden Eğitimi ve Spor Yüksek Okulunun özel yetenek sınavına giren öğrencilerin profilleri sporcuların seviyelerindedir. Öğrencilerin bu performans seviyeleri her geçen yıl azalmaktadır. Hatta bu özellikleri dördüncü yıla gelindiğinde sedanter insanlar seviyesine kadar gerilemektedir. Beden Eğitimi ve Spor Yüksekokulu öğrencilerinin yoğun ders programları ve teorik derslerin fazlalığı, öğrencilere okul ya da spor arasında bir tercih yapma zorunluluğunda bırakmaktadır. Bu zorunluluk birçok öğrenci okulunu tercih etmesiyle sonuçlanmaktadır. Bu durum onları spordan uzaklaştıran önemli bir faktör olarak karşımıza çıkmaktadır.

Sonuç olarak, çalışma bulguları Beden Eğitimi ve Spor Öğretmenliği Bölümlerinin müfredat programlarının tekrar gözden geçirilerek düzenlenmesi gerekliliğini düşündürmektedir.

Anahtar Kelimeler: Beden eğitimi ve spor, öğretmen, performans, fiziksel, fizyolojik.