An Assessment of Physical Activity, Exercise Self-Efficacy Level, and Stages of Behaviour Change among Adolescents in Turkey

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Introduction

Today, the benefits of technological developments, urbanization, continuously changing living conditions, television viewing, electronic games, and time spent on computers reduce daily energy consumption, leading adolescents to a sedentary life [1]. Physical activity levels decrease along with technological advancements while reduced physical activity causes illness and poor health. Insufficient physical activity is considered an important cause of obesity and obesity in turn result in less physical activity, ending up in a vicious circle [2]. According to the data of the World Health Organization (WHO), obesity which is closely associated with physical inactivity and diseases like heart disease and diabetes rank among the top ten causes of deaths. Ischemic heart disease and stroke are the major causes of death worldwide and account for 15.2 million deaths in 2016. In addition, diabetes caused 1.6 million deaths in 2016 [3]. Physical inactivity is also held responsible for 6-10% of cases of coronary heart disease, diabetes, breast cancer and colon cancer and 9% of premature mortality worldwide. WHO estimates that two-thirds of the adolescents in Europe are not sufficiently physically active [4].

Globally, 81% of adolescents aged 11-17 had insufficient physical activity in 2010. Adolescent girls (84%) are less active than adolescent boys (78%). According to WHO, children and adolescents aged between 5 and 17 should do moderate-to-vigorous physical activity.
intensity physical activity for at least 60 minutes on a daily basis [5].

When we look at the physical activity levels in Turkey, we see that the rate of doing regular physical activity in the general population is considerably low. A study titled “Eat Healthy, Protect Your Heart” which was conducted by the Ministry of Health in seven different regions of Turkey found that only 3.5% of Turkish people engaged in physical activity regularly. In other saying, 96.5% of the population fail to do regular physical activity [6]. There have been no studies in Turkey targeting youth at national level, that is, most of them were regional studies. Previous studies found that the rate of inactivity in adolescents was between 26% and 79%. All these figures indicate physical inactivity is very common among adolescents in Turkey [7-9].

Studies have shown that physical activity contributes to the general health state of people and it plays an important role in tackling and treating health conditions such as hypertension, cancer, heart attack, obesity, osteoporosis, and emotional disorders [10,11]. Helping adolescents adopt a physical activity habit is of crucial importance as it is likely for them to practice this behavior in their future life. Unfortunately, adopting a new habit is not an easy process. The Transtheoretical Model of behavior change (TTM), which offers a convenient intervention opportunity in line with a person’s stage of change for physical activity step by step and involves five stages: Pre-contemplation, contemplation, preparation, action, and maintenance [12].

The self-efficacy construct is of central importance to exercise behavior. Based on Bandura’s Social Cognitive Theory (1986), self-efficacy is defined as the confidence individuals have in their ability to execute specific behaviors [13]. The self-efficacy levels of individuals have an impact on their motivation to take action. The studies conducted based on TTM to help individuals build an exercise behavior have determined that self-efficacy of people who were in the pre-contemplation stage was lower, and self-efficacy of those in higher stages of change increased linearly [14,15]. To date, descriptive and interventional studies based on this model have been conducted with adults in Turkey. However, no studies have been found that targeted adolescents [16,17]. In international studies among participants aged 10-16 years, physically active students were found to have higher self-efficacy compared to inactive students. These findings indicated that participation in PA was related to a high level of self-efficacy [18,19].

The school-based context, which is related to opportunities in the physical and social environments of the school relating to PA is a critical variable. It is reported that physical activity self-efficacy is related to physical, social and socioeconomic environments [20]. Identifying self-efficacy levels towards physical activity and exercise in adolescence (a period in which the influence of the environment takes on greater importance) will help raise awareness among adolescents of this issue. As far as public health is concerned, it is an important practice to determine the number of adolescents who are not physically active enough for a healthy life, and take action according to the results. We think that identifying the exercise stages of change among adolescents will guide through future interventions and especially through educational activities targeting them [21].

Nurses in schools can play an active role in school-based physical activity programs. Nurses play an important role in preventing the health problems that may occur in old age by increasing physical activity in schools. They can cooperate with school management, classroom teachers and physical education teachers to raise awareness of the needs of the physical activity program [22].

This study aims to assess the level of physical activity, exercise self-efficacy, and the stages of change for exercise behavior among adolescents.

Methods

The study was conducted as descriptive. The study population consisted of the students attending Muş Anatolian High School (529 students) located in the east of Turkey. No sample selection method was used. The whole of the population was tried to be reached and the study was carried out with 500 students. It was not possible to reach 29 students for various reasons (student leave or disagreeing to participate in the study).

Written permissions for the study were obtained from Muş Provincial Directorate of National Education and ethical approval was taken from Ataturk University Faculty of Health Sciences Ethics Board (Number: 36 and Date: 21.12.2015). Informed consents of the students and their families were obtained before the start of the study. Participation in research was on a voluntary basis.

Data collection

Since the age of the adolescents was small, written consent was obtained from their parents. Adolescents whose consent was received from their families were informed about the study and voluntary participation was provided. The questionnaires were distributed to the adolescents who received the consent form at the time allowed by the school administration, and they were re-collected at the end of the period (20-25 min).

The data for the study were collected using a personal information questionnaire, the Exercise Self-efficacy Scale Questionnaire, and the Exercise Stages of Change Short Form.
Personal information questionnaire: Prepared by the researchers in line with the recent literature, the personal information questionnaire consisted of 8 questions inquiring about the respondents’ age, gender, class standing, socioeconomic status (students were asked how they perceived their socioeconomic status: good, medium or bad), physical activity status, the reasons for not engaging in physical activities, and the most frequently performed physical activities [7,8,14,21].

Exercise Self-efficacy Scale (ESES): Developed by Marcus, et al. and adapted into Turkish by Ay and Temel in 2008, this scale is used to assess the way how individuals perceive themselves in their ability to control their physical activity habits at various levels [16,23,24]. The general Cronbach’s Alpha of the scale was 0.90. The scale consisted of 6 items and used a 5-point Likert-type scale. The respondents were asked to choose a score from 1 to 5 that indicates their degree of confidence in their ability to engage in exercise in a certain situation. The highest score that a person could receive from the scale was 30 and the lowest score was 6. Exercise self-efficacy of individuals increases while their mean scale score becomes higher.

Exercise stages of change short form: This scale was developed by Marcus, et al. and was subsequently adapted for Turkish people by Ay and Temel in 2008. The scale consists of five questions which reveal a person’s stage of change. These stages are, in order, pre-contemplation, contemplation, preparation, action, and maintenance [16,23,24].

International Physical Activity Questionnaire-Short Form (IPAQ-SF): Developed by Craig, et al., the questionnaire was tested for validity in Turkey by Saglam, et al. in 2010 [25,26]. This questionnaire collects data on the time people spent while doing low, moderate and vigorous-intensity physical activities. A separate question is asked about the time spent sitting.

The questionnaire inquired about the time respondent spent doing following activities in the last 7 days:

1. Vigorous physical activity (basketball, football, fast cycling, heavy lifting, etc.) amount (min),
2. Moderate physical activity (carrying light loads, dancing, table tennis, bowling, etc.) amount (min),
3. Walking and daily sitting time (min).

The time spent doing physical activities was converted into Metabolic Equivalent of Task (MET), which corresponds to the Basal Metabolic Rate, then the total physical activity score (MET-min/week) was calculated.

- Vigorous activity score (MET-min/week) = 8 × vigorous activity time × days of vigorous activity
- Moderate activity score (MET-min/week) = 4 × moderate activity time × days of moderate activity
- Walking score (MET-min/week) = 3.3 × walking time × days of walking
- Total physical activity score (MET-min/week) = Walking + moderate activity + vigorous activity score

The physical activity levels of respondents are classified as low, moderate and high depending on their total physical activity scores.

Physical Activity Levels
1. Low level: Less than 600 MET-min/week
2. Moderate level: Between 600-3000 MET-min/week
3. High level: More than 3000 MET-min/week

Data analysis
Statistical analysis was performed using SPSS software (version 17). Mean percentages, min and max values were calculated and Kruskal Wallis test was used to analyze the data. The Shapiro-Wilk test was used to assess the normal distribution and the Mann Whitney U test was applied for advanced analysis.

Results
Of the adolescents surveyed, 55.4% were male, 36.8% were 11th grade students and 66.6% had moderate socio-economic status. The rate of adolescents who engaged in physical activity was 56.6%. A majority of those who did not engage in any physical activity (37.2%) indicated unfavorable conditions as a reason for their inactivity. Walking was the most common (82.8%) physical activity among the adolescents.

The distribution of adolescents by physical activity and exercise stage of change is presented in Table 1.

The distribution of the international physical activity and mean self-efficacy scores of adolescents is presented in Table 2.

Table 1: The distribution of adolescents by physical activity and exercise stage of change.
he results of this study which aimed to assess the level of physical activity, exercise self-efficacy and stages of change for exercise behavior among adolescents are discussed with respect to previous studies and current literature.

In this study, 56.6% of the adolescents reported that they engaged in physical activity. Another study conducted with adolescents found that 27.8% of adolescents involved in regular exercise [27]. Previous studies showed that participation in physical activity was at a moderate level [28]. According to the WHO (2015), 20% of adolescents have a sufficient level of physical activity [29]. Contrary to other study results and literature, more than half of the adolescents in our study responded positively to the question “Do you engage in any physical activity?” However, the distribution of the international activity scores of the adolescents showed that slightly more than one-third of them (37.6%) had a moderate physical activity level (Table 1). When we look at the distribution of exercise stages of change among the adolescents, we can see that more than one-third of them (36.4%) were in the pre-contemplation stage and only 35.6% reported that they did regular physical activity at the desired level (action stage: 18.8%, maintenance stage: 16.8%). This can be explained by the fact that the adolescents considered themselves physically active, but when it comes to their state of doing regular physical activity at the desired level (exercise stages of change), it indicates that their performance was inadequate (as most of them were in the pre-contemplation stage).

In this study, the respondents indicated the following reasons for their physical inactivity: unfavorable conditions (37.2%), lack of time (33.5%), and unwillingness (29.3%). A similar study with adolescents listed the following reasons for inactivity: Unwillingness, having no friends to do physical activity together, lack of time, dangerous environment, challenges faced and low self-sufficiency [30]. In accordance with our results, previous studies have identified the lack of favorable conditions (physical environment) and time, and unwillingness as grounds for inactivity.

A review of the physical activities reported in the study showed that the most engaged physical activity among adolescents was walking with a rate of 82.8%. Another study with adolescents also found that walking was the most widely done activity with 45.8% [7]. Walking has a significant impact on the quality of life, and it is also the easiest and cheapest one among physical activities [7]. Similar to our study findings, previous studies in the literature have reported that walking is the most frequently engaged physical activity and preferred for being easy and cheap [7]. Due to the physical conditions of the province where the study was conducted, schools are mostly located in a short distance to the dwellings. The ease of walking and the absence of a requirement for driving to school are thought to be the reasons why adolescents are engaged in the walking activity at a high rate.

The data on the stages of change for exercise behavior among the adolescents showed that they were in the pre-contemplation stage with a rate of 36.4% (Table 1). We found that more than one-third of the adolescents were in the pre-contemplation stage (currently not exercising and no intention of starting exercising regularly within the next 6 months) and only 35.6% of them (action stage: 18.8% + maintenance stage: 16.8%) did regular physical activity at the desired level. The large number of adolescents who are in the pre-contemplation stage in our study suggests that a considerably large proportion of the adolescents lead a sedentary lifestyle and may continue to live so in the future.

In the study of Kim, et al., 54.6% of Korean adolescents being inactive (precontemplation or contemplation) or exercise irregularly (preparation) [31]. A study conducted with adolescents in New Zealand found that the adolescents were mostly in the

| Table 2: The distribution of the mean self-efficacy scores of adolescents. |
|---------------------|-----|----------|----------|----------|----------|
|                      |  N  |  Min    |  Max     |  Mean    |  SD       |
| Total physical activity score | 500 | 4.00    | 23609.50 | 2550.49  | 2821.50  |
| Self-efficacy         | 500 | 6.00    | 30.00    | 13.64    | 6.06     |

Physical activity score (MET-min/week) was calculated.

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<th>Table 3: A comparison of mean exercise self-efficacy score by exercise stage of change and physical activity level.</th>
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Discussion

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preparation stage with a rate of 40.8% [32]. We can see that the findings related to the stages of change for exercise behavior generally differs between studies conducted with different groups both in Turkey and other countries. Although the adolescents in our study were physically active at a moderate level, unfortunately, more than one-third of them (36.4%) did not do regular exercise nor intend to start exercising within the coming 6 months (pre-contemplation stage).

More than one-third of adolescents in the present study (37.6%) had a moderate physical activity level (Table 1). In most of the studies conducted with adolescents, the activity level of adolescents was found to be at a low level [27,28]. The results of the existing studies conducted with adolescents show that youth is in general insufficiently physically active.

The mean exercise self-efficacy score of the adolescents surveyed was found to be 13.64 ± 6.06 based on 6–30 points score assessment (Table 2). A study with adults identified the mean exercise self-efficacy score as 2.43 ± 0.98 [33]. In an interventional study, the mean self-efficacy score before the intervention was found to be 14.32 ± 4.15 in the treatment group and 13.81 ± 4.65 in the control group [17]. The self-efficacy level of individuals is an influential factor in their motivation to take action. The mean self-efficacy score was found to be at a moderate level in our study, which is also supported by the result that they reported a moderate level of physical activity.

The results of the International Activity Questionnaire showed that the mean total activity score was 2550.49 ± 2821.50 MET-min in the adolescents in the present study (Table 2). The mean total activity score was found to be 4685.18 ± 5454.42 MET-min in another study [34].

The difference between the exercise stages of change of the adolescents and their mean self-efficacy scores was significant (Table 3). It has been identified that the exercise self-efficacy scores increased from the pre-contemplation through the maintenance stage. The results of many studies based on the Transtheoretical Model show that there is a significant positive correlation between the stages of change for exercise behavior and the exercise self-efficacy score [14,15,17,35]. The literature on the exercise stage of change has demonstrated that the self-efficacy of individuals in the pre-contemplation stage is low, and the self-efficacy of those in higher stages of change increases linearly [36]. The results of the current study are similar to the other research findings and the current information in the literature [18,19].

This study has found that the mean self-efficacy score of the adolescents increased linearly as their physical activity level increased from low to high. The self-efficacy of individuals is an influential factor in their motivation to take action. We have not found any study comparing individuals’ self-efficacy levels to their International Physical Activity Questionnaire scores. In the present study the fact that more than one-third of the adolescents were moderately active while having moderate mean self-efficacy score supports this result.

Conclusions

This study has found that there was an increase in the mean self-efficacy scores of the adolescents as their exercise stages of change and their physical activity levels became higher. Of the students surveyed, 37.6% had self reported moderate physical activity levels. We also found that more than one-third of the adolescents were in the pre-contemplation stage, which means that they did not exercise currently and had no intention of beginning to exercise within the next six months. Moreover, most of the adolescents who engaged in exercise were found to have a moderate level of physical activity. In view of these results, we recommend that nurses provide training programs for students, parents and teachers to increase the level of physical activity of adolescents. They should try to increase the level of self-efficacy of adolescents in their education. These training programs should be designed considering the stages of change among adolescents.

Limitation

A limitation of this study is that it only included students of a high school during the 2015-2016 academic year in Turkey at this school.

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Conflict of Interest

There is no financial support for our research and there are no conflicts of interest between the authors.

References


12. Transtheoretical model: Stages of change.


