Mental Health Condition of Socioeconomically Disadvantaged Adolescents and Physical Inactivity As A Risk Factor

Sosyoekonomik Dezavantajlı Adolesanların Ruhsal Sağlık Durumları ve Bir Risk Faktörü Olarak Fiziksel Inaktivite

**ABSTRACT**

Objective: Mental health problems emerge in early and late adolescence and it is an important public health problem. This study aimed to assess the mental condition in socioeconomically disadvantaged adolescents to determine risk factors that affect their mental condition and, assess the effect of physical inactivity as a risk factor. For mental health conditions. Materials and Methods: This descriptive study was conducted with 993 students in a secondary and high school. The Socio-demographic Characteristics Questionnaire Form, The General Health Questionnaire -12, and the Physical Activity Questionnaire were used to collect data. Data analysis was performed using descriptive statistics, chi-square test, regression analysis and multiple regression analysis. Results: The mean age of the participating students was 15.3 ± 1.2 years (min = 13-max = 17); 53.9% of the students were male. The logistic regression analysis determined that the “female gender” and moderate/poor perception of academic achievement are important risk factors regarding poor/moderate mental health conditions. There were significant differences between age, gender, perceived academic achievement, and physical activity total score and mental health condition (p < 0.05). Conclusion: In this study, approximately 1/3 of the students assessed mental health condition as moderate or poor. Regarding determining these problems in the early period, it will be important to assess the mental health condition of students while performing health screening within the scope of school health services.

**Keywords:** Adolescent; depression; exercises; mental health

**ÖZET**

Ruh sağlığı sorunları erken ve geç adolesan dönemi ortaya çıkmaktadır ve önemli bir halk sağlığı sorunudur. Bu çalışma ile sosyo ekonomik yönden dezavantajlı adolesanlarda ruhsal durumun değerlendirilmesi ve ruhsal durumun etkileyen risk faktörlerinin belirlenmesi, ve ruhsal sağlık durumunun bir risk faktörü olarak fiziksel inaktifitenin değerlendirilmesi amaçlanmıştır. **Gereç ve Yöntemler:** Tanımlayıcı türdeki bu çalışma, bir ortaokul ve lisede öğrenim gören 993 öğrenci ile yürütülmüştür. Verilerin toplandığındaki öğrencilerin Sosyo-demografik Özellikler Anket Formu, Genel Sağlık Anketi ve Fiziksel Aktivite Soru Formu kullanılmıştır. Verilerin analizi tanımlayıcı istatistik- ler ki kare testi, logistik regresyon analizi ve çoklu regresyon analizleri kullanılarak gerçekleştirilmiştir. **Bulgular:** Çalışmaya katılan öğrencilerin yaş ortalaması 15.3 ± 1.2 olup (min = 13-max = 17) %53.9'u erkek öğrencidir. Lojistik regresyon analizine göre cinsiyetin kız olmasına ve akademik başarıyi orta/kötü algılamının orta/kötü ruhsal sağlık durumu için önemli risk faktörleri olduğu belirlenmiştir. Yısa, cinsiyet, algılanan akademik başarı durumu ve fiziksel aktivite toplam puanı ile ruhsal sağlık durumunun arasında istatistiksel olarak anlamlı bir fark tespit edilmiştir (p < 0.05). **Sonuç:** Bu çalışmada öğrenci- lerin yaklaşık 1/3’ü ruhsal sağlık durumunu orta ve kötü olarak değerlendirir. Okul sağlık hizmetleri kapsamında sağlık taramaları yapılıırken öğrencilere ruhsal durumlarının da değerlendirilmesi erken dönemde bu sorunların saptanması açısından önemli olacaktır.

**Anahtar Kelimeler:** Adolestan; depresyon; egzersiz; ruh sağlığı

During the adolescent period, which is defined as the age group of 10-19 years, many conditions and behaviors that have effect the health not only in this period but also in adulthood occur. The population of adolescents globally has reached to 1.8 billion of which 2.6 mil-
lion died. Detailed analysis of mortality data reported that suicide is the third largest cause of death in the adolescent, period. Moreover, non-fatal mental problems pose a severe burden. Mental problems comprise a large part of problems experienced in the second decade of life. According to the World Health Organization (WHO) global report, approximately 20% of adolescents have ever experienced a mental health problem at any time in their life. Among the study conducted in Turkey; researchers reported that 17.5% of high school students suffered from depression. Türkoğlu (2014) found that 11.3% of females and 6.9% of males had depression. Therefore, promoting and protecting mental health in adolescents is important for public health.

Changes occurring in adolescence may manifest lifelong health outcomes. Moreover, this situation has been observed to be the same for mental health problems. Many mental problems arise mostly in childhood and adolescence and continue into adulthood. Unhealthy habits such as smoking and alcohol and substance abuse generally commence in adolescence and are closely related to increased morbidity and mortality. Poor mental health in adolescence is known to be related to early age pregnancy, HIV/AIDS, other sexually transmitted diseases, domestic violence, child abuse, motor vehicle accidents, physical fights, criminal behavior, murder, and suicide. Conversely, life style behavior, technological developments, and modernized settled life styles cause an increase in diseases related to inactivity such as obesity and other non-communicable diseases. Physical activity has protective effects on various health aspects. In adolescence, physical activity has an important effect on the musculoskeletal system and cardiovascular health, increases academic achievement and self-respect and reduces depression/anxiety symptoms. McPhie and Rawana (2015) reported that adolescents who perform more physical activity were more vulnerable to the development of depressive symptoms. Another studies determined that a reduction in the frequency of physical activity was related to the occurrence of depressive symptoms. Variables including age, gender, and academic achievement, educational background of parents are also related to the mental condition of an individual.

Studies determining the prevalence of mental problems in adolescents and the factors causing these problems, create a database for planning and providing mental health services for people in this period. Conversely, when the effect and burden of mental health conditions is considered, it is necessary to identify mental problems in adolescents and plan interventions. This study aimed to assess the mental condition in socioeconomically disadvantaged adolescents to determine risk factors that affect their mental condition and, particularly, assess the effect of physical activity on mental health.

**Research Questions:**

- What is the mental health condition in adolescents?
- What is the physical activity level in adolescents?
- Are the sociodemographic characteristics and physical activity level related to mental condition in adolescents?
- What are the risk factors for moderate and poor mental health conditions in adolescents?

**MATERIALS AND METHODS**

**STUDY DESIGN**

This was a descriptive-cross-sectional study.

**PARTICIPANTS**

The province where this study was conducted has a settlement with good, moderate and poor socioeconomic characteristics. For this study, the researchers preferred a region with poor socioeconomic indicators comprising mostly shanty houses or new settlement areas, which were founded after migration. In the studies conducted in this area families were found to be disadvantaged in terms of socioeconomic characteristics. Convenience samplings method was used in districts selection.

This study was conducted by simple random sampling in two schools: a secondary school and a
high school. The universe of the study comprised 1196 students: 942 high school and 254 secondary school students. The study used the complete enumeration method. Among these, 94, 38, and 61 students were not included in the study because they had not been in a classroom environment, did not accept to participate, and suffered from a health problem within the last week, respectively. The study group comprised 933 students. The participation rate was 83%. **Study inclusion criteria** were age 12 or older, being able to establish verbal communication; the **study exclusion criteria** were being reluctant to continue completing the questionnaire, incomplete questionnaire and students suffering from a health problem within the last week.

**MEASURES**

The researchers informed students and their families about the aim of the study. It was emphasized that the participation would be voluntary and the identifying information would not be collected. Questionnaires were administered to participants during a one hour course under the supervision of the researchers. The researchers attempted to administer the questionnaires to all students at the same time.

**DATA COLLECTION TOOL**

The researchers collected data between March and April 2017. The Socio-demographic Characteristics Questionnaire Form, The General Health Questionnaire -12, and the Physical Activity Questionnaire were used to collect data.

**The Socio-demographic Characteristics Questionnaire Form** included six questions (about age, gender, mother educational background, father educational background, body mass index, and academic achievement) was developed by the researchers.

**The General Health Questionnaire-12 (GHQ-12)** was developed by Goldberg and Williams to determine possible mental disorders. Goldberg et al. (1997) performed validity analyses. Kılıç performed its Turkish and reliability. Questionnaire sensitivity and specificity were calculated to be 0.74 and 0.84, respectively. GHQ included 12 items. For each question, there were four opinions ranging from “never,” “same as usual,” “more than usual” and “much more than usual.” Scoring for each scale item was made as 0-0-1-1. Participants who scored lower than 2 points, scored 2 to 3 points and scored more than 4 points were grouped as good, moderate and poor, respectively. In the GHQ-12, 2 or more points indicated the risk of possible depression. Özdemir and Rezaki conducted a study to determine the appropriate cut-off point and validity of the GHQ-12 in determining possible depression in university students applying to a psychiatric clinic and found that the GHQ-12 was a useful screening scale in determining possible depression. Cronbach alpha coefficient was found to be 0.83 in this study.

**Physical Activity Questionnaire (PAQ)** was developed by Crocker, Bailey, Faulkner, Kowalski and McGrath in the United States of America in 1997. Kowalski et al. (1997) performed its validity analyses. Its Turkish validity and reliability analyses were performed by Emlek Sert & Bayık Temel. In the first administration of the PAQ, Cronbach alpha coefficient was found to be 0.74, while it was found to be 0.82 in the second administration. This study found that the correlation value between the pretest and posttest scores (r=0.74, p<0.05) in time invariance of the PAQ showed a positively strong and statistically significant relationship. The general scope validity index was calculated as 0.98. Cronbach alpha coefficient was found to be 0.92 in this study. This questionnaire included nine items and examined the physical activities of the students from the past seven days, and the frequency of these activities was recorded. In this context, this questionnaire examined whether any of the specified activities (hopscotch, football, basketball, and gymnastics, etc.) were performed within the last seven days. Moreover, the questionnaire examined the level of participation in the physical education course and the student activities (and their frequency) during playtimes, lunch breaks, after school, in evening hours and at weekends. The frequency of sport, play, dance and other physical activities during the week were recorded. Activities such as exercising,
dancing or playing games within the last seven days were also examined. The minimum possible score of each item on the PAQ was 1, and the maximum was 5. The minimum PAQ score was 9, and the maximum was 45. The tenth item of the PAQ was not included in the calculation. This item was created to exclude the questionnaire of students from the assessment, if there was a situation that prevented them from performing a physical activity within that week.26-29

VARIABLES

**Independent variables:** Age, gender, educational background of parents, the status of academic achievement perception, body mass index, and physical activity level.

**Dependent variables:** Mental health condition

DATA ANALYSIS

Data were analyzed using SPSS Programme As summary statistics, unit numbers (n), percentages (%), mean [standard deviation (SD)] values were used. This study used chi-square test in comparing categorical variables; p<0.05 value was accepted as statistically significant. Risk factors for mental health level were assessed using logistic regression analysis. The independent variable coded as 1 in the logistic regression analysis is shown in Table 2.

ETHICAL CONSIDERATION

To initiate the study, the researchers obtained necessary permissions and ethics committee consent form the Provincial National Education Directorate and from ………… University, Faculty of Health Sciences, Non-Interventional Ethics Committee (No:2017/33). Moreover, Informed consent was obtained from all individual participants included in the study and their parents. Informed consent form was sent to the families through the school and the families’ consent was obtained.

STUDY LIMITATIONS

Because the study sample was school-based, there was a limitation to generalize the study results to other society-based adolescents. In this study, the number of variables affecting mental health condition was limited; therefore, it is important to examine the variables regarding students’ familial, environmental, and biological characteristics in more detail. The use of a convenience samplings method is another limitation of this study.

RESULTS

PARTICIPANT CHARACTERISTICS

The mean age of the participating students was 15.3 ± 1.2 years (min=13-max=18); 53.9% of the students were male. Among the participating students’ mothers, 15.6% did not complete basic education while 78.1% of fathers were primary school graduates. Of the students, 42.7% and 54.3% assessed their academic achievement as “good” and “moderate,” respectively.

MENTAL HEALTH STATUS AND ASSOCIATED FACTORS

According to the General Health Questionnaire results of the students, 61.1%, 18.5%, and 20.3% had good, moderate, and poor health respectively. Based on the assessment of students’ mental health condition, this study found that students who were 17-years or older (x²=6.154) were female (x²=27.241) and perceived their academic achievement as moderate/poor (x²=11.546) had a higher percentage of moderate/poor health condition perception compared with other groups (p < 0.05). In groups formed according to the educational background of the parents, the general health levels showed similar distribution (p<0.05). This study determined that the participants with moderate-poor mental health conditions had lower mean scores on the physical activity scale compared with participants with good mental condition (p<0.05) (Table 1).

RISK FACTORS FOR MODERATE/POOR MENTAL HEALTH

The logistic regression analysis determined that female gender and moderate/poor perception of academic achievement were important risk factors regarding their mental health condition. Physical activity was found to be a protective factor, and as the physical activity score increased, a positive change occurred in the mental health condition (Table 2).
PHYSICAL ACTIVITY

This study examined the physical activity characteristics of students and found that activities frequently (seven or more times a week) performed during a week were running (32.5%), cycling (30%), playing football (26.2%), and playing volleyball (22.2%). Among the students, 33.8%, 39%, 33.8%, 46.1%, 34.0%, and 22.7% did not perform any physical activity during play times, lunch breaks, after school, in evening hours, at weekends, and at leisure times, respectively. The rate of students who actively participated in all physical education lessons was 50.9%. Moreover, this study showed that the mean score of students on the physical activity questionnaire was 21.2±6.4.

### TABLE 1: Distribution of students’ mental health status according to some variables

| Variables                  | General Health Status | Chi-square test | p     |
|---------------------------|-----------------------|-----------------|-------|
|                           | Moderate/Poor | Good          |               |
|                           | n (%)       | n (%)         |               |
| Age                       |             |               |               |
| 13-16 years               | 283 36.8    | 486 63.2      | 6.154         | 0.013 |
| 17 years and over         | 103 45.9    | 121 54.1      |               |       |
| Gender                    |             |               |               |
| Female                    | 218 56.5    | 240 39.5      | 27.241        | < 0.001|
| Male                      | 168 43.5    | 367 60.5      |               |       |
| Mother’s education        |             |               |               |
| Illiterate                | 61 39.3     | 94 60.7       | 0.018         | 0.893 |
| Elementary school and upper| 325 38.8 | 513 61.2      |               |       |
| Father’s education        |             |               |               |
| Elementary school graduate| 309 39.8    | 467 60.2      | 1.342         | 0.247 |
| Secondary and upper       | 77 35.5     | 140 64.5      |               |       |
| Perceived academic achievement |       |               |               |
| Moderate+Poor             | 247 43.4    | 322 56.6      | 11.546        | 0.001 |
| Good                      | 139 32.8    | 285 67.2      |               |       |
| BMI (kg/m²)               |             |               |               |
| Weak / Normal             | 308 38.8    | 485 61.2      | 0.002         | 0.967 |
| Overweight/Obez          | 78 39.0     | 122 61.0      |               |       |
| TOTAL                     | 386 38.8    | 607 61.1      |               |       |

| Variables                  | Mean (SD) | Mean (SD) | t test | p     |
|---------------------------|-----------|-----------|--------|-------|
| Physical activity total score | 20.1 ± 6.5 | 22.0 ± 6.3 | -4.181 | < 0.001 |

### TABLE 2: Risk factors for moderate/poor mental health status of students.

| Variables                  | β         | Odds Ratio | %95 Confidence Interval | p*    |
|---------------------------|-----------|------------|-------------------------|-------|
| Age (17 years)            | 0.074     | 1.077      | 0.769-1.508             | 0.665 |
| Gender (female)           | 0.653     | 1.922      | 1.451-2.545             | < 0.001|
| Mother’s education (literate / illiterate) | 0.117 | 1.125 | 0.780-1.620 | 0.929 |
| Father’s education (elementary and lower) | 0.088 | 1.093 | 0.790-1.511 | 0.592 |
| Perceived academic achievement (Moderate+Poor) | 0.519 | 1.680 | 1.280-2.206 | < 0.001|
| BMI (overweight and above) | -0.037    | 0.964      | 0.693-1.340             | 0.826 |
| Physical activity total score | -0.030    | 0.971      | 0.950-0.992             | 0.007 |

* Logistic regression analysis.
DISCUSSION
The existence of mental disorders in adolescents may have potential long-term effects on both their social and personal lives. Therefore, this study is important regarding the assessment of the adolescents’ mental conditions and planning interventions in the early period after determining the risk factors affecting their mental condition. Since this study was conducted in a socioeconomically disadvantaged region, it may provide important information for developing strategies to protect the mental health of adolescents living in disadvantaged regions. The region selected for this study was founded later after migration and unemployment is common in this region. Moreover, the study showed that students having mothers who did not complete basic education (five-year education) and fathers who had lower education levels, represented risky student groups.

In this study it was determined that age, gender and academic achievement is related to mental health condition (Table 1). Previous studies have emphasized that age is an important factor that affects the prevalence of a health condition. Studies, similar to the present study, have reported that the incidence of mental health problems increases with increasing age. The fact that mental condition gets worse with age may be attributed to physical, and emotional changes and familial characteristics.

The relationship between depression and gender varies by life cycles. This study found a significant difference between gender and mental health condition; the moderate/poor mental health condition perception levels of female students (56.5%) were higher than those of male students (43.5%). Moreover, males and females showed similar depression rates before adolescence, but there was a higher incidence of depression in females during adolescence. Lewis et al. (2018) explain that social and psychological factors as well as hormonal factors may contribute to the increase in the incidence of depression in girls.

However, some studies did not find a significant difference between male and female students regarding depression scores, and some other studies determined that males experience depression more often than females. The diversity in results may be attributed to the sample size, distribution of females and males in the sample, the measurement tool used, or environmental factors in the study region. Higher depression prevalence in female students may persuade the researchers to assess the region for gender equality.

It has been reported that in adolescents poses a threat to their learning and performance. Low energy and concentration problems specific to serious depressive disorders may have negative effects on school success. The result showed that there was negative effect of depression on student’s academic achievement whereas there was a significance difference between the academic performance of the students having poor, medium and high level depression. Consistent with literature information, the present study determined that people who perceived their also perceive their health condition as poor/moderate. It can be said that many factors can play a role in this relationship.

In this study, the logistic regression analysis determined that the female gender, the moderate/poor perception of academic achievement, and the status of physical activity are important risk factors regarding poor/moderate mental health condition (Table 2). In contrast to the present study, a study by Demir, Karaceyin, Eralp Demir, & Uysal, reported that the increasing age and the low level of the mother’s education were positively related to the depression level. Similar to the results of the present study, a study by Özmen et al. determined that the BMI values had no effect on depression. The present study found that physical activity was a protective factor (Table 2) and as the physical activity score increased, a positive change occurred in the mental health condition (Table 1). It was reported that the mental health was related to the physical activity in children and adolescents; however, the study designs were weak. According to a longitudinal study, it was found that adolescents who performed more physical activity were more vulnerable to the development of depressive symptoms. A systematic review study
stated that exercise improved self-esteem and decreased the depression scores. Another study determined that the frequency of activity (over the moderate level threshold) and depressive symptoms show a negative correlation. The same study reported that, in multilevel mixed-effects models, the participation in sports and a greater frequency of physical activity, independently, contributed to lower depressive symptoms in both genders. According to previous studies, the effect of physical activity on depression may vary according to its frequency and intensity. The present study examined the general physical activity characteristics of students and found that the most common activity type was running. Moreover, students had inadequate sources for physical activity in out-of-school environments and physical education courses were not used effectively, and the physical activity scores of students were highly low. The present study also determined that the female gender and poor/moderate academic achievement perception, which are a risk factor for mental health conditions, were important determinants of the physical activity score and reduced the physical activity score. A systematic review reported that the variables including age, gender, parental education level, socioeconomic condition, self-efficiency, parental support, peer support, physical activity history, depressive symptoms and physical activity were related in adolescents. The present corroborated a previous study that showed that physical activity in adolescents was inversely proportional to age and that physical activity levels decreased with the increasing age. Another study determined that the relationship between age and physical activity was not important. Moreover, gender was an important determinant for participating in physical activity and compared with males; females had less physical activity levels. In contrast to the present study, a study by Kantomaa, Tammelin, Nayha, & Taanila, reported that higher parental education level was related to higher physical activity in adolescents. As shown in several studies, it can be said that physical activity is affected by many variables and this variable has a significant effect on depressive symptoms.

**CONCLUSION**

In conclusion, this study found that students living in a socioeconomically disadvantaged region experienced negative effects on their mental health and physical activity. One-third of the students had a moderate-poor level of mental health; moreover, increasing age, female gender, and poor/moderate academic achievement are risk factors. Thus, physical activity was found to have a protective characteristic for mental health.

Students who perceived their academic achievement as poor to moderate are likely to be at risk of having symptoms of depression. And several factors could play a role in this relationship. Therefore, further research is needed in this area specifically longitudinal studies.

**IMPLICATIONS FOR PRACTICE**

This study emphasized the importance of providing opportunities to the students living in this socioeconomically disadvantaged region. The basic strategies should be ensuring that students play more sports and have exercise opportunities in the school environment to support their academic success.

School nurses working in this socioeconomically disadvantaged region should perform mental health screening every year and direct students to physical activities. Moreover, they should be aware of disadvantages experienced by female students, and develop interventions for female students, older students, and academically unsuccessful students.

Creating or improving physical conditions so that students can participate in sports free of charge in socioeconomically disadvantaged regions may be beneficial regarding the mental health conditions of students. Thus, services to be planned within the scope of protective health services should be planned with student-school-family.

**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

Ideas/Concept: Alime Selçuk Tosun, Deniz Tanyer, Belgin Akin; Design: Alime Selçuk Tosun, Deniz Tanyer, Belgin Akin; Control/Supervision: Alime Selçuk Tosun, Deniz Tanyer, Belgin Akin; Data Collection and/or Processing: Alime Selçuk Tosun, Emine Ergin, Tuba Özyaydin; Analysis and/or Interpretation: Alime Selçuk Tosun, Deniz Tanyer; Literature Review: Alime Selçuk Tosun, Deniz Tanyer, Emine Ergin; Writing the Article: Alime Selçuk Tosun, Deniz Tanyer, Belgin Akin, Emine Ergin, Tuba Özyaydin; Critical Review: Alime Selçuk-Tosun, Deniz Tanyer, Belgin Akin; References and Fundings: Alime Selçuk Tosun, Emine Ergin, Tuba Özyaydin.

REFERENCES

1. World Health Organization (WHO). Health for the second decade. Geneva: WHO Document Production Services; 2014. p.1-5.
2. Patton GC, Cooney C, Sawyer SM, Viner RM, Dagmar MH, Bose K, et al. Global patterns of mortality in young people: a systematic analysis of population health data. Lancet. 2009; 374(9693): 881-92.
3. Patel V, Flisher AJ, Hetrick S, McGorry P. Mental health of young people: A global public health challenge. Lancet 2007;369(9569): 1302-13.
4. World Health Organization (WHO). Adolescent mental health: Mapping actions of non-governmental organizations and other international development organizations. Geneva: WHO Press; 2012 p.6-8.
5. Eskin M, Ertekın K, Harlak H, Dereboy C. [Prevalence of and factors related to depression in high school students]. Turkish Journal of Psychiatry. 2008;19(4):382-89.
6. Türkoğlu S. [Diagnosis of patients referring to a child and adolescent psychiatry outpatient clinic]. Selcuk Medical Journal. 2014;30:18-22.
7. Suchet V, Hanewinkel R, Issetüsee B. Sedentary behavior and indicators of mental health in school-aged children and adolescents: A systematic review. Preventive Medicine. 2015;76(2015;):48-57.
8. Beller M L. Child and adolescent mental disorders: The magnitude of the problem across the globe. Journal of Child Psychology and Psychiatry. 2008;49(3):226-36.
9. Jones PB. Adult mental health disorders and their age at onset. The British Journal of Psychiatry. 2013;202(54):5-10.
10. World Health Organization (WHO). Maternal, newborn, child and adolescent health: Adolescents and mental health: adolescent health mortality and viales in adolescents by who region, 2000 and 2012, aged 10-19 years. Global Health Estimates; 2017. p.1.
11. Dale H, Brassington L, King K. The impact of healthy lifestyle interventions on mental health and wellbeing: a systematic review. Mental Health Review Journal. 2014;19(1):1-26.
12. Hoare E, Milton K. Foster CS. The associations between sedentary behaviour and mental health among adolescents: a systematic review. International Journal of Behavioral Nutrition and Physical Activity. 2016;13(1):108.
13. Strong WB, Malina RM, Blimkie CJ, Daniels SR, Dishman RK, Gutin B, et al. Evidence-based physical activity for school-age youth. The Journal of Pediatrics. 2005;146(6):723-37.
14. McPhee ML, Rawana JS. The effect of physical activity on depression in adolescence and emerging adulthood: a growth curve analysis. Journal of Adolescence. 2015;40: 83-92.
15. Johnson CC, Murray DM, Elder JP, Jobe B, Dunn AL, Kubik M, et al. Medicine and Science in Sports and Exercise. 2008; 40(5): 818-26.
16. Tajik E, Abdul Latif L, Azdarn SN, Awangi H, Yit Siew C, Abu Bakar AS. A study on level of physical activity, depression, anxiety and stress symptoms among adolescents. The Journal of Sports Medicine Physical Fitness. 2016; 57(10):1382-87.
17. Aras Ş, Ünlü G, Varol Taş F. [Symptoms, Diagnoses and Diagnostic Procedures of Patients who Presented to the Child and Adolescent Psychiatry Outpatient Clinic]. Clinical Psychiatry. 2007;10(1): 28-37.
18. Tuncer I. [Evaluation of growth and development with some anthropometric measurements in primary school students in Konya city center]. Süleyman Demirel University Medical Faculty Journal. 2007;14(1):25-36.
19. Koçoğlu D, Akin B. [The relationship between socioeconomic inequalities and healthy lifestyle behaviors and quality of life]. Dokuz Eylül University Electron-ic Nursing Faculty Journal. 2009;2(4):145-54.
20. Selçuk Tosun A, Akça G. [Factors influencing social support and mental health status of individuals living in regions with different socioeconomic characteristics in the Konya City Centre]. Journal of Anatolia Nursing and Health Sciences. 2014;17(4):207-15.
21. Esin MN. [Sampling]. Erdogan S, Nahcivan N, Esin N, eds. Hemşirelikte Araştırma Süreci, Uygulama ve Etik. Nobel Kitabevleri. İstanbul; 2014.p.173-74.
22. Goldberg DP, Williams PA. Users guide to the General Health Questionnaire (GHQ). University of London, Institute of Psychiatry. NFER-NELSON. 18th Edition. London; 1998.p.1.
23. Goldberg D, Gater R, Sartorius N, Ustun T, Piccinelli M, Gureje O, et al. The validity of two version of the GHQ in the WHO study of mental illness in gen-eral health care. Psychological Medicine. 1997;27 (1), 191-97.
24. Kilic C. [General Health Questionnaire: Validity and reliability study]. Turkish Journal of Psychiatry. 1996;7(1):3-11.
25. Ozdemir H, Rezaki M. [General health questionnaires for the detection of depression]. Turkish Journal of Psychiatry.2007;18(1):13-21.
26. Crocker PRE, Bailey DA, Faulkner RA, Kowalski KC, McGrath R. Measuring general levels of physical activity: preliminary evidence for the physical activity questionnaire for older children.[Medicine and Science in Sports and Exercise] 1997;29(10):1344-49.
27. Kowalski, K. Crocker P. Donen R. The Physical Activity Questionnaire for Older Children (PAQ-C) and Adolescents (PAQ-A) Manual. College of Kinesiology, University of Saskatchewan. 2004-1-38.
28. Kowalski KC, Crocker PR, Faulkner RA. Validation of the Physical Activity Questionnaire for Older Children. Pediatric Exercise Science.1997; 9, 174-86.
29. Emlek Sert Z, Bayık Temel A. [Adaptation of physical activity questionnaire to Turkish community for elementary school students: validity and reliability study]. Dokuz Eylül University Electronic Nursing Faculty Journal. 2014;7(2): 109-14.

30. Demir T, Karaceyin G, Eralp Demir D, Uysal Ö. Epidemiology of depression in an urban population of Turkish children and adolescents. Journal of Affective Disorders 2011; 134(1-3):168-76.

31. Jha KK, Singh SK, Nirala SK, Kumar C, Kumar P, Aggrawal N. Prevalence of depression among school-going adolescents in an urban area of bihar, India. Indian Journal of Psychological Medicine. 2017;39(3):287-92.

32. Lewis G, Ioannidis K, van Harmelen A-L, Neufeld S, Stochi J, Lewis G, et al. The association between pubertal status and depressive symptoms and diagnoses in adolescent females: A population-based cohort study. PLoS ONE. 2016; 13(6): e0198804.

33. Yılmazel G, Günyay O. [Self-Esteem and Depression Levels Among 12-17 Years old Students in Kırşehir]. Journal of Health Sciences. 2012;21(1):20-9.

34. Sun Y, Tao F, Hao J, Wan Y. The mediating effects of stress and coping on depression among adolescents in China. Journal of Child and Adolescent Psychiatric Nursing. 2010; 23(3):173–80.

35. Undheim AM, Sund AM. School factors and the emergence of depressive symptoms among young Norwegian adolescents. European Child & Adolescent Psychiatry. 2005;14(8):446-53.

36. Khurshid S, Parveen Q, Yousauf MI, Chaudhry AG. Effects of depression on students’ academic performance. Science International (Lahore). 2015: 27(2),1619-24.

37. Özmen D, Özmen E, Ergin D, Celinkaya AC, Sen N, Dündar PE, et al. The association of self-esteem, depression and body satisfaction with obesity among Turkish adolescents. BMC Public Health. 2007;16(7):80.

38. Biddle SJ, Asare M. Physical activity and mental health in children and adolescents: a review of reviews. British Journal of Sports Medicine. 2011;45(11):886–95.

39. Ahn S, Fedewa AL. A meta-analysis of the relationship between children’s physical activity and mental health. Journal of Pediatric Psychology. 2011;36(4):385-397.

40. Das JK, Salam RA, Lassi ZS, Khan MN, Mahmood W, Patel V, et al. Interventions for Adolescent mental health: an overview of systematic reviews. Journal of Adolescent Health. 2016;59(4S):49-60.

41. McMahon EM, Corcoran P, O’Regan G, Keeley H, Cannon M, Carl V, et al. Physical activity in European adolescents and associations with anxiety, depression and well-being. European Child & Adolescent Psychiatry.2017;26(1):111-22.

42. Park H, Kim N. Predicting factors of physical activity in adolescents: a systemic review. Asian Nursing Research. 2008;2(2): 113-28.

43. Ammouri AA, Kaur H, Neuberger GB, Gajews- ski B, Choi WS. Correlates of exercise participation in adolescents. Public Health Nursing. 2007; 24(2): 111-20.

44. Shi Z, Lien N, Kumar BN, Holmboe-Ottesen G. Physical activity and associated sociodemographic factors among school adolescents in Jiangsu province, China. Preventive Medicine. 2008;43(3):218-21.

45. Loucides CA, Plotnikoff RC, Bercovitz, K. Differences in the correlates of physical activity between urban and rural Canadian youth. Journal of School Health. 2007;77(4):164-70.

46. Kantomaa MK, Tammelin TH, Nayha S, Taanila AM. Adolescents' physical activity in relation to family income and parents' education. Preventive Medicine. 2007;44(5):410–15.