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PHYSICAL ACTIVITY PATTERNS OF TURKISH ADOLESCENTS: INFLUENCE OF SOME SOCIAL FACTORS

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Abstract
Objectives: this study examined the associations between physical activity and some social factors in a sample of Turkish adolescents. **Methods:** 883 middle and high school students provided information on physical activity, socioeconomic status, living conditions, school performance, family status, family's attitude about exercise, and playmates. Scales measuring self-esteem, problem solving, and self-care levels were used for each student. **Results:** 531 (60.1 %) students were practicing some kind of sport. The most commonly preferred sports were ball games. Low activity was associated with living without families, higher age, low mother education, and low self-care scores suggesting that sociocultural factors may affect the exercise status of adolescents. **Conclusions:** Low physical activity was associated with some social factors in teenagers. Efforts should be sought to increase self-esteem and self-care of adolescents, and the opportunity to participate in sportive activities with friends and parents.

Key words: adolescent medicine, exercise, self care, self-esteem, social conditions

Introduction

The benefits of promoting physical activity among children and youth are well established. First, a substantial amount of evidence shows the potential for preventing cardiovascular diseases and all-cause mortality in a population by increasing the physical activity and physical fitness in less active groups. Second, adolescence is believed to be an important period for learning health-related behavior patterns, including physical activity, that will carry over into adulthood (1).

Several social and environmental factors such as parental and peer influences, gender differences, body perception, urbanization, self-esteem, school performance, race, smoking, and drinking have been shown to effect physical activity patterns (2-9). However, there are no published data on the relationship between physical activity and living conditions or parental education.

Physical activity consists of at least four interrelated dimensions: type of activity (e.g., walking, swimming, playing tennis), frequency of participation, duration per episode, and the intensity or vigor with which the activity is performed. Studies focusing on different dimensions can lead to different descriptions of activity patterns in a given population. In this article, we analyzed the patterns of participation in physical activity by including all dimensions according to the method proposed by Fuchs et al. (10).

We conducted this study in order to obtain the baseline data for the physical activity behaviors of adolescents in Edirne, a 185000 population city in western Turkey, and evaluate the influence of different factors.

Materials and Methods

From the 28 middle and high schools in Edirne, with a total population of 12923 students, 883 (6.83%) were sampled using a stratified method according to the number of students in each school. A written consent was obtained from the parents of the students. The average age of participants was 15.00 ± 1.80 years. Demographic characteristics of the participants are presented in Table 1. Two groups were defined according to age: early adolescents (=15 years) and late adolescents (>15 years). A 32-item self-report questionnaire was applied to each student under supervision of the trained researchers to ascertain exercise, and demographic information. Additionally, students were asked to complete scales measuring problem solving (Happner and Petersen, 1982; adapted into Turkish by Taylan, 1990), self-care (Kearney and Fleischer, 1979; adapted into Turkish by Nahcivan, 1979), and self-esteem (Rosenberg 1963; adapted into Turkish by Cuhadaroglu, 1986). The physical activity patterns were estimated from a series of questions about the type, frequency, and duration of activities performed. Other Demographic information consisted of age, sex, parental education, socioeconomic status (SES), living conditions, school performance, living with or without parents, playmates, and family's attitude about exercise. Living conditions were divided into two categories: those living with their own family, and those having other living conditions. School performance was queried according to the last report card: adolescents with one or more

failing grades in the last report card were grouped as low performers, whereas the ones with no failing grades were grouped as high performers. Two types of families were defined according to living with parents: families where one or both of the parents have died, or parents have divorced were grouped as separated families and others as two parent families. Parental education was grouped as low educated (less than secondary school) and high educated (secondary school and more). SES was measured using the scale developed by Neyzi et al. (11). This tool uses the educational status of mother and father, and the occupation of father to calculate a scale from 1 (highest SES) to 4 (lowest SES).

Table 1: Demographic Characteristics of the Participants

	N	%
Age		
< 16	480	54.44
≥ 16	403	45.64
Total	**883**	**100.00**
Sex		
Female	484	54.81
Male	399	45.19
Total	**883**	**100.00**
Living conditions		
With own family	769	87.39
Other	111	12.61
Total	**880**	**100.00**
Status in the last report card		
1 or more poor grades	438	50.17
No poor grades	435	49.83
Total	**873**	**100.00**
Educational level of mother		
Primary school or less	518	58.86
Secondary school or higher	362	41.14
Total	**880**	**100.00**
Educational level of father		
Primary school or less	334	38.84
Secondary school or higher	526	61.16
Total	**860**	**100.00**
Socioeconomic status		
1	75	10.0
2	218	29.0
3	423	56.3
4	35	4.7
Total	**751**	**100.0**

Separated Family Yes No **Total**	 63 814 **877**	 7.2 92.8 **100.0**

Based on pilot studies, 21 activity types were selected. The frequency of participation (FREQi) was assessed by asking how often the activity type i was performed when it was in season. The response categories were daily, several times per week, once per week, several times per month, once a month, less than once a month, or never. These responses were coded as 24, 12, 4, 2.5, 1, 0.5, and 0 times per month, respectively. Each of these numbers was divided by 4.3 to get an estimated weekly frequency. Because the number of months during which a given activity is in season varies, the frequency reports were multiplied by a seasonal adjustment factor to estimate an average frequency of participation year around. For example soccer is usually played during 9 months of the year and, thus, has a seasonal adjustment factor of 0.75 (9/12). Adjustment factors for various activities are reported in Appendix 1.

To assess the average duration per episode (DURi), students were asked about how long they usually performed each activity type i on each occasion. The responses were coded as < 15 min, 15-30 min, 30-60 min, 1-2 hr, or if > 2 hr, the exact number of hours. These responses were converted to an estimate in hours of 0.125, 0.375, 0.75, 1.3, 3, and 4 respectively. Responses above 4 hr were coded as the number of hours.

Standard estimates of intensity were used to classify activities according to the energy expenditure typically associated with them (12,13). The types of activity measured were divided into two classes (Appendix 1): vigorous activities.

- Those requiring an energy expenditure of = 7 metabolic equivalents (METs; 1MET is the energy expended by a person while sitting at rest) and moderate activities with MET values in the range of 3-6. This classification was based on tables of energy expenditure published by Durnin and Passmore (14) and McArdle et al. (15).

On the basis of this information, several indices were constructed: time spent per week for vigorous activities, time spent per week for moderate activities, and time spent per week for total activities.

Time spent per week for vigorous activities (TIMEvi) was calculated by multiplying the frequency (FREQvi) and the duration (DURvi) per episode for vigorous activities:

TIMEvi = FREQvi * DURvi

Time spent per week for moderate activities (TIMEm) was calculated by multiplying the frequency (FREQmi) and the duration (DURmi) per episode for moderate activities:

TIMEm = FREQmi * DURmi.

Time spent per week for total activities (TIMEi) was calculated by multiplying the frequency (FREQi) and the duration (DURi) per episode for all activities:

TIME = FREQi * DURi

The time spent in physical activity is not symmetrically distributed. Therefore, we generally present the median value instead of arithmetic mean (AM) when describing the central location of the data.

Chi square, Student's t test, and logistic regression analysis were used in statistical analysis.

Results

Demographic characteristics of the subjects are presented in Table 1. It was of notice that, around half of the students had one or more poor grades in their last report card and fathers were more educated than mothers.

Five hundred and thirty one (60.1 %) students were practicing some kind of sport whereas 352 (39.9 %) students were doing no exercise. The mean values for TIMEv, TIMEm,and TIME for adolescents participating some kind of sport were calculated as 6.8574 (hour/week) (n=501, min: 0.01, Max. 120.49), 5.3115 (hour/week) (n=295, min: 0.01, Max: 75.33), and 9.5732 (hour/week) (n=531, min: 0.05, Max. 120.49) respectively.

The numbers of exercising and non-exercising adolescents were 480 (62.6 %) vs 287 (37.4 %) for those living with their families and 50 (44.2 %) vs 63 (55.8) for those living in other conditions. There was a significant difference between the two groups with regard to exercise status ($X2 = 13.820$, $p = 0.000$).

Boys performed vigorous as well as moderate type of exercises significantly more than girls (Table 2).

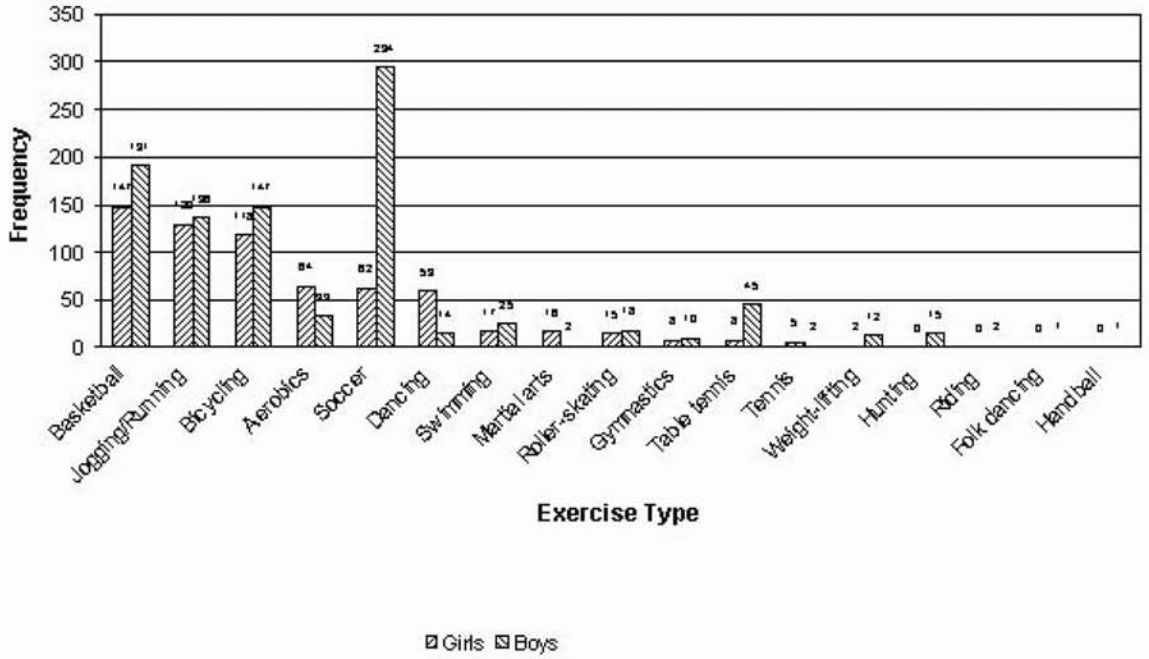
Early adolescents performed significantly more moderate type exercise (2.09 ± 4.49; n=478), than late adolescents (1.35 ± 4.86) ($t = 2.349$, $p=0.019$). Self-esteem was found to be high in 460 (53.4 %), moderate in 370 (42.9 %), and low in 32 (3.7 %) of the students. The mean value of problem solving and self-care scores was 92.2 ± 18.1 (Min. 50, Max. 166) and 99.5 ± 19.8 (Min. 32, Max. 154) respectively.

Most commonly preferred sports were ball games for both sexes (Soccer for boys and basketball for girls). Vast majority of the students preferred basketball, running, cycling, aerobics, soccer, or dancing. 89.1 % of girls and 86.0 % of boys chose one or more of these six exercise types (Figure 1).

Table 2: Descriptive statistics of exercise parameters

	Girls (N=489)				Boys (N=399)				Total (N=883)			
	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD
TIMEv	0.00	120.49	3.29*	8.45	0.00	41.85	4.61*	6.10	0.00	120.49	3.89	7.50
TIMEm	0.00	75.33	1.36**	4.77	0.00	46.04	2.26**	4.62	0.00	75.33	1.77	4.72
TIME	0.00	120.49	4.76***	10.02	0.00	58.59	6.96***	8.65	0.00	120.49	5.75	9.48

Figure 1: Participation to different type of exercise according to gender



The most common reason to exercise was "health preservation" for both sexes. The most striking difference for both sexes was in the categories "weight loosing" and "becoming strong". The number of girls aiming for weight loss was double that of males. The contrary of this was the case for those aiming to become strong. Here the number of boys was double of the number of girls (Figure II).

The reasons for not exercising were around the same for both sexes with exception of dating. None of the girls mentioned dating as a reason for not exercising (Figure III). Also the playmates were around the same for boys and girls. 67.9 % of the girls and 57.3% of the boys preferred to exercise with friends or a team (Figure IV).

Most parents were encouraging or neutral to exercising. There was no significant difference between girls and boys with regard to the approach of the parents to exercise (Table 3).

Table 3: Parent's approach to exercising with regard to sex

	Encouraging	Neutral	Opposing	Total
Boys	144	196	12	352
	40.9%	55.7%	3.4%	100.0%
Girls	158	216	19	393
	40.2%	55.0%	4.8%	100.0%
Total	302	412	31	745
	40.5%	55.3%	4.2%	100.0%

Bivariate correlations were calculated between TIMEv, TIMEm, TIME, SES, age, problem solving, self-care, and self-esteem. Significant correlations were found between TIMEv, TIMEm, TIME. In addition negative correlations were found between SES and TIME, age and TIME as well as TIMEm., and self-esteem and TIME as well as TIMEv. Self-care showed a positive correlation with TIME and TIMEv. There was no correlation between the problem solving scores and any of the exercise parameters (Table 4).

Figure 2: Reasons for exercising

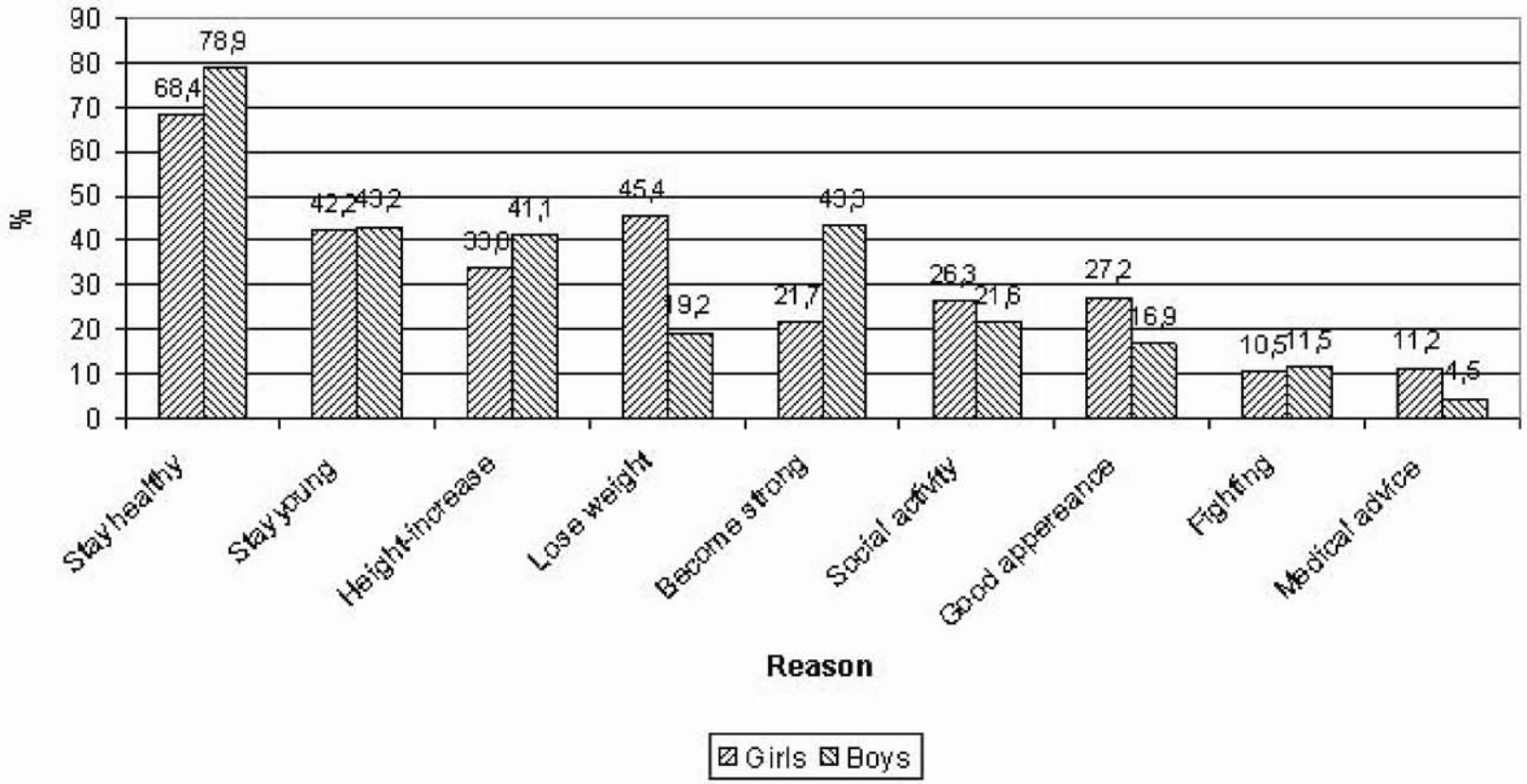


Figure 3: Reasons for not exercising

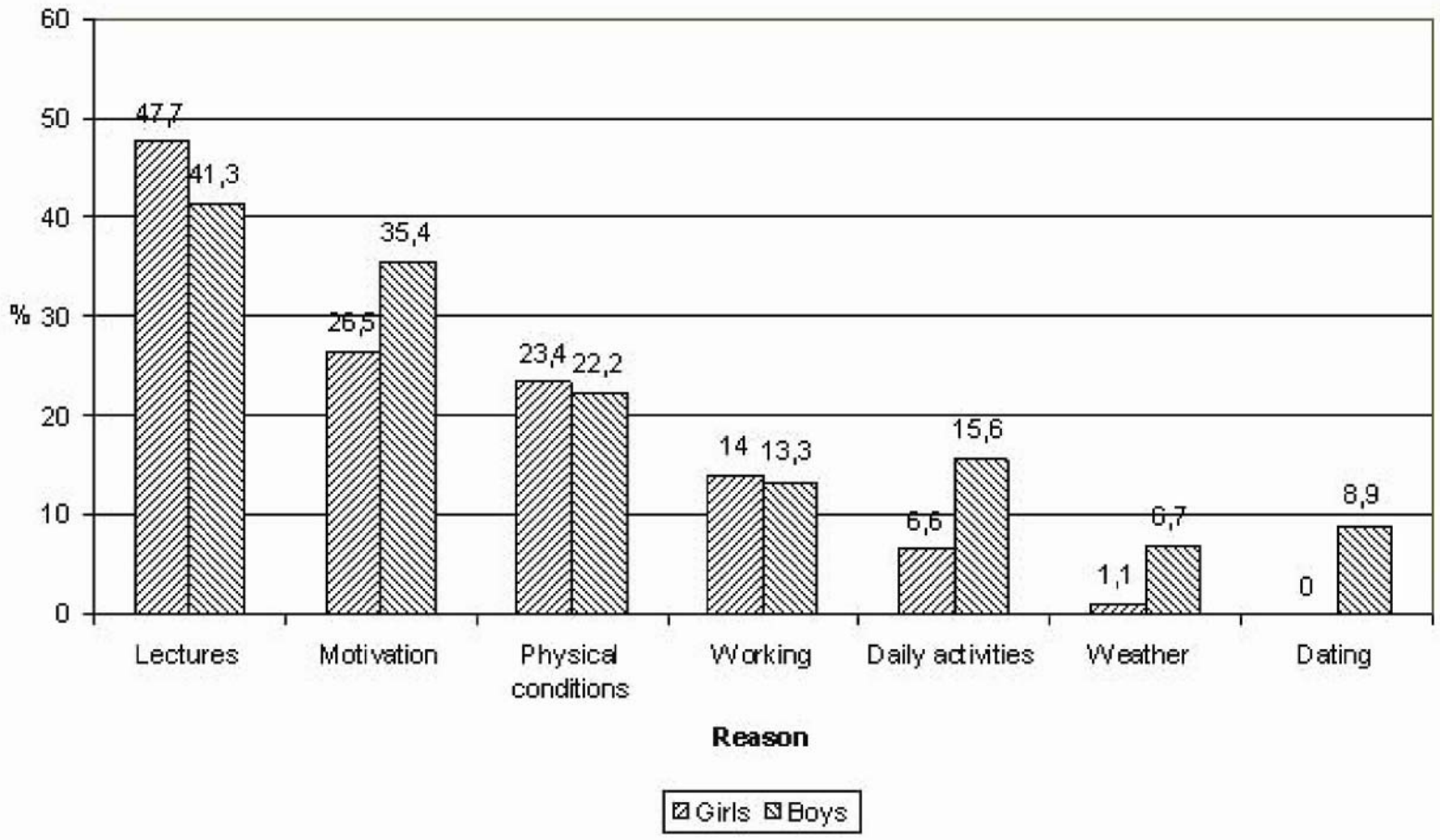


Figure 4: Playmates according to sex

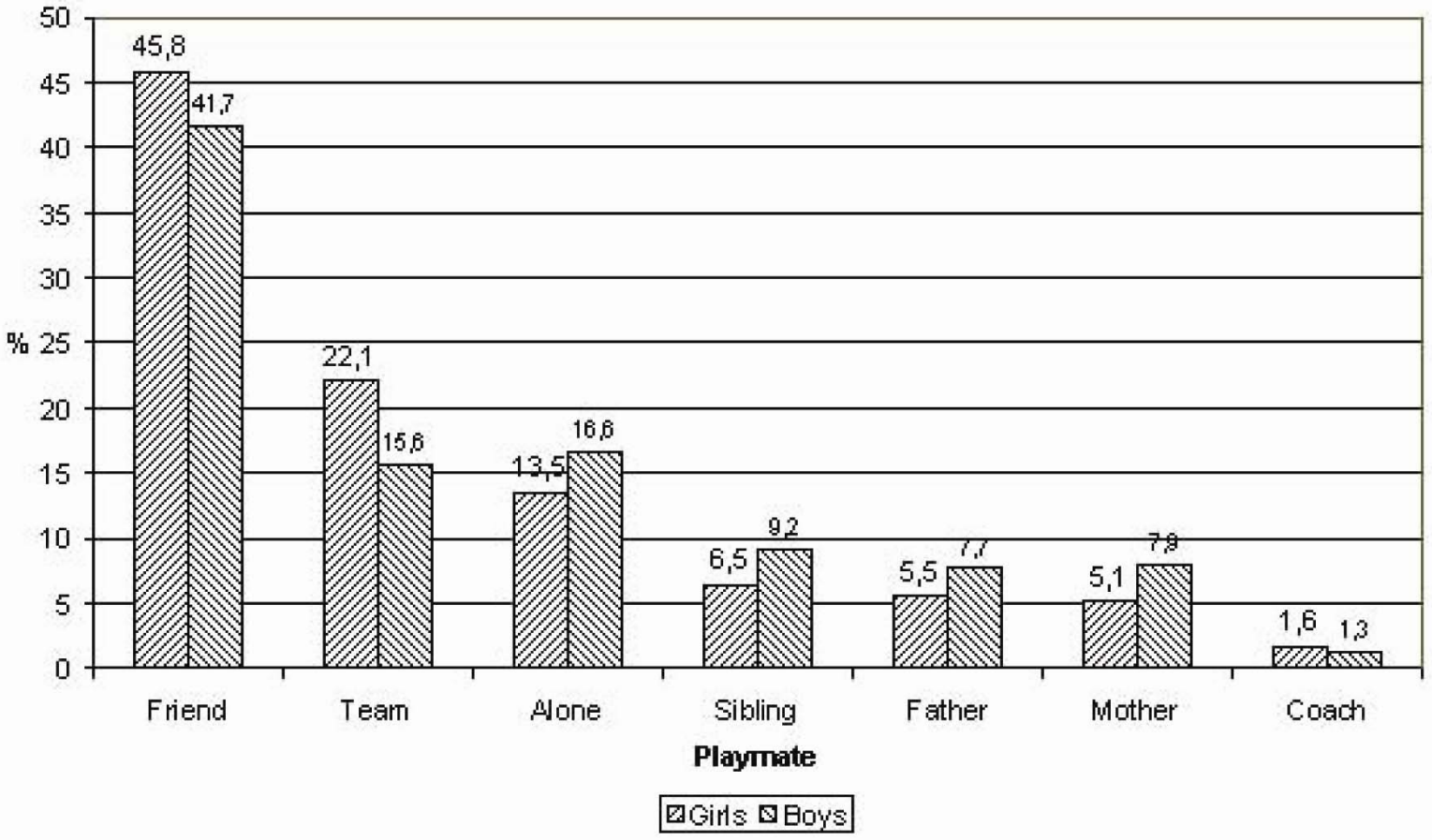


Table 4: Correlations between age, TIME, TIMEv, TIMEm, age, SES, problem solving, self-care, and self-esteem.

		TIMEv	TIME	TIMEm	AGE	SES	PC	SC	SE
Cor	**TIMEv**	1.000							
	TIME	0.864**	1.000						
	TIMEm	0.139**	0.606**	1.000					
	Age	-0.036	-0.069*	-0.091**	1.000				
	SES	-0.069	-0.077*	-0.046	-0.071	1.000			
	PS	-0.059	-0.062	-0.026	-0.055	0.135**	1.000		
	SC	0.119**	0.108**	0.029	0.001	-0.018	-0.513**	1.000	
	SE	-0.104**	-0.086*	-0.009	-0.208**	0.026	0.273**	-0.375**	1.00
Sig	**TIMEv**	.							
	TIME	0.000	.						
	TIMEm	0.000	0.000	.					
	Age	0.281	0.042	0.007	.				
	SES	0.057	0.034	0.209	0.051	.			
	PS	0.138	0.120	0.509	0.169	0.002	.		
	SC	0.004	0.008	0.485	0.975	0.690	0.000	.	
	SE	0.002	0.012	0.796	0.000	0.481	0.000	0.000	.
N	**TIMEv**	883							
	TIME	883	883						
	TIMEm	883	883	883					
	Age	878	878	878	878				

	SES	751	751	751	748	751			
	PS	627	627	627	624	539	627		
	SC	599	599	599	595	509	475	599	
	SE	862	862	862	857	731	619	589	862

PS=Problem solving, SC=Self-care, SE=Self-esteem.
** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 4 Continued…

From the logistic regression model only mother's education, self-care, and living condition were found significantly effecting exercise status. Especially living with family caused a two-fold increase in exercise status (Table 5).

Table 5: Logistic regression model.

Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
Family (1)	**-1.0668**	**0.7104**	**2.2551**	**1**	**0.1332**	**-0.0253**	**0.3441**
Mother education (1)	0.7486	0.3470	4.6549	1	0.0310	0.0815	2.1140
Father education (1)	**-0.4239**	**0.3213**	**1.7409**	**1**	**0.1870**	**0.0000**	**0.6545**
Self-care	0.0195	0.0083	5.5501	1	0.0185	0.0942	1.0197
School performance (1)	**-0.4644**	**0.2697**	**2.9660**	**1**	**0.0850**	**-0.0491**	**0.6285**
Problem solving	0.0012	0.0084	0.0188	1	0.8909	0.0000	1.0012
Living condition (1)			**4.6412**	**3**	**0.0312**	**0.0813**	**2.2976**
SES	0.8319	0.3861	2.2895	1	0.5145	0.0000	
SES (1)	**0.5924**	**0.8778**	**0.4554**	**1**	**0.4998**	**0.0000**	**1.8083**
SES (2)	0.9742	0.7753	1.5791	1	0.2089	0.0000	2.6492
SES (3)			**1.6057**	**2**	**0.2051**	**0.0000**	**2.4783**
Parent's attitude to exercise	0.9076	0.7162	0.3321	1	0.8470	0.0000	
Parent's attitude to exercise (1)	**0.2500**	**0.6268**	**0.1592**	**1**	**0.6899**	**0.0000**	**1.2841**
Parent's attitude to exercise (2)	0.3333	0.6171	0.2918	1	0.5891	0.0000	1.3956
Self-esteem	**0.1020**	**0.1107**	**0.8488**	**1**	**0.3569**	**0.0000**	**1.1073**
Constant	-2.0071	1.7446	1.3236	1	0.2500		

Discussion

The results of this study give important information about the exercise habits of Turkish adolescents in Edirne. It is remarkable that the rate of moderate exercises is less than the rate of heavy exercises. This is valid for both boys and girls. The reason for this situation is attributed to the fact that some branches of sports, such as swimming, gymnastics, dancing, and table tennis, are not conventionally common in Turkey. On the other hand, the branches of sports, which require a saloon or equipment, such as, swimming, and gymnastics are possibly not common due to the financial limitations in Turkey.

Weekly exercise rates are low when compared with other studies. Fuchs et al. found in their research TIME as 8.8 hours/week for girls and 4.0 hours/week for boys, heavy activity rate as 1.6 hour/week for girls and 4.0 hours/week for boys, and moderate activity rate as 6.3 hour/week for girls and 5.6 hours for boys (10). Moderate activities of the girls are expected to be more than those of boys, but we have not found such a result may be due to the reasons we mentioned above.

To our knowledge, the fact that 40% of the students do not participate in any sporting activity in Edirne is reported in literature for the first time. This finding should be evaluated together with the reasons for not exercising. The most important three reasons are time spent for school, lack of motivation, and insufficient physical conditions. It can be concluded that, the number of students who exercise may be increased when the school schedules are arranged in conformity with social activities of the students, home

works are given considering that students should spend some time on sports or, sportive activities that are held under the auspices of school management, school and family cooperation and other associations, and also students are enabled to participate in these activities. Importance should be given to infrastructure establishments, which will facilitate sportive activities.

The most popular sportive activities for both sexes were games played with ball. It is obvious that cycling is the third one for boys and racing for girls. Although there are neither cycling nor racing tracks in Edirne, the interest in these branches of sports is still high. If the necessary infrastructure is built, the rate of these exercises may increase.

Both sexes have expressed that their most important reason to exercise was to take care of their health. This shows that adolescents have comprehended the relationship between health and exercising. The reasons why they want to exercise are similar for both sexes, but girls want to exercise in order to lose weight and boys want to exercise in order to become stronger. These reasons have more significance when compared to others.

The data, that should be considered when making plans towards increasing exercise rate, are adolescents take part in sportive activities with their friends and play in a team. Parents rarely oppose to sportive activities and there is no statistical difference between girls and boys concerning parental point of view. So, it is obvious that family is not an obstacle to exercise and furthermore there is not any restriction towards girls. Also the study of Anderssen and Wold (1) support the opinion that others have an important impact in promoting physical activity in adolescents either by serving as models or acting as supporters.

Age is an important factor for the relationship between adolescence and exercising. Age especially becomes important due to the fact that, most of these habits are acquired during puberty. It is well known that the possibility of keeping the habits of puberty during the maturity period is higher.

A significant correlation in a way that results in a decrease of exercising with the age is seen in this study. Early adolescents get more exercise -either moderate or heavy- than late adolescents and furthermore there is a statistical difference between two groups in respect to getting only moderate exercise. So, it leads us to think that early adolescents get moderate exercises more easily owing to the capability of their bodies. It is understood that, early adolescents should be given priority in creating a habit of exercising, however some precautions must be taken to prevent them from giving up the habit of exercising at older ages.

Although SES does not seem to be an important factor which effects exercise in logistic regression analysis, there is a relationship between SES and TIME, which is reverse and statistically significant. This finding could be gainsaid as the possibility of reaching exercising resources of individuals whose SES is high, is more than the others.

References

1. Yamauchi T, Umezaki M, Ohtsuka R. Influence of Urbanization on Physical Activity and Dietary Changes in Huli-speaking Population: a Comparative Study of Village Dwellers and Migrants in Urban Settlements. Br J Nutr 2001 Jan; 85(1): 65-73.

2. Parent CJ, Whall AL. Are Physical Activity, Self-esteem, and Depression Related. J Gerontol Nurs 1984 Sep; 10(9): 8-11.

3. Boyd KR, Hrycaiko DW. The Effect of a Physical Activity Intervention Package on the Self-esteem of Pre-adolescent and Adolescent Females. Adolescence 1997 Fall; 32(127): 693-708.

4. Daley AJ, Ryan J. Academic Performance and Participation in Physical Activity by Secondary School Adolescents. Percept Mot Skills 2000 Oct; 91(2): 531-4.

5. Felton GM, Parsons MA. Factors Influencing Physical Activity in Average-weight and Overweight Young Women. J Community Health Nurs 1994; 11(2): 109-19.

6. Fuchs R, Powell KE, Semmer NK, Dwyer JH, Lippert P, Hoffmeister H. Patterns of Physical Activity among German Adolescents: The Berlin-Bremen Study. Prev Med 1988; 17: 746-763.

7. Neyzi O. Alp H, Orhon A. Sexual maturation in Turkish girls. Ann Hum Biol 1975; 2(1): 49-59.

8. Andersen LK, Rutenfranz J, Masironi R, Seliger V. Habitual physical activity and health. Copenhagen: WHO (European Series, No. 6); 1978.

9. Sallis JF, Haskell WL, Wood PD, Fortmann SP, Rogers T, Blair SN, Paffenbarger RS. Physical activity assessment methodology in the five-city project. Amer J Epidemiol 1985; 121: 91-106.

10. Durnin JVGA, Passmore R. Energy, Work, and Leisure. London: Heinemann; 1967.

11. McArdle WD, Katch FL, Katch VL. Exercise Physiology: Energy, Nutrition, and Human Performance. Philadelphia: Lea & Febiger; 1981.

Appendix (1)

Activity types measured, their seasonal adjustment factors (months per year), and their intensity classification (moderate vs vigorous): bicycling 9/12, moderate; swimming, 5/12, moderate; gymnastics/ballet, 12/12, moderate; dancing 12/12, moderate; table-tennis 12/12, moderate; soccer 9/12, vigorous; ball games (e.g. volleyball/basketball) 12/12, vigorous; jogging/running 9/12, vigorous; roller-skating/skateboard, 6/12, vigorous.