ORİJİNAL ARAŞTIRMA ORIGINAL RESEARCH

DOI: 10.5336/sportsci.2017-57533

Physical Activity Levels, BMI and Healthy Life Style Behaviors in Adolescents Living in a Rural District

Bir Kırsal Bölgede Yaşayan Adölesanların Fiziksel Aktivite Düzeyleri, BKİ ve Sağlıklı Yaşam Biçimi Davranışları

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Received: 04.08.2017
Received in revised form: 31.10.2017
Accepted: 01.11.2017
Available online: 23.03.2018

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This work was presented as an oral presentation at the 11th Annual Meeting and 6th HEPA Conference (7-9 October 2015, Istanbul).

ABSTRACT Objective: Getting insight into pubescent health behaviors and related aspects is the initial step in improving lifelong health. The purpose of this study was to examine the relationship among physical activity levels (PALs), body mass index (BMI) and healthy lifestyle behaviors (HLBs) in adolescents in one of the rural districts of Turkey. **Material and Methods:** Participants were 749 14-18-year-old Turkish girls and boys in one of the rural districts of Turkey. Their physical characteristics like body weight (kg), height (cm) and BMI were determined. Participants completed the Physical Activity Assessment Questionnaire (PAAQ) and the Adolescent Lifestyle Profile Scale (ALP) for determination of physical activity level (PAL) and HLBs, respectively. **Results:** The physical characteristics and BMI of girls and boys revealed gender related differences ($p<0.05$) whereas PAL did not show any gender related differences ($p>0.05$). The total health behavior scores of adolescents were found as above the average (111.77 (SD=11.81)). Results also indicated correlations, from low to moderate, between PAL and health responsibility, physical activity, positive life perspective, stress management, spiritual health subscales and total profiles ($p<0.05$). In contrast no significant relationship was found between PAL and nutrition and interpersonal relations ($p>0.05$). Moreover, there was no relationship between BMI and PAL, BMI and healthy life style profiles ($p>0.05$). **Conclusion:** It was concluded that adolescents had gender related BMI differences as expected but did not have sufficient levels of PA and gender related changes in PALs and healthy life style choices were not different. In addition, we found no relationship among BMI, PAL & HLBs whereas PAL and ALP subscales and total profile were associated within the range of weak to moderate in boys, girls and total sample.

Keywords: Pubescent; health behaviors; exercise

ÖZET Amaç: Ergen sağlık davranışları ve bununla ilişkili konuların iç yüzünü anlamak, yaşam boyu sağlığın geliştirilmesi için ilk basamaktır. Bu çalışmanın amacı Türkiye'deki kırsal bölgelerden birinde yaşayan adölesanların fiziksel aktivite düzeyleri (FAD), beden kitle indeksi (BKİ) ve sağlıklı yaşam biçimi davranışları (SYBD) arasındaki ilişkiyi incelemektir. **Gereç ve Yöntemler:** Çalışmanın örneklemini yaşları 14-18 yıl olan 749 kız ve erkek adölesanlar oluşturmuştur. Katılımcıların öncelikle vücut ağırlığı (kg), boy uzunluğu (cm) ve BKİ gibi fiziksel özellikleri belirlenmiştir. Katılımcıların fiziksel aktivite düzeylerinin ve sağlıklı yaşam biçimi davranışlarının belirlenmesi için sırasıyla Fiziksel Aktivite Değerlendirme Anketi (FADA) ve Adölesan Yaşam Biçimi (AYB) Ölçeği kullanılmıştır. **Bulgular:** Araştırma sonucuna göre, erkek ve kızların fiziksel özellikleri ve BKİ cinsiyete bağlı olarak farklılık gösterse de ($p<0,05$) fiziksel aktivite düzeylerinde cinsiyete bağlı herhangi bir fark ortaya çıkmamıştır ($p>0,05$). Adölesanların toplam sağlıklı yaşam skorları ortalamanın üstünde bulunmuştur [111,77 (SS=11,81)]. Ayrıca, fiziksel aktivite düzeyi ile sağlık sorumluluğu, fiziksel aktivite, pozitif yaşam bakışı, stres yönetimi, spiritüel sağlık alt ölçekleri ve toplam profilleri arasında düşük ve orta dereceli bir ilişki bulunmuştur ($p<0,05$). Bunun aksine, fiziksel aktivite düzeyi ile beslenme ve kişilerarası ilişkiler alt ölçekleri arasında anlamlı bir ilişkiye rastlanmamıştır ($p>0,05$). Benzer şekilde, BKİ ile fiziksel aktivite düzeyi, BKİ ile sağlıklı yaşam biçimi profilleri arasında da herhangi bir korelasyon bulunmamıştır ($p>0,05$). **Sonuç:** Adölesanların BKİ cinsiyete bağlı olarak farklılaşsa da, fiziksel aktivite düzeylerinin yeterli seviye olmadığı ve cinsiyetler arasında fiziksel aktivite düzeyi ve sağlıklı yaşam biçimi tercihlerinin farklı olmadığı sonucuna varılmıştır. Ayrıca, BKİ, fiziksel aktivite ve sağlıklı yaşam biçimi davranışları arasında bir ilişki olmasa da erkeklerde, kızlarda ve toplam katılımcılarda, fiziksel aktivite düzeyi ve AYB alt ve toplam profilleri arasındaki ilişki zayıf ve orta düzeyde olduğu tespit edilmiştir.

Anahtar Kelimeler: Ergen; sağlık davranışları; egzersiz

It is emphasized that physical activity (PA) is a multidimensional behavior that occur in multiple contexts and is very important for learning, enjoyment, social interactions, and self-unders tanding.[1] In general terms; exercise, walking, labor, gardening, daily chores, physical education, play, dancing, and sport as well as other activities that involve energy expenditure are globally accepted PA occasions. It is recommended that school-age youth should participate daily in 60 minutes or more of moderate to vigorous physical activity that is developmentally appropriate, enjoyable, and involves a variety of activities.[2] Adolescence may be a period particularly relevant for acquisition of lifelong habits of PA.[3] Most of the adolescents, unfortunately, do not engage in adequate degrees of PA and fail to meet age-associated PA suggestions to accomplish health gains.[4] Notably, girls are less active compared to boys, youth from socio-economically deprived communities, and adolescents with special needs have lower levels of PA, and regional living adolescents oftentimes have less access to services and facilities which negatively affects PA behavior.[5-11] National data also revealed similar findings. For instance, Kin-İsler et al. examined age and gender differences in physical activity levels (PALs) and various PA patterns of 11-14-year-old Turkish adolescents.[12] Six hundred and fifty girls and 666 boys between the ages constituted the sample of the study. The findings indicated an age-related decline in PAL, an increase in participation in low activities, and a decrease in participation in moderate and vigorous activities. In addition it was found that boys were more active than girls and participated more in moderate and vigorous activities. Aksoydan and Cakir conducted a study with 319 adolescents in Kocaeli city and their results indicated that secondary and high school students did not engage in regular PA and secondary school students were found to be more active than high school students which are an indicator of decline in PA participation with age.[13] Likewise, a study conducted by Tunc and Kin-İsler found out that high school students had higher levels of PA compared to university students.[14]

Concern is growing about unhealthy behaviors in youth including adolescent pregnancy, risky sexual intercourse, tobacco and drug use, decreased PALs, increased sedentary behaviors, increased consumption of calorie-dense foods, and increased prevalence of unhealthy weight among youth with diverse characteristics that may lead to adverse health outcomes.[15-18] A cross sectional survey carried out by Ortabag et al. to determine health risk and promotion behaviors of adolescents between the ages of 11 and 19 years (total 1.351 participants) in Ankara city showed that most of the adolescents did not have adequate and balanced nutrition and did not engage in adequate PA.[19] And also, Aktas-Ozakgul et al. analyzed the health-promoting lifestyles of senior high school students and the factors that affected this lifestyle.[20] According to the study results, the senior high school students did not have sufficiently health promoting lifestyles. They indicated that training programs for healthy lifestyle behaviors (HLBs) should be addressed, planned and implemented to senior high school students. This is a big concern as these unhealthy behaviors commonly track into later life and adulthood. Therefore, higher levels of physical inactivity during childhood and adolescence are likely to contribute to an increased risk of obesity and other adverse health conditions in adulthood.[21,22]

It is worth to mention that adolescent health can be promoted and improved if HLBs can be developed and there is a consistency in the literature that educational institutions lack health promotion activities and evaluation of program outputs.[23-25] Therefore, school-based health promotion programs that involve the promotion of adolescent HLBs are significant in the context of preventing these problems.[26] For example, Jewett et al. highlighted that school sport participation may protect against poor mental health in early adulthood and therefore policies to increase school sport participation may be warranted as part of public health strategies to promote mental health.[27]

It is believed that identifying the multi-dimensional predictors of adolescent health behaviors will provide an opportunity for the deve lopment of more effective health promotion pro-

grams. As mentioned earlier, adolescence health is essential because this stage is a transitional period, with many external aspects influencing health and wellbeing from adolescence to early maturity.

It should not be forgotten that the cornerstone for healthy lifestyle preferences and HLBs in maturity initiates in childhood and adolescence. Given the significance of pubescence health, getting insight into pubescent health behaviors and related aspects is the initial step in improving lifelong health.

It must be emphasized that there may be relationships between body mass index (BMI), PA, and HLBs in adolescents. Therefore, the aim of the current study was to examine the relationship among PALs, BMI and HLBs in adolescents and to investigate gender related differences. This study had three hypotheses. Initially, it was hypothesized that there would be a gender differences among BMI, PA and HLBs. Secondly, there would be negative relationship between BMI and PAL, BMI and HLBs; and thirdly, PAL and HLBSs would be positively correlated. The unique aspect of the present study was that it might fill the gap among BMI, PALs and healthy life style choices of adolescents and gender related differences of this population living in a rural area.

MATERIAL AND METHODS

PARTICIPANTS AND SETTINGS

The study sample was recruited from one of the rural districts of Yozgat city of Turkey. The participants were enrolled in the 9th, 10th, 11th and 12th grades in high schools and randomly selected from eight different public high schools during 2014-2015 academic years in the included district, namely Yerkoy. This district was chosen because studies in rural part were scarce in Turkey and at the same time, it was easy for the authors to reach the study sample. In order to determine sample size of the study, power analysis was performed at α=0.05 (Power software (version 3.1.9.2; Franz Faul, Universitat Kiel, Dusseldorf, Germany).[28] Power analysis (1-β=0.95) indicated that required sample size for this study was at least n=631. A total of 749 volunteer adolescents (age 14-18 years; mean age 16.26 years (SD= 1.06); mean height 165.34 cm (SD=7.96); mean weight 60.47 kg (SD= 10.23)) participated in this study. Students who volunteered to participate in this study completed an inform consent form before data collection.

DATA COLLECTION INSTRUMENTS

Assessment of the HLB

Adolescent Lifestyle Profile (ALP)

The ALP scale developed by Hendricks et al. based on the Health Promotion Model (HPM) was used to evaluate the HLBs of adolescents.[29,30] The ALP scale is an adolescent version of the Health Promotion Lifestyle Profile (HPLP).[29-31] In this study, the Turkish ALP (T-ALP) was used.[32] The T-ALP scale consists of 40 items and 7 subscales, including (a) Positive life perspective (PLP; 8 items), (b) Physical activity (PA; 6 items), (c) Nutrition (NU; 6 items), (d) Health responsibility (HR; 5 items), (e) Stress management (SM; 5 items), (f) Interpersonal relations (IR; 5 items), and (g) Spiritual health (SH; 5 items).[32]

The frequency of health-promoting behaviors was evaluated using a 4-point self-report scale, with responses ranging from 1 (*never*) to 4 (*always*). The score ranges between 160 (highest) - 40 (lowest). Higher scores indicated a higher frequency of health-promoting behaviors.

Physical Activity Assessment Questionnaire (PAAQ)

PAAQ is a self-report questionnaire, which asked the participants to give the weekly average of the number of times, and duration they engaged in physical activity over the last year.[33] The work (school for students), travel, home, sport and stair activities were listed as 5 separate categories to estimate the activity of participants during the last year.

Respondents indicated whether the activities that are listed under these categories were done and if so, on how many days and how many minutes per day the activity was generally performed in a week.

Each activity was assigned an intensity value (Metabolic expenditure units-MET) based on the

work of Ainsworth et al. MET/week values are computed by the multiplication of duration, frequency and assigned MET values to each activity (MET/week= Frequency Duration x MET value of activity).[34] The average weekly energy expenditure in kilocalories (kcal/week) is also computed by using the following formula set:

Kcal=week= Frequency x Duration x MET value of activity x Weight.

PAAQ reveals MET/week and kcal/week values for home, work, travel, sport and stair categories. The sum of the five scores is considered the total physical activity score (MET/week or kcal/week).[33] PAAQ has been shown to have acceptable validity for research purposes. Two week test–retest reliability was r=0.40 for MET/week and r=0.53 for kcal/week in adults and the PAAQ has been found to be moderately correlated (r=0.72; p<0.01) with 24 hours daily writing of the activities.[33] In high school students the reliability of this questionnaire was between 0.56-0.94.[35]

Determination of Physical Characteristics

Height and weight were measured by a single fieldworker in the majority (99%) of cases to minimize observer bias. Standard techniques were used for each measurement. Weight was measured to the nearest 0.1 kg using a digital scale (Tanita TBF300A, Tanita Corporation, Tokyo, Japan). Height was measured using a daily calibrated stadiometer (Seca 770, Germany) to the nearest 0.1 cm and body mass index (BMI) was calculated automatically as weight (kg)/height $(m)^2$.

DATA COLLECTION PROCEDURES

This study was approved by Hacettepe University Institutional Review Board and Ethics Committee (Project no: GO 15/517). Before conducting the study the consent was obtained from the Ministry of Education and the administrations of the participating high schools. Following the official registration and ethical approval, invitations were distributed by the principles at the schools. Each participant received an information folder and signed a written consent. The parents of subjects below 18 years also signed the consent. The PAAQ and ALP were administrated to participants at classroom settings.

Prior to data gathering, each measure was pilot tested to make sure that the reading level and answer design were suitable for the 9^{th}, 10^{th}, 11^{th} and 12^{th} grades students. Researchers provided verbal and visual information on how to respond to items in the questionnaires.

Participants in the study were volunteers and self-report questionnaires responses were anonymous. Physical characteristics of the subjects were determined in the physical education classes. Each consenting student was measured in a private and screened area out of view of other students by a trained researcher. Height and weight measurements were obtained after removal of slippers or shoes.

STATISTICAL ANALYSIS

To understand and summarize the data, sample characteristics were given according to gender by using descriptive statistics. Tests for homogeneity of variances (Kormagorov-Smirnov test) were performed to ensure the normality of population for every dependent variable (p>0.05). In addition, an independent samples t-test was used to determine gender differences in physical characteristics, PAL and ALP of the sample. As the assumption of normality was not confirmed Spearman's Rank Order Correlation test was used to determine the relationship among BMI, PAL, healthy life style subscales and total profiles. The significance level was set at p<0.05.

RESULTS

SOCIO-DEMOGRAPHIC ATTRIBUTES OF THE ADOLESCENTS

Of the 749 adolescents who completed the study, 390 (52.06%) were boys and 359 (47.93%) were girls. The subjects' mean age was 16.44 ± 0.94 and ranged from 14 to 18 years; 42 were aged 14 years (5.60%), 131 were aged 15 years (17.48%), 224 were aged 16 (29.90%), 292 were aged 17 (39.11%), and 59 were aged 18 (7.87%) (Socio-demographic attributes of the adolescent are summarized in Table 1).

TABLE 1: Socio-demographic attributes of adolescents.

Demographic attributes		n	%
Grade	9	179	23.89
	10	231	30.84
	11	225	30.04
	12	114	15.22
Age (year)	14	42	5.6
	15	131	17.48
	16	224	29.9
	17	293	39.11
	18	58	7.74
Gender	Boys	390	52.06
	Girls	359	47.93

PHYSICAL CHARACTERISTICS OF ADOLESCENTS

Descriptive statistics of the adolescents were as follows: the mean height (cm), weight (kg) and BMI (kg/m^2) of the participants were 169.46 cm (SD= 7.34), 62.11 kg (SD= 9.51), and 21.53 kg/m^2 (SD= 2.33), respectively. Additionally, a significant difference was observed among boys and girls with respect to height (t= 17.515, p= .000), and BMI (t= -4.860, P= .000); while, there was no significant difference in weight (t= 4.618, p= .750) (Physical characteristics of the adolescents are summarized in Table 2 according to gender).

ADOLESCENT LIFESTYLE PROFILES

The total health behavior scores of the adolescents were found as above the average (111.77 (11.81)). Adolescents scored higher on positive life perspective and lower on health responsibility (25.74 (3.30); 11.21 (2.63), respectively). Similar evidences were found both for boys (PLP, (25.67 (3.32); HR, 11.16 (2.64)); and girls (PLP, 25.82 (3.27); HR, 11.26 (2.63)). Meanwhile there was no significant difference between boys and girls in regard to health responsibility, physical activity, nutrition, positive life perspective, interpersonal relations, stress management and spiritual health subscales (p>0.05) (Table 3).

PHYSICAL ACTIVITY LEVEL (PAL)

Boys had PAL of 111.59 (21.17) MET/week and girls had PAL of 111.38 (21.28) MET/wk. Results indicated no significant differences between boys and girls with respect to PAL (p>0.05) (Table 2).

TABLE 2: Physical characteristics and PALs of adolescents.

	Boys (n=390)	Girls (n=359)	t	p
Height (cm)	169.46 (7.34)	160.87 (5.94)	17.515	0.000*
Weight (kg)	62.11 (9.51)	58.69 (10.69)	4.618	0.750
BMI (kg/m^2)	21.53 (2.33)	22.71 (4.12)	-4.860	0.000*
PAL (MET/week)	111.56 (21.17)	111.38 (21.28)	0.133	0.946

Means (standard deviations) of boys and girls described across gender. Significance is denoted by *$p<0.05$. **BMI:** body mass index; **PAL:** physical activity level.

TABLE 3: The ALP scores of boys, girls and total study sample.

ALP Scores		Boys	Girls	T	p
HR	11.21 (2.63)	11.16 (2.64)	11.26 (2.63)	-0.534	0.797
PA	14.96 (3.16)	14.99 (3.17)	14.94 (3.15)	0.207	0.805
NU	15.06 (3.36)	15.02 (3.39)	15.11 (3.33)	-0.371	0.812
PLP	25.74 (3.30)	25.67 (3.32)	25.82 (3.27)	-0.621	0.600
IR	16.28 (2.54)	16.24 (2.55)	16.31 (2.53)	-0.425	0.809
SM	14.96 (1.70)	14.93 (1.70)	14.98 (1.70)	-0.384	0.954
SH	13.53 (2.50)	13.51 (2.50)	13.55 (2.50)	-0.229	0.891
TOTAL	111.77 (11.81)	111.55 (11.90)	112.01 (11.71)	-0.536	0.812

ALP: Adolescent Lifestyle Profile, **HR:** Health Responsibility, **PA:** Physical Activity, **NU:** Nutrition, **PLP:** Positive Life Perspective, **IR:** Interpersonal Relations, **SM:** Stress Management, **SP:** Spiritual Health.

CORRELATIONS AMONG PAL, BMI AND ALP

Results revealed that there was no significant correlation between BMI and PAL, BMI and ALP subscales and total profiles ($p>0.05$) (Table 4). In contrast, examination of the results showed low and moderate correlation between PAL and healthy life style subscales and profile ($p<0.05$). For the total sample, PAL was inversely associated with PLP ($r=-0.117$, $p<0.05$), SM ($r=-0.124$, $p<0.05$), SH subscales ($r=-0.512$, $p>0.05$) and ALP ($r=-0.196$, $p<0.05$). Furthermore, positive but weak correlation was found between PAL and HR ($r=0.188$, $p<0.05$) and PA subscale ($r=0.211$, $p<0.05$). A similar pattern of relationship was evident between PAL and ALP when gender differences were taken into consideration. In detail, PAL was negatively correlated with PLP ($r=-0.114$, $p<0.05$), SM ($r=-0.116$, $p<0.05$), SH ($r=-0.519$, $p<0.05$) and ALP ($r=-0.200$, $p<0.05$) in boys whereas positively correlated with PAL and HR ($r=0.174$, $p<0.05$) and PA subscales ($r=0.202$, $p<0.05$). In girls, however there was a negative and weak association among PAL and PLP ($r=-0.119$, $p<0.05$), SM ($r=-0.132$, $p<0.05$), SH ($r=-0.504$, $p<0.05$), ALP ($r=-0.190$, $p<0.05$) and positive and weak correlation between PAL and HR ($r=0.203$, $p<0.05$) and PA subscales ($r=0.221$, $p<0.05$).

TABLE 4: Correlations among PAL, BMI and ALP according to Gender.

PAL (Spearman's rho)	Boys	Girls	Total
BMI	NS	NS	NS
HR	0.174**	0.203**	0.188**
PA	0.202**	0.221**	0.211**
NU	NS	NS	NS
PLP	-0.114*	-0.119*	-0.117**
IR	NS	NS	NS
SM	-0.116*	-0.132*	-0.124**
SH	-0.519**	-0.504**	-0.512**
ALP	-0.200**	-0.190**	-0.196**

*p<0.05, **p<0.001 PAL: physical activity level, **BMI:** body mass index, **ALP:** Adolescent Lifestyle Profile, **HR:**Health Responsibility, **PA:** Physical Activity, **NU:** Nutrition, **PLP:** Positive Life Perspective, **IR:** Interpersonal Relations, **SM:** Stress Management, **SP:** Spiritual Health, **NS:** No Significance.

DISCUSSION

The enactment of HLBs requires a complex interaction of features from numerous determinants and adolescent health life style choices are affected by a number of factors.[36-38] These factors include adolescents' close environment namely significant others such as peers, teachers, parents and families and as well as parental healthy lifestyle choices and parents' educational level and the school environment. Some outcomes of lifestyle choices and behaviors are BMI and PAL. Kelly et al. have found that among the 404 adolescents, cognitive beliefs about leading a healthy lifestyle, including attitudes and intended choices, are related to PA as well as nutrition.[36] Similarly, it was shown that there was a relationship between HLBs and BMI.[39] We hypothesized that there would be negative relationship between BMI and PAL, BMI and HLBs in adolescents which we could not find. It may be that adolescents' personal attributes, socio-demographic characteristics, cultural norms, living conditions, or family structure could be the reasons of why noteworthy association between BMI and PAL, BMI and HLBs was not observed.

Our findings might indicate that lower levels of PA could be predictor of unhealthy eating, unsuccessful stress management, pessimistic life perception and negative spiritual health which indicated by lower levels of PAL and poorer behavioral skills in adolescents of the present study. In other words, adolescents who found hard to have healthy lifestyle behaviors perceived PA as more difficult to perform. This result might unfortunately suggest that adolescents cannot receive benefit in healthy life style for PA.

On the other hand, in the present study positive but weak relationship was found between PAL and PA subscale among adolescents. It can be said that this finding is line with Kelly et al. as adolescents in their study who reported greater behavioral skills for PA also reported being more physi cally active.[36]

We also hypothesized that there would be gender differences among BMI, PA and HLBs. We

found that there was a gender related variances in BMI which was in line with the previous studies.[40,41] On the other hand, our findings are not in line with previous reports which revealed significant gender-related differences in self-reported PAL.[42-45] In addition our results did not show consistency with earlier studies conducted in Turkey. For instance, a recent review done by Sumen and Oncel found out that PA scores of boys were higher than girls and this was influenced by social activity participation, health perception, education level of parents, peers and family relations.[46] Similarly, Kocak et al. reported that among the 333 girls and 359 boys, girls had lower PA level and participated less in sport than boys.[47]

In addition, it was reported that Turkish boys devoted more time to moderate to vigorous PA than girls among the 1044 adolescents aged between12 and 13 years in the urban areas of Istanbul, Ankara and Izmir in Turkey.[48] It is beneficial to emphasize that diversity and the residential status of the adolescents such as residing in urban or suburban communities, and heterogeneity of the target groups, social variables, cultural norms and disparities within and/or out of the groups and living conditions might be the reasons for finding conflicting results with the previous literature. Correlatively, this study population of the present study might have interpreted the PAL questionnaire differently as "sport" term is used predominantly rather than "physical activity."

In our study, the total health behavior scores of adolescents were above the average and we discovered no significant difference between boys and girls in regard to ALPs. These results showed that both adolescents perform similarly in terms of healthy life style behavior. Compared to our current findings, Ardic et al. reported higher health behavior scores among 812 and 912 Turkish adolescents.[32] In addition, Hendricks et al. found likewise results in the original study.[29] We found that adolescents did above the average at the health responsibility dimension of ALP and accordingly other studies also reported comparable findings.[29,32] This might be due to the age groups of adolescents in the present study. Adolescents of the present study might be too young to understand their roles in promoting their health and quality of life. In addition, they are still on the cognitive development stage.[49] Henceforth, having scored lowest at the health responsibility subscale may be an anticipated result.

In the current study, on the other hand, both girls and boys scored higher on PLP than their counterparts.[29] PLP reflexes that adolescents look into the future positively and think optimistically about life. It may be highlighted that adolescents who took part in our study were excited about the future, happy with themselves, working toward important goals in their lives, setting goals that they could achieve and feeling good about themselves when they were doing something well. The current finding can be considered as a significant outcome that having a PLP is important for attaining and maintaining positive health behaviors.

It was hypothesized that PAL and ALPs would be positively correlated. This study revealed no positive correlation between PAL and ALPs. Cultural norms and socio-cultural aspects surrounding the HLBs perhaps may be reasons for not discovering the positive correlation between PAL and ALPs among study population.

Moreover, in Turkey, adolescents starting from pre-adolescence period are involved in the extensive education courses of university entrance exam and hence, they are very busy to pay attention to healthy life style behaviors and its outcomes. Especially parents in small districts with lower levels of incomes are much in demand of their children to have a better life with enrolling a good university which probably will lead better paid jobs after graduations. It may be that, level of education of the parents is a considerable part in youth's multi-dimensional development which can suggest that it is an important predictor of adolescents' behavioral outcomes. Also, social provisions for activity, availability of early community interventions for developing positive health related outcomes during childhood and adolescent periods are also need to be taken into consideration while interpreting the current findings.

The unique strengths of the present study were that it might fill gap in the national literature on healthy life style choices of adolescents, its relation to PA and BMI, and it was conducted in one of the rural districts of Turkey. However, our study has some limitations. First, it is a cross-sectional study and thus generalizations of the findings should be cautious. Second, students were recruited during lessons hence; those who were not present in the class at the time of data collection were not included in the study. Third, the participants of the study were from a district which is part of one of the least developed cities in Turkey. There is further need to design, implement, and provide supervised quality after-school interventions that target PA programs in diverse settings which may help adolescents to achieve daily PA recommendations.[50,51]

Henceforth, comparison of adolescents according to their living areas such as rural, suburb and metropolis is recommended. It is also worth to mention that, precise estimation of PA with self-reported methods might have limit the validity among adolescents and do not provide adequate description of the intensity and duration of physical activity and self-report methods do not provide an opportunity to assess patterns of physical activity (i.e., bouts of activity) within a given day or over several days.[52,53] Therefore, a possible recommendation for future research would be combining objective measures of PA (such as accelerometers or heart rate monitors) with self-reported measures of PA which may lead a better understanding of PALs of target population.

CONCLUSION

It was concluded that adolescents had gender related BMI differences as expected but did not have sufficient levels of PA and gender related changes in PALs and healthy life style choices were not different. In addition, we found no relationship among BMI, PAL & HLBs whereas PAL and ALP subscales and total profile were associated within the range of weak to moderate in boys, girls and total sample.

FUTURE DIRECTIONS

It could be suggested that there is an educational health-promotion intervention needed among this population including their families, school principals, health care providers and local governmental organs to change their healthy lifestyle behaviors, implement strategies to strengthen their beliefs about their ability to make healthy choices, and engage in healthy lifestyle behaviors. In addition, social support from family and friends, namely close environment, is a key contributor to increase positive HLSb among adolescents as social support was consistently predictive of increased positive behavioral changes.[54]

Additionally, programs that utilize PA promotions are needed to determine if these types of interventions can lead to both short-term and longer term changes in PA development. These variables are essential components to include in developmentally appropriate and culturally relevant targeted interventions for this population.[5] These results support a multiple behavior approach to intervention for obtaining healthy life style choices and developing PA behaviors as being at risk for one behavior may increase the odds of being at risk for behavior.[40]

Overall, it seems that the social environment, living conditions, social support, education, cognitive behavioral skills are need to be taken into consideration while implementing positive health promotion strategies.[8]

Acknowledgements

The authors would like to thank the participants, their parents and the school principals and boards staff for their co-operation in this study.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Ayşe Kin-İsler;* ***Design:*** *Ayşe Kin-İsler, Ferhat Esatbeyoğlu;* ***Control/Supervision:*** *Ayşe Kin-İsler;* ***Data Collection and/or Processing:*** *Ferhat Esatbeyoğlu;* ***Analysis and/or Interpretation:*** *Ayşe Kin-İsler, Ferhat Esatbeyoğlu;* ***Literature Review:*** *Ferhat Esatbeyoğlu;* ***Article Writing:*** *Ferhat Esatbeyoğlu;* ***Critical Review:*** *Ayşe Kin-İsler;* ***Sources and Refe rences:*** *Ayşe Kın-İsler, Ferhat Esatbeyoğlu;* ***Materials:*** *Ayşe Kın-İsler, Ferhat Esatbeyoğlu.*

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