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## Effects of regular physical activity on physical and mental health in high school students

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### Abstract

This study aims to investigate the effects of regular physical activity on physical and mental health in male and female high school students. Data were collected from 1350 high school students. Short form- health scale (SF- 12) were used for physical health scores (PCS) and mental health scores (MCS). A physical activity stage of change questionnaire was used for activity level. Results of this study showed that the percentages of physical activity level were 41,6 % for males and 27,72% for females. There were significant differences in the means of MCS and PCS depending on physical activity level in male and females. Significant differences were only observed in the means of age, body height in males not females. PCS and MCS were significantly correlated with physical activity levels in both genders. Regular physical activity is a need to enhance and maintain PCS and MCS.

Keywords: Physical activity; physical and mental health ;students.

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## 1. Introduction

Physical inactivity with non-communicable diseases such as high blood pressure, high blood sugar and obesity, is the fourth major risk factor that threatens general health and causes global deaths. (WHO, 2008). Physical activity refers to all bodily movements resulting from skeletal muscle contraction in increased energy consumption above the baseline or resting level (US Department of Health and Human Services, 2008; ACSM, 2013). Exercise is a planned, structured, and repetitive work in the form of physical activity to develop and protect one or more items of physical fitness (WHO, 2010).

Improving physical fitness is one of the most important health indicators in young people. The ultimate purpose of participation in physical activity is to improve the health related physical fitness including five basic fitness elements: morphological, cardiorespiratory, metabolic, motor and muscular. The monitoring and evaluation of these five classes is important not only in the youth years but also in the protection and development of health in all periods from childhood to old age. Regular physical activity has an effect on general health and enhances psychosocial health (Brown, Balluz, Heath, Moriarty, Ford, Giles & Mokdad, 2003 ; Gorczynski & Faulkner, 2010). However, few evaluations the effect of regular physical activity on health have focused on a broader evaluation of health-related quality of life (HRQoL) including physical and mental health in high school students (Genc, Sener, Karabacak & Ucok, 2011; Tavazar, Erkaya, Yavas, Tez, Zerengok, Guzel & Ozbey, 2014).

Health-related quality of life is an indicator of overall health status with its multidimensional construction encompassing emotional, physical, social and subjective feelings of well-being which expresses an individual's evaluation and reaction towards their health or illness (Fontaine & Barofsky, 2001).

Tavazar et al. (2014) have reported positive effects of physical activity for promoting increased HRQoL in young people with sedentary life styles. Physical activity habits decrease significantly in the transition from high school to university and tend to decrease with age in the following years (Douglas, Collins & Warren 1997).

The promotion and increasing participation of physical and sporting activities at high schools will play an active role in increasing the health and academic achievement of young people. All physical activities in high schools should aim to develop the students' physical, intellectual, emotional, and social potentials in order to bring up healthier, happier, and more successful people integrating to the society. Thus, the purpose of this study is to investigate the effects of regular physical activity on physical and mental health in male and female high school students.

## 2. Material and Method

Data were collected from 1350 participants including 725 males and 625 females at the age range of 14-19 years living in Cukurova district of Adana city attending the high school were chosen randomly. The means values for females were  $15.82 \pm 1.08$  years for age,  $163.73 \pm 5.77$  cm for body height,  $56.01 \pm 9.12$  kg for body weight and  $20.92 \pm 3.17$  for BMI, respectively. Same values for males were  $15.94 \pm 1.14$  years for age,  $175.12 \pm 7.20$  cm for body height,  $66.80 \pm 13.82$  kg for body height and  $21.69 \pm 3.77$  for BMI, respectively. After collecting socio-demographic data, short form-12 (SF- 12) short health scale (Ware et al. 2008) were used for physical and mental health scores. Turkish version of Physical Activity Stages of Change Questionnaire (Cengiz, Asci & Ince, 2010) was used for data collection activity level in male and female high school students. In this study, participants were divided into five categories as stages of exercise behavior change including a pre-contemplation, contemplation, preparation, action and maintenance stages. After performing normality tests, Kruskal

Wallis tests were used for comparison among five groups. Mann Whitney U test was also used for two group comparisons.

### 3. Results

Results of this study showed that the percentages of physical activity level were 41,6 % for males and 27,72% for females (Table 1). There were significant differences in the means of MCS and PCS depending on physical activity level in both genders. Significant differences were only observed in the means of age, body height in males not females. Physical activity stages of behavior change were significantly correlated with age ( $r=-.167, p<.01$ ), body height ( $r=.123, p<.01$ ), physical health ( $r=.159, p<.01$ ) and mental health ( $r=.191, p<.01$ ) scores in males. These significant correlations with physical activity level were observed in body height ( $r=.107, p<.01$ ), physical health ( $r=.102, p<.05$ ) and mental health ( $r=.087, p<.05$ ) scores in female students.

**Table 1. Physical activity stages of behaviour change in males and females.**

	Physical Activity Stages of Behaviour Change					Total
	PC	C	P	A	M	
<b>Females</b>	215 (29,66%)	177 (24,41%)	132 (18,21%)	81 (11,17%)	120 (16,55%)	725 (% 100)
<b>Males</b>	123 (19,68%)	148 (23,68%)	94 (15,04%)	70 (11,20%)	190 (30,40%)	625 (% 100)
<b>Total</b>	338 (25,04%)	325 (24,07%)	226 (16,74%)	151 (11,19%)	310 (% 22,96)	1350 (% 100)

$\chi^2=43.457, p<.000$

Pre-Contemplation (PC), Contemplation (C), Preparation (P), Action (A) and Maintenance (M).

**Table 2. Comparison of Physical characteristics, physical and mental health Scores according to stages of exercise behaviour changes in females.**

Variables	Stages	MALE STUDENTS					FEMALE STUDENTS						
		N	M.	SD.	$\chi^2$	Asymp. Sig.	MW U	N	M.	SD.	$\chi^2$	Asymp. Sig.	MW U
Age (years)	PC (G 1)	215	16,02	1,11	22,41	,000**	G1>G3, G4, G5; G2>G3, G4; G2>G5;	123	16,02	1,19	3,98	,409	n.a.
	C (G 1)	177	15,95	1,07				148	15,97	1,21			
	P (G 1)	132	15,68	1,03				94	16,12	1,25			
	A (G 1)	81	15,57	1,09				70	15,89	1,06			
	M (G 1)	120	15,63	1,04				190	15,82	1,07			
	Total	725	15,83	1,08				625	15,95	1,16			
Body Height (cm)	PC (G 1)	215	163,01	5,55	12,4	,015*	G1<G4, G5; G2<G5;	123	173,66	6,67	9,27	,055	n.a.
	C (G 1)	177	163,25	6,06				148	175,16	7,27			
	P (G 1)	132	164,05	5,57				94	175,21	7,75			
	A (G 1)	81	164,31	5,44				70	174,90	7,12			
	M (G 1)	120	164,99	5,95				190	176,08	7,16			

<b>Body Weight (kg)</b>	<b>Total</b>	725	163,73	5,77				625	175,12	7,21			
	<b>PC (G 1)</b>	215	55,21	8,09				123	64,40	11,99			
	<b>C (G 1)</b>	177	56,69	10,01				148	67,41	14,83			
	<b>P (G 1)</b>	132	56,59	9,28	3,73	,444	n.a.	94	67,23	15,47			
	<b>A (G 1)</b>	81	56,57	9,73				70	66,87	12,81	3,85	,426	n.a.
<b>Body Mass Index (BMI)</b>	<b>M (G 1)</b>	120	55,97	8,95				190	67,65	13,58			
	<b>Total</b>	725	56,10	9,13				625	66,80	13,82			
	<b>PC (G 1)</b>	215	20,78	2,88				123	21,29	3,36			
	<b>C (G 1)</b>	177	21,27	3,52				148	21,89	4,19			
	<b>P (G 1)</b>	132	21,02	3,27	7,51	,111	n.a.	94	21,78	4,09	1,16	,885	n.a.
<b>Physical Health Scores</b>	<b>A (G 1)</b>	81	20,93	3,21				70	21,78	3,50			
	<b>M (G 1)</b>	120	20,53	2,94				190	21,72	3,62			
	<b>Total</b>	725	20,92	3,17				625	21,69	3,77			
	<b>PC (G 1)</b>	215	50,70	6,82				123	52,82	5,86			
	<b>C (G 1)</b>	177	51,67	6,24			G1<G4, G5;	148	51,83	5,91			
<b>Mental Health Scores</b>	<b>P (G 1)</b>	132	51,80	6,86	19,46	,001**	G2<G4; G2<G5;	94	52,84	5,42	12,27	,015*	G2<G4; G2<G5;
	<b>A (G 1)</b>	81	53,20	5,13			G3<G5;	70	53,37	5,50			
	<b>M (G 1)</b>	120	53,51	5,44				190	53,86	5,38			
	<b>Total</b>	725	51,88	6,37				625	52,97	5,66			
	<b>PC (G 1)</b>	215	38,28	11,56				123	44,50	11,30			
<b>Physical Health Scores</b>	<b>C (G 1)</b>	177	38,90	11,88			G1<G4, G5;	148	44,80	10,13			
	<b>P (G 1)</b>	132	40,14	10,18	32,44	,000**	G2<G4; G2<G5;	94	43,03	9,55			G 1<G4; G2<G4;
	<b>A (G 1)</b>	81	42,53	10,96			G3<G5;	70	48,32	7,83	15,39	,004**	G3<G4; G3<G5;
	<b>M (G 1)</b>	120	44,82	11,36				190	46,74	9,75			
	<b>Total</b>	725	40,33	11,52				625	45,46	10,04			

\*P<0.05; \*\*p<0.01; n.a.=not available; MW U=Mann Whitney U test

G 1=Pre-Contemplation (PC), G 2=Contemplation (C), G 3=Preparation (P), G 4=Action (A) and G 5=Maintenance (M).

**Table 3. Correlations coefficients among variables in males and females.**

	M A L E S			F E M A L E S		
	Physical activity stages of change	Physical health scores	Mental health scores	Physical activity stages of change	Physical health scores	Mental health scores
Physical activity stages of change	1,000	,159**	,191**	1,000	,102*	,087*
Age	-,167**	-,169**	-,256**	-,051	-,078*	-,115**
Body Height	,123**	,066	,000	,107**	-,023	,073
Body Weight	,029	-,058	-,058	,067	-,087*	-,017
BMI	-,034	-,094*	-,059	,033	-,095*	-,056
Physical Health Scores	,159**	1,000	,010	,102*	1,000	-,158**
Mental Health Scores	,191**	,010	1,000	,087*	-,158**	1,000

\*P<0.05, \*\*P<0.01.

#### 4. Discussion

It was well known that regular physical activity develops general health and physical fitness (Brown et al., 2003; Gorczynski & Faulkner, 2010). Physical activity habits decrease significantly in the transition from high school to university and tend to decrease with age in the following years (Douglas et al., 1997). Thus, this study aims to investigate the effects of regular physical activity on physical and mental health in male and female high school students. Results of this study showed that participation rates in physical activity were 41,6 % for males and 27,72% for females. This lower participation rate in physical activity is a risk factor threatening general health of high school students. However, the effects of regular physical activity on health should focus on a broader evaluation of health-related quality of life (HRQoL) including physical and mental health in high school students. In our study, there were significant differences in the means of physical and mental health (PCS and MCS) depending on physical activity level in male and females (Table 2). In males, physical and mental health scores increase with physical activity stages of change, while there is an irregular increase in females. This difference between these two trends suggests that males perform physical activity more effectively than females. Comparison of physical characteristics between two genders demonstrated that significant differences were only observed in the means of age, body height in males not females. Physical activity stages of behavior change were significantly correlated with physical characteristics and health in males and females (Tablo 3). Results of this study is in agreement with the study done by Tavazar et al. (2014). They have reported positive effects of physical activity for promoting increased HRQoL including physical and mental components score in young people with sedentary life styles. It is important that health should be assessed by the physical, mental, social, emotional dimensions of the individuals. It will be useful to identify new strategies for the evaluation of knowledge level, skills and behaviors.

It can be concluded that there was a need to show new approach towards to change the students' sedentary lifestyles based on scientific information. For participating regular physical activity at least three days a week and one hour a day throughout the year, it is not only important to present indoor and outdoor facilities, but also the employment of qualified coaches, exercise specialists and leaders as well as to plan the physical and sport activity strategies meeting students expectations.

Further research is required to repeated on a large number of students in different socio-economic and geographical characteristics whether the effects of regular physical activity on physical and mental health in male and female high school students.

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