INTERNATIONAL JOURNAL OF SPORT, EXERCISE & TRAINING SCIENCES
http://dergipark.gov.tr/useeabd
e-ISSN 2149-8229 Vol 3, Issue 4, 199–205, (2017) Original Article

The Relation of Physical Activity to Physical and Mental Health Level in Adolescents

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Abstract

Aim: The promotion and increasing participation of physical and sports activities at high schools can play an active role in increasing the health and academic achievement of young people. This study aims to investigate the effects of regular physical activity on physical and mental health in male and female high school students.

Methods: Data were collected from 1350 high school students. Short form- health scale (SF-12) were used for physical health scores (PHS) and mental health scores (MHS). A physical activity stage of change questionnaire was used for activity level.

Results: Results of this study showed that the percentages of physical activity level were 41.6 % for male and 27.72% for females. There were significant differences in the means of MHS and PHS depending on physical activity level in male and females. Significant differences were only observed in the means of age, body height in females not male. PHS and MHS were more significantly correlated with physical activity levels in females than male.

Conclusion: An inactive lifestyle of high school students leads to lower their health scores. So, regular physical activity is a need to enhance and maintain PHS and MHS.

Keywords
Physical activity, Physical and mental health, Students,

Article Info
Received: 17.11.2017
Accepted: 28.12.2017
Online Published: 29.12.2017

DOI:10.18826/useeabd.355110

INTRODUCTION

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

Improving physical fitness is one of the most important health indicators in young people. The ultimate purpose of participation in physical activity is to improve the health related physical fitness including five basic fitness elements: morphological, cardiorespiratory, metabolic, motor and muscular. The monitoring and evaluation of these five classes is important not only in the youth years but also in the protection and development of health in all periods from childhood to old age. Regular physical activity has an effect on general health and enhances psychosocial health (Brown, Balluz, Heath, Moriarty, Ford, Giles, Mokdad, 2003; Gorczynski & Faulkner, 2010; Cetinkaya & Omuris, 2017). However, few evaluations the effect of regular physical activity on health have focused on a broader evaluation of health-related quality of life (HRQoL) including physical and mental health in high school students (Genc, Sener, Karabacak, & Ucok, 2011; Tavazar, Erkaya, Yavas, Tez, Zerengok, Guzel, & Ozbey, 2014).

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

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

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Ceker, Cekin, and Ziyagil (2013) reported that ratios for pre-contemplation, contemplation, preparation, action and maintenance stages of exercise behaviour changes were 20.75%, 18.65%, 15.85%, 19.81% and 24.94% respectively in 14 to 19 years Turkish male and female students. In the regular physical activity participation, male had a higher percentage than females while exercise participation percentages decreased with increasing age in both gender after high school years. They also concluded that percentage of the maintenance stages is still the lowest for participation level in regular physical activity when compared to European Countries. Thus, health and physical activity policies should be based on comprehensive data that represents all the cities of the Nation. Physical activity stages of change questionnaire and SF-12 health survey produces usable information for exercise and health politics.

It is well known that the physical health care of people with severe and persistent mental illness has been reported as a serious public health challenge (Morgan, Waterreus, Jablensky, Mackinnon, McGrath, Carr, Bush, Castle, Cohen, Harvey, Galletly, Stain, Neil, McGorry, Hocking, Shah, and Saw, 2012). Physical health is related to the functioning of the physical body and is influenced by many diseases, conditions and disabilities. On the other hand, mental health is defined as the enjoyment of life, ability to cope with stress and sadness, the fulfilment of goals and potential, and a sense of connection to others in the view of social and emotional wellbeing of individuals and communities with respect to their culture (Hunter Institute of Mental Health, 2015).

The SF-12 is a multipurpose short form survey with 12 questions, all selected from the SF-36 Health Survey. The questions were combined, scored, and weighted to create two scales that provide short summary related to physical component summary (PCS) and mental component summary (MCS). PCS includes physical functioning, role physical, bodily pain and general health subscales while MCS comprises vitality, social functioning, role emotional and mental health subscales (Ware, Kosinski, & Keller, 1995).

The promotion and increasing participation of physical and sporting activities at high schools will play an active role in increasing the health and academic achievement of young people (Danylchuk, 2007). All physical activities in high schools should aim to develop the students' physical, intellectual, emotional, and social potentials in order to bring up healthier, happier, and more successful people integrating to the society. Thus, the purpose of this study is to investigate the effects of regular physical activity on physical and mental health in male and female high school students.

METHOD

Participants

Data were collected from 1350 participants including 725 females and 625 males at the age range of 14-19 years living in Çukurova district of Adana city attending the high school were chosen randomly. The Mean values for females were 15.82±1.08 years for age, 163.73±5.77 cm for body height, 56.01±9.12 kg for body weight and 20.92±3.17 kg/m^2 for BMI, respectively. Same values for male were 15.94±1.14 years for age, 175.12±7.20 cm for body height, 66.80±13.82 kg for body weight and 21.69±3.77 kg/m^2 for BMI, respectively.

Data Collection

After collecting socio-demographic data, short form SF-12 as a short health scale (Ware, Kosinski, Turner-Bowker and Gandek, 2008) is a self-report measure of perceived health and functioning. The questions of multipurpose SF-12 were selected from the SF-36 Health Survey. Demiral, Ergor, Unal, Semin, Akvardar, Kıvırcık, and Alptekin (2006) obtained population norms of the short form 36 (SF-36) health surveys and the relation of SF-36 domains with socioeconomic and demographic parameters in Turkish urban population. They suggested that the SF-36 can be cautiously generalizable and a valuable tool for studies on health outcomes in Turkish population.

SF-12 Health Survey had two scales including PCS and MCS. PCS includes physical functioning (PF), role physical (RP), bodily pain (BP) and general health (GH) subscales. PF shows the limitations doing moderate activities and climbing several flights of stairs (2 items). RP imply role limitations due to physical problems, less accomplishment than one would like to achieve and limitation in kind of work or other activities (2 items). BP demonstrates pain interference with one's normal work (1 items). GH indicates general health perception (1 items). On the other hand, MCS comprises vitality (VT), social functioning (SF), role emotional (RE) and mental health (MH) subscales (Ware et al, 1995). VT

shows having energy (1 item). SF indicates the interference of physical health or emotional problems with one's social activities (1 item). RE imply role limitations due to emotional problems, less accomplishment than one would like to achieve and not being careful in doing activities as usual (2 items). MH shows mental health perception, feeling cool or peaceful and feeling sad or blue (2 items) (Ware et al, 2008). The physical component score (PCS) and the mental component score (MCS) of the SF-12 were derived by the weighted sum of 12 items' scores using the USA standard SF-12 scoring algorithm (Ware et al.).

Turkish version of Physical Activity Stages of Change Questionnaire (Cengiz, Asci, & Ince, 2010) was used for data collection physical activity level in male and female high school students. In this study, participants were divided into five categories as stages of exercise behaviour change including a pre-contemplation, contemplation, preparation, and action and maintenance stages.

Statistical analysis

Values were presented as medians (25-75 percentile) in the comparisons with respect to stages of behaviour change for physical activity while these values were shown as frequencies and percentages. In addition, percentage differences between male and female group were tested by Chi square analysis. After performing Kolmogorov-Smirnov normality test Independent-Samples Kruskall-Wallis analysis were used for comparison among five groups. Then Bonferroni corrected Mann Whitney U, as a multiple comparison test, was also used for comparison among stages of behaviour change for physical activity. Spearman Rank Order Correlation was calculated among variables. The statistical significance level, alpha (α) level of error, was accepted as $p < 0.05$.

RESULTS

Table 1. Stages of behaviour change for physical activity in male and females.

		Stages of Behaviour Change for Physical Activity								
		PC	C	P	A	M	Toplam	χ^2	df	p
Gender	**Female**	215 (29.66%)	177 (24.41%)	132 (18.21%)	81 (11.17%)	120 (16.55%)	725			
	Male	123 (19.68%)	148 (23.68%)	94 (15.04%)	70 (11.20%)	190 (30.40%)	625	43.457	4	**0.001****
Total		338 (25.04%)	325 (24.07%)	226 (16.74%)	151 (11.19%)	310 (%22.96)	1350			

p<0.001; **PC=Pre-Contemplation, **C**=Contemplation, **P**=Preparation, **A**=Action, **M**=Maintenance**.**

There are significant differences found in the percentage differences between male and female group in sex. Stages of behaviour change for physical activity were presented for male and females in Table 1.

Table 2. Comparison of Physical characteristics, physical and mental health Scores according to stages of exercise behaviour changes in females (Kruskal-Wallis H and Bonferroni).

	Median (25–75 percentiles)							
Variables	**PC (n=215)**	**C (n=177)**	**P (n=132)**	**A (n=81)**	**M (n=120)**	**p**	**Groups**	**p**
Age (years)	16.00 (15.00-17.00)	16.00 (15.00-17.00)	16.00 (15.00-16.75)	15.00 (15.00-16.00)	15.00 (15.00-16.00)	**0.000****	PC-P PC-A PC-M	**0.039*** **0.006**** **0.006****
Body Height (cm)	163.00 (159.0-167.0)	163.00 (159.0-167.0)	163.00 (160.0-168.0)	165.00 (161.0-168.0)	165.00 (162.0-169.0)	**0.015***	PC-M	**0.003****
Body Weight (kg)	54.00 (50.00-60.00)	56.00 (51.00-62.00)	55.00 (50.00-62.00)	52.89 (47.98-55.93)	55.00 (50.00-61.00)	0.374	-	-
BMI (kg/m^2)	20.20 (18.83-22.31)	21.09 (19.33-23.08)	20.57 (18.88-22.26)	20.20 (18.74-22.58)	19.10 (18.65-22.39)	0.083	-	-
Physical Health Scores	51.94 (46.24-55.61)	52.31 (47.77-56.06)	39.84 (32.21-48.08)	54.43 (49.62-56.75)	55.09 (50.60-57.13)	**0.001****	PC-A PC-M C-M	**0.044*** **0.001**** **0.046***
Mental Health Scores	37.33 (28.91- 48.06)	39.28 (30.31-48.79)	39.84 (32.21-48.08)	42.75 (34.40-51.76)	46.28 (37.65-54.12)	**0.000****	PC-M C-M P-M	**0.000**** **0.000**** **0.004****

p<0.001, *p<0.05, **PC=Pre-Contemplation, **C**=Contemplation, **P**=Preparation, **A**=Action, **M**=Maintenance**.**

Significant differences were found in the age (χ^2=22.41; df=4; p<0.001), physical health scores (χ^2=19.46; df=4; p<0.01), body height (χ^2=12.41; df=4 p<0.05), and Mental Health Scores (χ^2=32.44; df=4; <0.01) to the stages of exercise behaviour changes. However, there are no significant differecences in body weight (χ^2=4.25; df=4; p>0.01) and BMI (χ^2=8.25; df=4; p>0.01) (Table 2).

Table 3. Comparison of Physical characteristics, physical and mental health Scores according to stages of exercise behaviour changes in male (Kruskal-Wallis H and Bonferroni).

Variables	Median (25– 75 percentiles)					p	Groups	p
	PC (n=123)	C (n=148)	P (n=94)	A (n=70)	M (n=190)			
Age (years)	16.00 (15.00-17.00)	16.00 (15.00-17.00)	16.00 (15.00-17.00)	16.00 (15.00-17.00)	16.00 (15.00-17.00)	0.409	-	-
Body Height (cm)	174.00 (169.00-178.00)	175.00 (171.25-180.00)	175.00 (170.00-180.00)	175.00 (170.00-180.00)	176.00 (171.00-180.00)	0.055	-	-
Body Weight (kg)	64.00 (55.00-72.00)	65.00 (57.25-74.00)	62.50 (55.75-75.00)	65.00 (57.00-75.25)	65.00 (58.75-75.00)	0.426	-	-
BMI (kg/m^2)	20.75 (18.65-23.44)	20.96 (19.01-23.71)	20.74 (18.89-24.17)	21.50 (18.88-23.76)	20.96 (19.49-23.41)	0.885	-	-
Physical Health Scores	54.53 (49.43-56.58)	52.18 (48.56-56.05)	53.71 (48.71-56.87)	54.40 (50.52-56.89)	54.82 (50.72-57.68)	**0.015***	C-M	**0.006****
Mental Health Scores	46.39 (37.15-54.04)	46.14 (36.48-53.15)	42.36 (37.59-51.17)	49.42 (43.01-55.42)	48.05 (39.25-55.12)	**0.004****	P-A P-M	**0.009**** **0.021***

p<0.001, *p<0.05, **PC=Pre-Contemplation, **C**=Contemplation, **P**=Preparation, **A**=Action, **M**=Maintenance**.**

There is a significant difference in Physical Health Scores of male (χ^2=12.73; df=4; p<0.05) between contemplation and maintanence. Significant difference is found in Mental Health Scores of male (χ^2=15.39; df=4; p<0.01) between preparation and action and also between preparation and maintenance. There are no significant differences in Physical characteristics and in physical and mental health Scores according to stages of exercise behaviour changes in male (Table 3).

Table 4. Correlation coefficients among variables in male and female.

Variables	Female			Male		
	PASBC	PHS	MHS	PASC	PHS	MHS
Physical activity stages of behaviour change (PASBC)	1.000	**0.159****	**0.191****	1.000	**0.102***	**0.087***
Age	**-0.167****	**-0.169****	**-0.256****	-0.051	**-0.078***	**-0.115****
Body Height	**0.123****	0.066	0.000	**0.107****	-0.023	0.073
Body Weight	0.029	-0.058	-0.058	0.067	**-0.087***	-0.017
BMI	-0.034	-0.094*	-0.059	0.033	**-0.095***	-0.056
Physical Health Scores (PHS)	**0.159****	1.000	0.010	**0.102***	1.000	**-0.158****
Mental Health Scores (MHS)	**0,191****	0,010	1,000	**0,087***	**-0,158****	1,000

*p<0.05, **p<0.01; **PASC**: Physical Activity Stages of Change, **PHS**: Physical Health Scores, **MHS**: Mental Health Scores

In addition, correlation coefficients among variables were presented for male and females in Table 4.

DISCUSSION

This study aimed to investigate the effects of regular physical activity on physical and mental health in male and female high school students. In the view of adults' health, Shah, Anupindi, Vaidya, and Holiday-Goodman, (2015) found that older adults, African Americans, females, unemployed individuals, and individuals reporting poor perceived health and those having higher number of co-morbidities showed very low PHS-12 scores. They also reported that older adults, unemployed, unmarried or divorced individuals and those reporting poor perceived health were more likely to show very low MHS-12 scores. In the view of adolescents' health, Giannakopoulos, Dimitrakaki, Pedeli, Kolaitis, Rotsika, Ravens-Sieberer, and Tountas (2009) reported parental subjective mental health status was significantly correlated with adolescents' better physical and psychological wellbeing,

moods and emotions, parent-child relationships, school environment and financial resources. They also showed that there was strong association between parental subjective physical health status and more positive adolescents' self-perception. Adolescents' male gender, younger age, absence of chronic health care needs, high social support, and higher family income were positively associated with better life quality (Giannakopoulos et al.)

The percentages of physical activity level were 41.6% (A+M) for male and 27.72% (A+M) for females (Table 1). There were significant differences in the means of MHS and PHS depending on physical activity level in both genders (Table 2-3). Significant differences were only observed in the means of age, body height in females (Table 2) not male (Table 3).

PASBC was negatively correlated with age ($r=-0.167$, $p<0.01$), while PASBC were positively correlated with the body height ($r=0.123$, $p<0.01$), physical health ($r=0.159$, $p<0.01$) and mental health scores ($r=0.191$, $p<0.01$) in females. These significant positive correlations with physical activity level were observed in body height ($r=0.107$, $p<0.01$), physical health ($r=0.102$, $p<0.05$) and mental health ($r=0.087$, $p<0.05$) scores in male students (Table 4). These results were in agreement with the results reported by other studies (Brown et al. 2003; Gorczynski & Faulkner, 2010). However, the effects of regular physical activity on health should focus on a broader evaluation of health-related quality of life (HRQoL) including exercise, physical and mental health in high school students.

This study indicates that 65.85% of Turkish high school students do not participate in regular physical activity, and PHS and MHS values of these students are lower than the averages of 55.33 and 49.18 for the age group of 18-34 years in USA (Ware et al. 1995). Based on these facts, the monitoring and evaluation of students' regular physical activity and health levels should be recommended to educators and school administrators at the beginning and end of each school year. This process is important not only in the youth years but also in the prevention from illness and enhancement of health in all periods from childhood to old age. Regular physical activity has an effect on general health and enhances psychosocial health (Brown et al. 2003; Gorczynski & Faulkner, 2010; Cetinkaya & Omuris, 2017). In addition, Pan Korur (2010) reported that MHS-12 showed significant correlations with level of education, social security, socio-economic status and marital status while age-related changes were significantly associated with MHS-12 and PHS-12 in her study on 685 male and female participants in the age range of 18 to 83 years.

It was well known that regular physical activity develops general health and physical fitness (Brown et al. 2003; Gorczynski & Faulkner, 2010). Physical activity habits decrease significantly in the transition from high school to university and tend to decrease with age in the following years (Douglas et al. 1997). Results of this study showed that participation rates in physical activity were 41.6% for male and 27.72% for females. This lower participation rate in physical activity is a risk factor threatening general health of high school students. However, the effects of regular physical activity on health should focus on a broader evaluation of HRQoL including physical and mental health in high school students.

In our study, there were significant differences in the means of physical and mental health (PHS and MHS) depending on physical activity level in male and females (Table 2). In females, physical and mental health scores increase gradually with physical activity stages of change, while there is an irregular increase in male. This difference between these two trends suggested that male participated regular physical activity more effectively than females. Comparison of physical characteristics between two genders demonstrated that significant differences were only observed in the means of age, body height in females not male. Physical activity stages of behaviour change were significantly correlated with physical characteristics and health in male and females (Tablo 3). In a study with patients with fibromyalgia syndrome, it was reported that aerobic, aquatic and isometric exercise programs had a significant effect on PHS and MHS at different level. The aquatic aerobic exercise program was the most effective in the development of PHS and MHS (Sevimli, Kozanoglu, Guzel, & Doganay, 2015). Our results are in agreement with the studies done by Tavazar et al. (2014) and Sevimli et al. They have reported positive effects of physical activity for promoting increased HRQoL including physical and mental components score in young people with sedentary life styles. So, the higher participation of physical and sporting activities at high schools can play an active role in increasing the health and academic achievement of young people (Danylchuk, 2007). It is important that health should be assessed by the physical, mental, social, emotional dimensions of the individuals.

It will be useful to identify new strategies for the evaluation of knowledge level, skills and behaviours related to active life style.

CONCLUSION

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

Practical Application

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

Acknowledgments

This work was supported by BAP Department of Mersin University (Project number: 2017-1-TP2-2256). The study was also presented in 7th World Conference on Educational Technology Researches (WCETR-2017). 20–22 April 2017, AAB College, Pristina, Republic of Kosovo.

REFERENCES

American College of Sports Medicine (2013). *ACSM's guidelines for exercise testing and prescription, 9th ed.* Williams & Wilkins, Baltimore.

Brown, D.W., Balluz L.S., Heath, G.W., Moriarty, D.G., Ford, E.S., Giles, W.H., Mokdad, A.H. (2003). Associations between recommended levels of physical activity and health-related quality of life. Findings from the 2001 Behavioral Risk Factor Surveillance System (BRFSS) survey. *Prev Med. 37*:520–528.

Cengiz, C., Aşçi, F.H. & İnce, M.L. (2010). Exercise stages of change questionnaire: its reliability and validity. *Türkiye Klinikleri Journal of Sports Sciences. 2(1):* 32-37.

Çeker, A., Çekin, R., Ziyagil, M.A. (2013). Regular Physical Activity Stages of Behavior Change in Women and Men from Different Age Groups. [Farklı yaş gruplarındaki kadın ve erkeklerin düzenli fiziksel aktiviteye katılım davranışı değişim basamakları.] *CBÜ Beden Eğitimi ve Spor Bilimleri Dergisi: 8(1)*: 11-20.

Çetinkaya, G. & Ömüriş E. (2017). Examination of outdoor sports activities on ındividuals' positive and negative affect. *Int J Sport, Exer & Train Sci,* Vol 3, Issue 3, 76–85.

Demiral, Y. Ergor, G., Unal, B., Semin, S., Akvardar, Y., Kıvırcık, B., & Alptekin, K. (2006). Normative data and discriminative properties of short form 36 (SF-36) in Turkish urban population. *BMC Public Health, 6*:247.

Douglas, K. A., Collins, J. L., & Warren, C. (1997). Results from the 1995 National College Health Risk Behavior Survey. *Journal of American College Health, 45*, 55-66.

Danylchuk, K. (2007). "Leisure Sport and Sport Entertainment in the University". *Universiade Bangkok 2007 FISU Conference*, 9-12 August 2007 s.49-58.

Fontaine, K.R. & Barofsky, I. (2001). Obesity and health-related quality of life. *Obes Rev. 2*:173–182.

Genc, A., Sener, Ü., Karabacak, H. & Uçok, K. (2011). Investigation of physical activity and quality of life differences between male and female young adults. *The Medical Journal of Kocatepe. 12*: 145-150.

Giannakopoulos, G., Dimitrakaki, C. Pedeli, X., Kolaitis, G. Rotsika, V. Ravens-Sieberer, U., & Tountas, Y. (2009). Adolescents' wellbeing and functioning: relationships with parents' subjective general physical and mental health. *Health and Quality of Life Outcomes. 9*, 7:100

Gorczynski, P. & Faulkner, G. (2010). Exercise therapy for schizophrenia. *Schizophr Bull. 36*(4):665–666.

Hunter Institute of Mental Health (2015). *Prevention First: A Prevention and Promotion Framework for Mental Health.* Newcastle: Hunter Institute of Mental Health.

Morgan, V.A., Waterreus, A., Jablensky, A., Mackinnon, A., McGrath, J.J., Carr, V., Bush, R., Castle, D., Cohen, M., Harvey, C., Galletly, C., Stain, H.J., Neil, A.L., McGorry, P., Hocking, B., Shah, S, Saw, S. (2012). People living with psychotic illness in 2010: The second Australian national survey of psychosis. *Australian and New Zealand Journal of Psychiatry.* 46(8):735-752.

Pan Korur, A. (2010). *Assessment of health care utilization in different sociocultural groups living in the Adana City Center.* Unpublished Doctoral Dissertation, Department of Family Medicine, Faculty of Medicine, Çukurova University.

Sevimli, D., Kozanoglu, E., Guzel, R., & Doganay, A. (2015). The effects of aquatic, isometric strength-stretching and aerobic exercise on physical and psychological parameters of female patients with fibromyalgia syndrome *J. Phys. Ther. Sci. 27*: 1781–1786.

Shah, D., Anupindi, V.R., Vaidya, V., & Holiday-Goodman, M. (2015). Factors affecting health-related quality of life in individuals with depression. *Presented at the ISPOR 20th Annual International Meeting* May 16-20, 2015, Philadelphia, PA.

Tavazar, H., Erkaya, E., Yavaş, Ö., Tez, Ö., Zerengök, D., Güzel, P. & Özbey, S. (2014). The research of the differences between physical activity and life quality in senior high school students (Manisa City example) *Special Issue on the Proceedings of the 3rd ISCS Conference, SI (1)*: 496-510.

US Department of Health and Human Services (2008). *Physical activity guidelines for Americans*.

Ware, J.E., Kosinsky, M., & Keller, S.D. (1995). *SF12: How to Score the SF12 Physical and Health Summary Scales,* 2nd Ed. Boston, MA: The Health Institute, New England Medical Center,

Ware, J.E., Kosinski, M, Turner-Bowker, D.M., Gandek, B. (2008). *User's Manual for the SF-12v2 Health Survey (with a supplement documenting SF-12 health survey).* Lincoln, RI: Quality Metric Incorporated.

WHO (2008). *The global burden of disease: 2004 update,* World Health Organization, Geneva.

WHO (2010). *Global recommendations on physical activity for health.* World Health Organization, Report of a WHO forum and technical meeting, Geneva, 15-17.

CITATION OF THIS ARTICLE

İneçli, Ö.F., & Ziyagil, M.A. (2017). The Relation of Physical Activity to Physical and Mental Health Level in Adolescents. *Int J Sport Exer & Train Sci, 3* (4), 199-205. DOI: 10.18826/useeabd.355110