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Perceptions of exercise benefits and barriers among adolescents: A cross-sectional study

Adölesanlarda egzersiz yararları ve engelleri algısı: Kesitsel bir çalışma

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ABSTRACT

Aim: This study aims to examine the factors related to the perception of exercise benefits and barriers among adolescents. Methodology: The cross-sectional study included 3405 adolescents in 15 public high schools in Ankara, Turkiye. The sample size was calculated using a cluster sampling method. The first data collection section included the socio-demographic characteristics of participants and the second section contained sedentary lifestyle characteristics of participants. The third data form section of the data collection form included the Exercise Benefits and Barriers Scale which was a valid and reliable instrument for the Turkish population. Spearman's correlation test, Chi-square test, Mann Whitney U test, and Kruskal Wallis test were used for statistical analysis. Cronbach's α was calculated to determine the internal reliability of the scale. Results: In this study the mean age was 16.54 (1.09) years and 57% (n=1940) of the participants were female. More than half of the participants reported insufficient physical activity (56%) and irregular exercise (62.1%). The total Exercise Benefits and Barriers Scale score was 92.79 (13.22) and Cronbach α was 0.84 for the total of the scale. In this study, some factors such as sex (z=8.870; p=0.001), grade (z=20.37; p=0.001), physical activity (z=12.093; p=0.001), duration of sitting (z=3.555; p=0.001) were associated with perceptions of exercise benefits and barriers. Conclusion: A professional nursing approach can maintain lifelong activity and exercise by improving professional nursing interventions and perceptions of exercise benefits and effectively managing the relevant barriers and risks.

Key Words: Adolescent Health, Exercise Benefits, Exercise Barriers, Physical Activity

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ÖZ

Amaç: Bu çalışma, adölesanların egzersize yönelik yarar ve engel algıları ile ilişkili faktörleri incelemeyi amaçlamaktadır. Metodoloji: Kesitsel tipte yapılan bu çalışmaya Ankara ilindeki 15 devlet lisesinde öğrenim gören 3405 adölesan dâhil edilmiştir. Örnek büyüklüğü küme örnekleme yöntemi kullanılarak hesaplanmıştır. Veri toplama formunun birinci bölümünde katılımcıların sosyo-demografik özellikleri, ikinci bölümünde ise katılımcıların sedanter yaşam tarzı özellikleri yer aldı. Veri toplama formunun üçüncü bölümünde Türk toplumu için geçerli ve güvenilir bir araç olan Egzersiz Yararları ve Engelleri Ölçeği yer almaktadır. İstatistiksel analiz için Spearman korelasyon testi, Ki-kare testi, Mann-Whitney U testi ve Kruskal Wallis testi kullanılmıştır. Ölçeğin iç güvenirliğini belirlemek için Cronbach α değeri hesaplanmıştır. Bulgular: Bu çalışmada yaş ortalaması 16,54 (1,09) olup, katılımcıların %57'si (n=1940) kadındır. Katılımcıların yarısından fazlası yetersiz fiziksel aktivite (%56) ve düzensiz egzersiz (%62,1) yaptığını bildirmişlerdir. Egzersiz Yararları ve Engelleri Ölçeğinin toplam puanı 92,79 (13,22) ve Cronbach α katsayısı 0,84'tür. Bu çalışmada cinsiyet (z=8.870; p=0.001), sınıf (z=20.37; p=0.001), fiziksel aktivite (z=12.093; p=0.001), oturma süresi (z=3.555; p=0.001) egzersize yönelik yarar ve engel algılar ile ilişkili saptanmıştır. Sonuçlar: Profesyonel bir hemşirelik yaklaşımı ile profesyonel hemşirelik müdahalelerini ve egzersizin yararlarına ilişkin algıları iyileştirilerek ve ilgili engelleri/riskleri etkin bir şekilde yöneterek yaşam boyu aktivite ve egzersiz sürdürülebilir.

INTRODUCTION

Physical inactivity (PA), which leads range 6% to 10% of deaths worldwide, is a preventable epidemic in both developed and developing countries (Boisgontier & Iversen, 2020; Hallal et al., 2012). Physical inactivity has been defined as a global mortality risk, and it increases the risk of developing chronic diseases (WHOa, 2022; WHOb, 2022; Boisgontier & Iversen, 2020). Worldwide, one out of three adults (31%) and four out of five adolescents (80%) have been reported to lead a physically inactive lifestyle (WHOa, 2022; WHOb, 2022; Guthold et al., 2020; Hallal et al., 2012). The WHO's 2025 global PA goal of reducing insufficient PA by 10% will not be reached, is reported in the literature (Hall et al., 2021; Guthold, 2018). The rate of physical inactivity in adolescents is between 31.7% and 67.6%, and it is quite high in Turkey (Firat & Nogay, 2021; Aktürk et al., 2019). Physical activity and exercise (PA/E) constitute the core of programs targeting individuals

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struggling with obesity (WHOa, 2022; WHOb, 2022; Morton et al., 2016). Adolescence is one of the most critical developmental periods with early (10-12 ages), middle (13-15 ages) and late (16-19 ages) stages; during adolescence, rapid physical, psychological and social changes occur simultaneously, and behavioral patterns of adulthood are shaped (Liu et al., 2022; Bebis et al., 2015; Ortabag et al., 2011). Within this context, establishing PA as a lifestyle will enable individuals to maintain an active lifestyle during adulthood (Guthold et al., 2020; Ortabag et al., 2011; Roth & Stamatakis, 2010).

In systematic analyses and studies, demographic, cultural, psychosocial and behavioral characteristics, environmental factors and national policies are reported to be factors that affect adolescents' PA levels (Babic et al., 2014; Rauner et al., 2013). Physical activity-related cognitive factors represent an adolescents' "perceptions of benefits and barriers" (Ortabag et al., 2010). The Health Promotion Model is often used as a basis in studies conducted to determine the level of exercise and the factors affecting health behaviors. The basis of this model is the perceived benefits of health promotion behavior and the perceived barriers to that behavior (Sechrist et al., 1987). When an adolescents' perceived level of the PA/E-related benefits/barriers is known, initiatives and programs that are implemented are reported to be more effective. Determining the barrier and benefit perceptions of adolescents related to physical activity is very critical in terms of strategic measures to be taken to strengthen their perceptions of benefit and to eliminate barrier perceptions. The level of physical activity may increase with the removal of the obstacles in adolescent groups with revealed barriers. (Kubayi & Surujlal, 2014; Victor et al.,2012). In the literature, there are limited studies on the perceptions of exercise benefits/barriers in adolescents of both sexes using standard measurement methods, and studies are needed that analyze the factors related to these perceptions using sufficient sample size and different cultures and locations (Victor et al., 2012; Ortabag et al., 2010). This study aimed to examine the factors related to the perception of exercise benefits and barriers among adolescents.

METHOD

The study is reported according to STROBE Statement Checklist.

Design and sample

This cross-sectional study was conducted between March 2015 and May 2015. This study was conducted in Kecioren district in Ankara, the capital city of Turkiye. Kecioren has 30 state high schools. The study population comprised all students studying at state high schools in Kecioren, Ankara. The total number of students studying at these schools in the 2014-2015 school year was 33.828. The sample size was calculated using the sample calculation method which is used when the size of the target population is known. It was estimated that the frequency of being overweight and obese in the adolescents aged 14-19 participating in the study was approximately 20% and the number of adolescents that should be included in the study was calculated as 1470, with a margin of error of ±2 and a 95% confidence interval (Raosoft, 2017). The sample size was calculated by an expert statistician using a cluster sampling method. Based on the study methodology, each grade was accepted as a cluster. The sample size reached 3528 (with ±2 tolerance and 95% confidence) with the design effect of the cluster sampling method was acknowledged as 2, and assuming a 20% missed response rate. The statistician determined that the study should include 25 clusters. All 25 clusters were randomly selected from a list using simple randomized numbers. Finally, 3405 middle and late stage of adolescents, corresponding rate 96.5% of the sample size determined at the end of the study, were participated. In total, 3405 adolescents from 15 high schools voluntarily participated in the study. The inclusion criteria were followed as; (1) being a high school student; (2) volunteering to participate in the study; (3) having parents' informed consent if adolescent was younger than 18 years old; (4) able to communicate verbally; (5) to complete the questionnaire properly. Exclusion criteria was having the presence of orthopedic, mental, cardiac or pulmonary diseases or diabetes. Twenty-five adolescents with incomplete questionnaires and 20 adolescents with a disability or disease that inhibited exercise were excluded from the study.

Data collection procedures

Data were collected with a collection form developed as a result of a literature review (Bebis et al., 2015; Ortabag et al., 2010; Eisenberg et al., 2014; Morgan et al., 2012; Bauman et al., 2012; Ortabag et al., 2011). To evaluate the intelligibility and appropriateness of the questionnaire forms, a pilot test was conducted with 20 adolescents excluded from the study. Then, a final version of the questionnaire forms was created. The written and verbal informed consent was obtained from all participants after having been informed about the aims of the study. Only adolescents who volunteered with no coercion and had their parents' permission participated in the study. The data collection form was distributed to the participants in the classroom setting, and the participants completed the form under the observation of the researchers. The questionnaire took 20 minutes on average to be completed.

Measurements

The data collection forms consisted of three sections. The first section comprised socio-demographic

characteristics including 11 questions regarding the participants' age, grade, economic status, parents' education level, and health status. The second section comprised 16 questions regarding the sedentary lifestyle characteristics of the participants including PA/E (WHOa, 2022; WHOb, 2022; Morgan et al., 2012; Bauman et al., 2012). Since physical activity has been proven to reduce stress, the relationship between physical activity and stress level has also been questioned (Rodriguez-Ayllon et al., 2019). The participants were asked to mark the average stress level they had experienced in the last four weeks on a 10-cm VAS ranging from "0=not feeling stress" to "10=feeling excessive stress" (Lesage et al., 2012).

The third section was the Exercise Benefits and Barriers Scale (EBBS) determinant of an individual's perceptions of the benefits and barriers to exercise (Ortabag et al., 2011; Sechrist et al., 1987). EBBS based on Health Promotion Model and was developed by Sechrist et al. in 1987 (Sechrist et al., 1987). The validity and reliability of the Turkish version of EBBS was carried out by Ortabag and colleague in 2011 (Ortabag et al., 2011). The EBBS is a 4-point Likert-type scale consisting of 43 items with two subscales as benefits and barriers. The subscales could be evaluated separately. When the benefits subscale consists 29 items and scored range 29 to 116, barriers subscale has 14 items and scored range 14 to 56. The EBBS is scored from "I strongly agree=4" to "I strongly disagree=1". The EBBS is scored ranges from 43 to 172. Barrier subscale items are reverse-scored. High scores indicate that the participant has positive perceptions of exercise's benefits and low perceptions of barriers to exercise. The Turkish version of the EBBS was used in the current study (Ortabag et al., 2011). In the current study, Cronbach's α was calculated to be 0.84 for the EBBS.

Data analysis

The SPSS for Windows version 20.0 software package was used for the statistical analysis. Descriptive statistics were reported as frequency and percentage for categorical variables and as mean (standard deviation), minimum-maximum for continuous variables. The normality of the data distribution was analyzed with the Kolmogorov-Smirnov test. Since the data set did not show normal distribution, the Chi-square test, the Mann-Whitney U test, the Kruskal Wallis test, and Spearman's correlation test were applied. Cronbach's α was calculated for the internal reliability of the scale. In statistical decisions, $p<0.05$ was considered to indicate a significant difference.

Ethical Consideration

The study was approved by the Provincial Directorate of National Education. Additionally, the study design and informed consent procedure, number 1491-30-14/1648.4-47, was approved by the Institutional Ethics Committee of an education and research hospital.

Results

Socio-demographic characteristics of the participants were presented in Table 1. and distribution of participants according to some physical activity-related lifestyle behaviors were presented in Table 2. The mean age of participants was 16.54 (1.09) years. Based on body mass index (BMI), 9.8% of the participants were overweight and obese (Table 1). More than half of the participants (56%) reported that they did not engage in PA for at least 60 minutes daily (Table 2). When PA status was compared by sex, males (25.4%) were found to be more active than females (18.6%) ($x2=235.194$, $p<0.05$). Additionally, 62.1% of the participants reported not regularly exercising for 60 minutes per day for at least three days per week. In total, 23.5% of the male and 11.4% of the female participants regularly exercised, and these sex differences were significant ($x2=305.702$, $p<0.05$). The participants' mean stress level on the VAS was 7.11 (2.55). The higher the participant's grade level, the more perceived stress they had ($r=0.128$; $p<0.05$).

Table 1. Sociodemographic characteristics of the participants (n=3405)

Characteristics	Mean(SD)	Min.-Max
Age (years)	16.54 (1.09)	14-19
	n	**%**
Sex		
Female	1940	57.0
Male	1465	43.0
Grade Level		
9th	930	27.3
10th	971	28.5
11st	903	26.5
12nd	601	17.7
Family type		
Nuclear	2995	88.0
Extended	354	10.4
Other	56	1.6
Mother educational status		
8 years and below	2095	61.5
Over 8 years	1310	38.4
Father educational status		
8 years and below	1500	44.1
Over 8 years	1905	55.9

Monthly income		
1020TL and below	648	19.0
2021TL -3300 TL	1942	57.0
3301 TL and over	815	23.9
Perception of physical condition		
Very Good	1008	29.6
Good	1713	50.3
Average	573	16.8
Bad	111	3.3
Chronic disease condition which does not inhibit doing exercise		
Yes	248	7.3
No	3157	92.7
Body Mass Index		
Underweight (<18.50)	650	19.1
Healthy weight (18.5-25)	2421	71.1
Overweight (25-30)	300	8.8
Obese (30>)	34	1.0

Table 2. Distribution of participants according to some physical activity-related lifestyle behaviours (n=3405)

	n	%
Doing physical activity at least for 60 minutes per a day		
Yes	1497	44.0
No	1908	56.0
Doing exercise for 60 minutes at least for 3 days a week		
Yes	1292	37.9
No	2113	62.1
To use motor vehicle while going to school		
Yes	2129	62.5
No	1276	37.5
Watching television per day averagely (hours)		
2 hours and less	1994	58.5
More than 2 hours	1411	41.5
To use computer throughout the day (hours)		
2 hours and less	2325	68.2
More than 2 hours	1080	31.8
Sitting sedentarily in average per day (hours)		
6 hours and less	1468	43.1
More than 7 hours	1937	56.9
Going to bed at the same hour regularly every day		
Yes	1294	38.0
No	2111	62.0
To feel relaxed when you get up		
Yes	1178	34.6
No	2227	65.4
To have three mails without skipping a meal, generally		
Yes	1532	45.0
No	1873	55.0
Status of consuming fast food and soft drink		
At least once a day	1265	37.2
Once every two or three days	1062	31.2
Once a week or less	1078	31.6
Status of consuming fruit and vegetables		
At least once a day	1854	54.4
Once every two or three days	1093	32.1
Once a week or less	458	13.5
Status of consuming milk and milk products		
At least once a day	1908	56.0
Once every two or three days	911	26.8
Once a week or less	586	17.2

Relationship between the participants' socio-demographic characteristics and the EBBS scores

The total average EBBS score was 92.79 (13.22) (Table 3). A comparison of the socio-demographic characteristics of the participants and EBBS and subscale score averages are presented in Table 4. The benefit subscale and total scale scores of the female participants were found to be higher than those of the male participants ($p<0.05$). Although a poor relationship was found between age and the benefit subscale score ($r=0.014$; $p=0.014$), a strong negative relation was found between age and the barrier subscale ($r=-0.810$; $p=0.001$). A statistically significant difference was found between grade and total EBBS and subscale scores ($p<0.05$). Significant differences in the benefit subscale scores of participants whose mothers had "8 years of education or less" were detected ($p<0.05$). When the monthly income and EBBS scores of the participants were compared, a significant difference was observed ($p<0.05$). The benefit scores of low-income participants were higher than those of the other income groups; however, their barrier scores were the lowest ($p<0.05$). The significant differences were found in participants' perceptions by physical condition and EBBS scores ($p<0.05$). The benefit scale scores of the participants who identified their health as "poor" were the highest, while their barrier scale scores were the lowest ($p<0.05$) (Table 4). There was a very weak positive correlation between the stress scores of the participants and the EBSS scale score ($r=0.076$; $p=0.001$).

Relationship between sedentary lifestyle characteristics, diet habits, and EBBS scores

Comparison of sedentary lifestyle characteristics of participants and EBBS scale and sub-scale scores are

Table 3. EBBS and subscales total score, averages with Cronbach α

	Cronbach α	Mean (SD)	EBSS Min-Max
Perception of benefit	0.93	53.70 (13.67)	29-156
Perception of barrier	0.78	39.10 (6.64)	14-56
Scale Total	0.84	92.79 (13.22)	43-172

Table 4. Comparison of the sociodemographic characteristics of the participants and EBBS and subscale score averages (n=3405)

	Benefits			Barriers			EBBS		
Characteristic	**Mean (SD)**	**Test**	**p**	**Mean (SD)**	**Test**	**p**	**Mean (SD)**	**Test**	**p**
Gender									
Female	55.35 (13.78)	Z= 8.805	0.001	39.11 (6.63)	Z=0.485	0.628	94.45 (13.00)	Z=8.870	0.001
Male	51.51 (13.21)			39.08 (6.65)			90.59 (13.20)		
Grade level									
9th	53.76 (13.88)	KW=29.27	0.001	39.26 (7.07)	KW=18.16	0.001	93.02 (13.52)	KW=20.37	0.001
10th	52.06 (13.60)			39.53 (6.29)			91.59 (13.05)		
11st	54.83 (13.26)			39.00 (6.38)			93.83 (13.04)		
12nd	54.55 (13.82)			38.29 (6.80)			92.84 (13.18)		
Mother educational status									
8 years and below	54.23 (13.61)	Z=3.001	0.003	38.96 (6.64)	Z=1.792	0.073	93.18 (13.25)	Z=2.013	0.044
Over 8 years	52.85 (13.72)			39.32 (6.64)			92.17 (13.15)		
Monthly Income									
1020TL and below	55.24 (13.91)	KW=21.119	0.001	38.44 (6.74)	KW=12.547	0.002	93.68 (13.88)	KW=9.699	0.008
2021TL -3300 TL	53.75 (13.36)			39.10 (6.45)			92.85 (12.83)		
3301 TL and over	52.35 (14.06)			39.60 (6.96)			91.95 (13.57)		
Perception of physical condition									
Very good	49.36 (12.93)	KW=185.835	0.001	40.40 (6.67)	KW=99.488	0.001	89.76 (12.42)	KW=106.420	0.001
Good	54.54 (12.74)			39.08 (6.49)			93.62 (12.65)		
Average	57.49 (14.42)			37.31 (6.52)			94.80 (14.38)		
Bad	60.44 (18.41)			36.81 (6.51)			97.25 (17.20)		

Z= Mann Whitney U Test
KW= Kruskal Wallis Test

shown in Table 5. The PA of the participants and their EBBS scores were compared according to sedentary lifestyle characteristics, and significant differences were found between groups ($p<0.05$). When the EBSS scores were compared between participants who exercised for 60 minutes for at least three days and those who did not, a significant difference was identified ($p<0.05$). The benefit scale and total scale scores of the participants who exercised were lower than those of participants who did not exercise ($p<0.05$). The barrier scale scores of the participants who exercised were significantly higher than those of the participants who did not exercise. When the participants' computer usage status and EBBS scores were compared, statistically significant differences were found between groups in terms of barrier scale scores ($p<0.05$). The significant difference was found between the participants' time spent watching television and EBSS scores ($p<0.05$). The significant differences were identified between the participants' time spent sitting each day and average EBSS score ($p<0.05$). Participants who sat for seven or more hours each day had higher scores on the benefit scale and total scale and lower scores on the barrier scale ($p<0.05$). Participants who daily had less than three meals have higher scores on the benefit scale ($p<0.05$) (Table 5).

DISCUSSION

To examine the factors related to the perception of exercise benefits and barriers among adolescents was aimed in this study. For this purpose, the factors related to the perceived exercise benefits and barriers of 3405 adolescents were examined in this study. According to main result of the study, the majority of adolescents reported insufficient PA/E, perceptions of the benefits of exercise were insufficient, and substantial obstacles

Table 5. Comparison of sedentary lifestyle characteristics of participants and EBBS scale and sub-scale scores (n=3405)

	Benefits			Barriers			EBBS		
Characteristic	**Mean (SD)**	**Z**	**p**	**Mean (SD)**	**Z**	**p**	**Mean (SD)**	**Z**	**p**
Do you do physical activity at least for 60 minutes per a day?									
Yes	49.52 (12.56)	16.229	0.001	40.33 (6.53)	10.22	0.001	89.86 (12.55)	12.093	0.001
No	56.97 (13.61)			38.13 (6.56)			95.10 (13.28)		
Do you do exercise for 60 minutes at least for 3 days a week?									
Yes	48.59 (12.44)	17.799	0.001	40.53 (6.64)	10.535	0.001	89.12 (12.50)	13.483	0.001
No	56.82 (13.44)			38.22 (6.49)			95.04 (13.15)		
How many hours do you use computer throughout the day?									
2 hours and less	53.49 (13.66)	1.379	0.168	39.34 (6.6)	2.768	0.006	92.83 (13.25)	0.242	0.809
More than 2 hours	54.14 (13.68)			38.58 (6.7)			92.72 (13.17)		
How many hours do you watch television per day averagely?									
2 hours and less	53.18 (13.57)	2.377	0.017	39.28 (6.7)	2.051	0.04	92.46 (13.12)	1.594	0.111
More than 2 hours	54.43 (13.77)			38.84 (6.54)			93.27 (13.36)		
How many hours do you sit sedentarily in average per day?									
6 hours and less	52.47 (13.29)	4.352	0.001	39.42 (6.53)	2.493	0.013	91.89 (12.99)	3.555	0.001
More than 7 hours	54.63 (13.88)			38.85 (6.71)			93.48 (13.35)		
Do you go to bed at the same hour regularly every day?									
Yes	51.59 (13.22)	7.171	0.001	39.80 (6.59)	4.871	0.001	91.39 (12.66)	4.95	0.001
No	54.99 (13.78)			38.67 (6.63)			93.66 (13.48)		
Do you feel relaxed when you get up?									
Yes	51.02 (12.86)	8.52	0.001	40.14 (6.81)	7.15	0.001	91.16 (12.60)	5.444	0.001
No	55.11 (13.87)			38.55 (6.48)			93.66 (13.46)		
Characteristic	**Mean (SD)**	**Test**	**p**	**Mean (SD)**	**Test**	**p**	**Mean (SD)**	**Test**	**p**
Generally do you have three meals without skipping a meal?									
Yes	51.50 (13.01)	Z=8.7	0.001	39.92 (6.77)	Z=6.98	0.001	91.41 (12.46)	Z=5.531	0.001
No	55.50 (13.93)			38.42 (6.45)			93.92 (13.71)		
How often do you consume fast foods and drink?									
At least once a day	54.94 (13.69)			38.66 (6.64)			93.60 (13.21)		
Once every two or three days	54.18 (13.31)	KW=38.079	0.001	39.05 (6.33)	KW=17.632	0.001	93.23 (12.67)	KW=20.982	0.001
Once a week or less	51.76 (13.79)			39.65 (6.9)			91.41 (13.66)		
How often do you consume fruit and vegetables?									
At least once a day	51.96 (13.13)			39.81 (6.67)			91.78 (12.79)		
Once every two or three days	54.61 (13.76)	KW=87.959	0.001	38.67 (6.35)	KW=71.251	0.001	93.28 (13.44)	KW=32.731	0.001
Once a week or less	58.54 (14.21)			37.21 (6.76)			95.75 (13.93)		
How often do you consume milk and milk products?									
At least once a day	51.91 (13.19)			39.72 (6.66)			91.64 (12.97)		
Once every two or three days	54.53 (12.88)	KW=89.009	0.001	38.58 (6.33)	KW=48.512	0.001	93.11 (12.5)	KW=45.774	0.001
Once a week or less	58.22 (15.16)			37.85 (6.8)			96.07 (14.52)		

Z= Mann Whitney U Test
KW= Kruskal Wallis Test

to exercising were perceived among adolescents. Some variables examined in this study, such as sex, grade, physical activity, duration of sitting, were found to be associated with perceptions of exercise benefits and barriers.

For a healthy lifestyle, adolescents should engage in regular PA/E to protect and promote their health (Rosselli etal., 2020; Eisenberg et al., 2014). More than half of the participants had an insufficient level of PA and regular exercise in the current study. In line with this finding, studies conducted in different settings have shown high rates of inadequate PA among adolescents (Rosselli et al., 2020; Mikaelsson et al., 2020; Eisenberg et al., 2014). These rates are associated with behavioral, social, and environmental factors such as participants' spending insufficient time on PA/E, remaining seated for a long duration in school, using motor vehicles in general when going to school (Aparicio-Ugarriza et al., 2020), and spending a great deal of time in front of a screen (Ghekiere et al., 2019). The average EBBS scores of the participants were determined to be below the mid-level. The findings indicate that the majority of the participants led a sedentary lifestyle. Accordingly, it is believed that identifying and removing the barriers that adolescents perceive in relation to PA/E and increasing the perceived benefits of exercise and motivation will reduce their risk of developing a broad range of consequences associated with sedentary lifestyles.

Gender is a determinant of exercise (Ammouri et al., 2007). Adolescent females are reported to associate PA/E with looking good and having a thin body; for adolescent males, PA/E means being faster and stronger (Duffey et al., 2021; Rosselli et al., 2020; Ammouri et al., 2007). In this study, boys were determined to be more PA/E more than females, which is consistent with the literature. In addition, the perceived level of exercise benefits was higher among adolescent females than among adolescent males, and the perception of barriers was similar in both groups. It is stated that girls are more eager to perform exercise in adolescence but that boys are more successful in maintaining exercise (González et al., 2014). The fact that the majority of exercise programs require masculine strength is reported to be a barrier for girls (Duffey et al., 2021; Rosselli et al., 2020). This situation suggests that girls need more motivation and support in translating thought into action, even though they are aware of the benefits of PA/E (Portela-Pino et al., 2020; Ammouri et al., 2007).

Adolescents in Turkiye would have passed the Transition to Higher Education Examination (HEE) at the end of 12th grade to enter university. This exam creates severe stress in adolescents (Celik & Koc, 2015; Ortabag et al., 2011). The high mean stress score of the participants in this study and the increase in stress with increasing grade level confirm this information. These findings suggest that participants in 12th grade perceive the HEE as a major barrier. Furthermore, it is estimated that the use of exercise as an effective method of managing stress by school health nurses especially before exams will improve both psychological and physical health and increase academic success.

The children from families with a high income can participate in sport clubs, which requires financial capability, and have access to areas where they can exercise. Additionally, in families with a low level of income and education, the participation of adolescents in PA is reported be low (Love et al., 2019). The participants whose mothers had a lower education and a low income had more positive perceptions regarding the benefits of exercise. This finding indicates that social campaigns related to exercise in Turkiye may lead to positive perceptions regarding exercise in all groups of society.

In this study, participants with a poor perception of their physical condition and participants who reported that they had a chronic illness had more positive perceptions regarding the benefits of exercise. Despite this, these participants perceived more barriers to exercise. In the literature, it is reported that adolescents with a poor perception of physical condition and with chronic illness experience depressive symptoms (Kremer et al., 2014; Ammouri et al., 2007). These symptoms are thought to influence the desire, tendency, and participation behaviors of participants in relation to PA/E.

In the literature, the time adolescents allocate specifically for exercise is reported to be a major barrier (Kubayi & Surujlal, 2014). In this study, physically inactive participants who did not regularly exercise had high perceptions of the benefits of exercise. Nevertheless, they were found to perceive more barriers related to PA/E. Increasing the opportunities for exercise that arouses the interest of adolescents, entertains them and fosters their friendships through arranged activities in the school, home and social settings is reported to enhance the tendency of adolescents to exercise (Fu et al., 2022; Kelso et al., 2020). It is thought that time-management-related training that could be conducted by school health nurses would encourage adolescents to exercise.

Spending long periods of time in front of a screen (computer or television) is reported to be associated with risky lifestyle behaviors and physical inactivity (Ghekiere et al., 2019; Durkee et al., 2016; Eisenberg et al., 2014). In this study, it was determined that the perception of the benefits of exercise among participants who used computers and watched television for more than two hours per day and who sat for more than

seven hours per day was higher than the perceptions of their counterparts; however, they also perceived more barriers. It is thought that awareness of the benefits of exercise among participants who use social media, in particular, has increased as a result of the Internet and the exercise campaigns conducted by the media (Durkee et al., 2016). However, habits such as spending a substantial amount of time in front of a computer and/or television and sitting for long periods of time each day increase adolescents' level of inactivity and become one of their major barriers to exercise.

Studies reveal a positive relationship between exercise and sleeping (Ghekiere et al., 2019; Baron et al., 2013). More than half of the participants reported that they did not feel relaxed when they woke up. In this study, adolescents with irregular sleep habits perceived exercise as beneficial; however, they perceived more barriers to exercise. Adolescents who regularly exercise have high-quality sleep, feel more energetic when they wake up, and have no concentration problems reported in the literature (Ghekiere et al., 2019; Baron et al., 2013). Within this context, removing the barriers of adolescents who perceive the benefits of exercise and encouraging them to exercise would be effective in resolving sleep disorders.

The consumption of an unhealthy diet, fast food, and soft drinks is associated with obesity (Rosselli et al., 2020). In this study, one out of ten participants were overweight or obese; additionally, more than half of the participants skipped a meal and frequently consumed fast food. These findings suggest that adolescents with an unhealthy diet are aware of the importance of exercise but that they do not adopt it as a routine behavior. Exercise and healthy diet are closely interrelated concepts in promoting a healthy life (Rosselli et al., 2020; Ortabag et al., 2011). School health nurses can be recommended to jointly address exercise and diet to prevent obesity.

Limitations

This research has been focused on a limited geographic region. The data regarding exercise and BMI were based on self-reports.

CONCLUSION

In this study, the majority of adolescents reported insufficient PA/E. In addition, their perceptions of the benefits of exercise were insufficient, and substantial obstacles to exercising were perceived. Moreover, some factors such as sex, grade, physical activity, duration of sitting were associated with perceptions of exercise benefits and barriers. School health and public health nurses should treat adolescence as an opportunity to protect and maintain the health of adolescents and enable them to adopt healthy lifestyle behaviors that will influence their health in adulthood. The awareness of adolescents with a low perception of exercise benefits should be raised, and they should be encouraged about the short-term and long-term contributions of exercise to their health. It should be taken into consideration that the combination of the consumption of fast foods and soft drinks with physical inactivity leads to obesity, and dietary habits should thus be addressed to reduce physical inactivity. It should be kept in mind that exercise programs should play a key role in reducing sleeping disorders and stress.

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