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Turkish Adaptation of Healthy Habits Questionnaire for Adolescents: Diet, Physical Activity, Screen Time, and Sleep Habits

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ABSTRACT

Objective: The main purpose of this study was to adapt the adolescent Healthy Habits Questionnaire (HHQ) to the Turkish language and to test its validity and reliability. The study was also examined the diet, physical activity, screen time, and sleep habits of adolescents.

Methods: This study is a methodological and descriptive design. The sample of the research consists of 320 students. The validity of the HHQ was evaluated by the content validity index, the reliability by test-retest correlations, and the kappa coefficient of agreement. Number and percentage values were used for descriptive features.

Results: The content validity index of HHQ was found to be 0.96. The test-retest correlations of questions containing continuous variables were found to be between 0.44 and 0.91. Kappa values of questions containing categorical variables were between 0.7 and 0.94. It was found that 91.8% of the adolescents consumed less than three servings of vegetables, 76.9% of them consumed less than 2 servings of fruit, and 80.5% of them consumed less than 2 glasses of milk. In addition, it was determined 40.2% of the adolescents used screen use more than two hours, 47.6% did less than one hour of physical activity and 30.2% slept less than eight hours.

Conclusion: HHQ was found as a valid and reliable measurement tool. It was determined that the adolescents did not consume enough vegetables, fruits, water, and milk and did not engage in sufficient physical activity.

Keywords: Adolescence, fruit, screen time, sleeping, vegetable.

1. INTRODUCTION

Adolescence is a period between the ages of 10-19, from childhood to adulthood a rapid change is experienced in terms of physical, psychosocial, and cognitive aspects (1). This period is very significant when adolescents are open to preventable health problems and determine their health behaviors (1,2).

Many chronic health problems such as obesity, Type 2 diabetes, hypertension, and cardiovascular diseases are associated with sedentary life and unhealthy eating habits. There are approximately 41 million adolescents in the world (3). According to the data from the Centers for Disease Control and Prevention obesity rate increased from 15% to 19% (4). Parallel to the increase in obesity, the incidence of diseases such as Type 2 diabetes and hypertension in children and adolescents is increasing (3). In a study, it is stated that 20% of overweight and obese adolescents have lipidemia and 25% have diabetes in the literature (5).

It is quite significant to determine sedentary life and unhealthy eating habits in childhood and adolescence to prevent and reduce chronic health problems (6). Valid and reliable measurement tools that determine healthy habits are needed in the Turkish literature. One of these measurement tools is the Healthy Habits Questionnaire (HHQ). There are English and Spanish versions of the questionnaire including diet, physical activity, screen time, and sleep habits. There are two different forms of the questionnaire used for ages 2-9 and ages 10 and older (7). The HHQ can be used in clinics, family health centers, and schools. It has been stated that the questionnaire, which has been used in many studies abroad, is a measurement tool that is easy to use and can be adapted to all segments of society (8–11). The main purpose of this study was to adapt the HHQ (10 ages and over) to the Turkish language and culture and to test its validity and reliability. The study also examined the diet, physical activity, screen time, and sleep habits of adolescents.

2. METHODS

This study is a methodological in terms of adapting HHQ to the Turkish language and a descriptive study in terms of examining the healthy habits of adolescents. Permission was obtained via e-mail from the author who developed the HHQ for the study. Ethical approval was obtained from the University Health Sciences Institute Ethics Committee, written permission from the Istanbul Provincial Directorate of National Education, and consent from the students' parents.

The population of the research consisted of students studying in a secondary school located in the Gaziosmanpaşa district of Istanbul. The sample of the study was students are 5th 6th 7th and 8th grades that were chosen from eight classrooms by using the cluster sampling method. It consisted of 320 students studying in eight classes randomly selected from the 5th and 8th grades.

In the study, a pilot test was applied to 118 students with similar sample characteristics. Students who underwent the pilot test were not included in the study.

Data were collected in their classrooms over a period of about 10 minutes based on students' self-report. Data collection tools are sociodemographic form consisting of gender, age, class questions, and HHQ.

2.1. Healthy Habits Questionnaire (HHQ)

HHQ is a measurement tool that evaluates diet, physical activity, screen time and sleep habits in adolescents aged 10 and over that is developed by the Maine Health Organization in the United States, the validity and reliability analysis findings of the questionnaire are not available. The questionnaire is significant in terms of evaluating obesity risk factors (8). It is easy to use in public health fields and schools (8,12,13). HHQ consists of 10 questions. The questionnaire includes five questions about nutrition, one question about sleep, two questions about screen time, and one question that measures physical activity. Eight of these questions are open-ended questions containing numerical values, and one of them is the type of question with two options (There is/ no TV, tablet, or smartphone in the bedroom). The tenth question is a multiple-choice question about the habits that the adolescents want to change in their own life, and the adolescent is asked to mark the habit that wants to change. Survey questions are evaluated with percentage and median values, there is no scoring scale. In this study, in line with the literature, for adolescents; daily three servings of vegetables, two servings of fruit (14) eight glasses of water (15), and two glasses of milk (16) are determined as the limit. In addition, screen time is determined as maximum two hours, physical activity duration at least one hour, and sleep duration at least 8 hours (17,18). It is recommended that daily sugary drinks (fruit juice, carbonated drinks) should not be consumed at all (19).

2.1.1. Translation and Cultural Adaptation

The English form of Healthy Habits Questionnaire was translated into Turkish by two linguists. The Turkish forms were evaluated by the researchers and they were found to be similar in meaning. It was sent to two linguists independent of the first for back-translation. The back-translated English form was compared with the original questionnaire and found to be similar in meaning.

2.1.2. Content Validity

For content validity, 10 experts from the fields of public health nursing and nutrition dietetics were consulted. Experts rated each item on a scale of 1-4 (1: not appropriate, 2: somewhat appropriate, items \ expressions need to be adjusted properly, 3: quite appropriate, but minor changes required, 4: very appropriate).

2.1.3. Reliability

The test-retest method was used to assess time stability on questionnaire. The test-retest was conducted with 104 students at two – week intervals.

2.2. Data Analysis

Statistical Package for the Social Sciences (SPSS) 20 program was used for data analysis. The validity of the questionnaire was evaluated with the content validity index (CVI), and its reliability was evaluated with the test-retest. Test-retest evaluation was done with the kappa test for categorical variables and Spearman correlation for continuous variables.

Adolescents' habits were evaluated with median, interquartile range, and percentage.

3. RESULTS

3.1. Findings Related to Validity

It was determined that 10 experts, whose opinions were taken for content validity, gave three and four points to all items and the CVI was 0.96. In line with the suggestions of the experts, corrections were made in questions 1, 2, 3, and 4 without changing the meaning.

3.2. Pilot Test

After the pilot test with 118 students, it was determined that the questionnaire was filled in approximately five minutes and there were no questions left blank. Except for the two questions in the questionnaire, it was determined that the questions were understood. Two questions that needed editing were questions one and six. For a better understanding of the students, examples of fruit and vegetable (F&V) servings were added to the explanation part of the first question asking about daily F&V consumption. In addition, the question was arranged as two separate questions, 1a vegetable and 1b fruit,

and six options (0: does not eat at all-5: five servings or more) to limit the extreme values. The sixth question, asking about the presence of a screen in the bedroom, was asked separately as TV, computer, tablet, and smart phone.

3.3. Findings Related to Reliability

The test-retest correlations of questions containing continuous variables were found to be between 0.44 and 0.91. Kappa values of questions containing categorical variables were found to be between 0.7 and 0.94 (Table 1).

Table 1. Test-retest results of categorical and continuous variables in the Healthy Habits Questionnaire

Variables		r	Kappa	P
M1a	Number of fruit servings consumed per day	0.58	-	<.001
M1b	Number of fruit servings consumed per day	0.44	-	<.001
M2	Number of dinners with family in a week	0.96	-	<.001
M3	Number of breakfasts in a week	0.77	-	<.001
M4	Number of meals taken out in a week	0.91	-	<.001
M5	Screen time per day	0.66	-	<.001
M6a	TV in the bedroom	-	0.70	<.001
M6b	Computer in bedroom	-	0.86	<.001
M6c	Tablet in the bedroom	-	0.94	<.001
M6d	Smartphone in the bedroom	-	0.78	<.001
M7	Night time sleep duration	0.49	-	<.001
M8	Daily physical activity time	0.50	-	<.001
M9a	100% fruit juice consumed daily	0.68	-	<.001
M9b	Daily water consumed	0.88	-	<.001
M9c	Daily consumed instant/canned fruit juice and sports drink	0.77	-	<.001
M9d	Daily consumed milk	0.73	-	<.001
M9e	Fizzy drinks or fruit cocktails consumed daily	0.52	-	<.001
M9f	Daily consumption of skim milk	0.62	-	<.001
*p<.001 r: Spearman's correlation				

3.4. Findings on Introductory Features and Health Habits

The mean age of the adolescents was 12.5±1.16 and 60.3% were male. 26.3% of the adolescents were in the 8th grade (Table 2).

Table 2 Adolescents' sociodemographic characteristics

Variables		min-max	Average
Age		10-14	12.5±1.16
		n	%
Gender	Female	127	39.7
	Male	193	60.3
Class	5th grade	81	25.3
	6th grade	80	25
	7th grade	75	23.4
	8th grade	84	26.3

The median fruit servings consumed daily by adolescents was two, and the median vegetables was one. The median eating dinner and having breakfast with the family within a week was found to be seven. The median 100% fruit juice, water, whole milk, and skim milk per day was determined as one glass (Table 3).

Table 3. Adolescents' servings of fruits & vegetables, drink, consumed daily and eating habits according to HHQ

Variables	Median (IAA difference)
Number of fruit servings consumed per day (min 0 max 5)	2 (1 serving)
Number of vegetable servings consumed per day (min 0 max 5)	1 (1 serving)
Daily consumed vegetables and fruits (min 0 max 14)	3 (1 serving)
Number of dinners with family in a week (min 0 max . 7)	7 (2 times)
Number of breakfasts in a week (min 0 max 7)	7 (5 times)
Number of meals taken from outside in a week (min 0 max 8)	1 (1 time)
Daily drink (glass of water)	
100% juice (min 0 max 9)	1 (1 glass)
Water (min 0 max 10)	6 (5 glasses)
Ready / canned fruit juice and sports drink (min 0 max 9)	0 (1 glass)
Whole milk (min 0 max 9)	1 (1 glass)
Fizzy drink or fruit cocktail (min 0 max 10)	1 (1 glass)
Skimmed, low-fat (1%) or reduced-fat (2%) milk (min 0 max 5)	1 (1 glass)
HHQ: Healthy Habits Questionnaire	
IAA: Interquartile range difference (0.75-0.25)	
(1 glass=200 ml)	

The median daily screen time was two hours. It was determined that 73.4% of the students had an electronic media device in their bedroom (Table 4).

Table 4. Adolescents' physical activity, screen and sleep time, and habits they want to change, according to HHQ

Variables	Median (IAA difference)	
Daily screen time (min 0 max 10)	2 (1.5 hours)	
Daily physical activity time (min 0 max . 8)	1 (1 hour)	
Night time sleep duration (min 0 max 10)	8 (2 hours)	
No electronic media device in the bedroom (television, tablet, computer, smartphone)	n	%
Yes	235	73.4
No	85	26.6
The habit they want to change		
Sleeping more	74	24.8
Being more active – exercising more	62	20.8
Using TV or a tablet/smartphone	49	16.4
Drinking more water	38	12.8
Eating more often with your family	26	8.7
Eating more fruits and vegetables	24	8.1
Eating less takeout	15	5
Drinking fewer sodas, instant juices, or fruit cocktails	10	3,4
HHQ: Healthy Habits Questionnaire		
IAA: Interquartile range difference (0.75-0.25)		
(1 glass=200 ml)		

When asked about the habits they want to change; 24.8% of the adolescents stated that they want to sleep more, 20.8% stated that they want to be more active-exercise more,

and 16.4% spend less time watching TV or using a tablet/ smartphone (Table 4).

It was determined that 91.8% of the adolescents consumed less than 3 servings of vegetables, 76.9% of them consumed less than two servings of fruit, and 72.5% of them consumed less than five servings of F&V. It was determined 66.4% of them consumed less than 8 glasses of water and 80.5% of them consumed less than two glasses of milk (Table 5).

It was found that 31.7% of the adolescents had dinner with their families weekly, and breakfast frequency was less than seven days in 37.1%. It was determined that 86.1% ate out at least once a week. It was determined that 40.2% of them had a screen usage time of more than two hours, 47.6% of them had less than one hour of physical activity, and 30.2% of them had less than eight hours of sleep (Table 5).

Table 5 Health habits of adolescents according to the limit value stated in the literature

Variables	Limits	n	%
Daily consumption of vegetables	< 3 servings	293	91.8
	≥ 3 servings	27	8.2
Fruit consumption	< 2 servings	246	76.9
	≥ 2 servings	74	23.1
Fruit and vegetable consumption	<5 servings	232	72.5
	>5 servings	88	27.5
Daily water consumption	<8 glasses	193	66.4
	≥8 cups	127	33.6
Daily milk consumption	<2 cups	236	80.5
	≥ 2 glasses	84	19.5
Daily consumption of sugary drinks	=0 glass	90	28.4
	≥ 1 glass	230	71.6
Dinner with family in a week	<7 days	101	31.7
	=7 days	209	68.3
Number of days with breakfast in a week	<7 days	118	37.1
	=7 days	202	62.9
Food consumption in a week	< 1 time	44	13.9
	≥ 1 time	276	86.1
Daily screen time	<2 hours	198	59.8
	>2 hours	122	40.2
Daily physical activity	<1 hour	151	47.6
	>1 hour	169	52.4
Night time sleep duration	<8 hours	95	30.2
	>8 hours	225	69.8

4.DISCUSSION

This study, conducted with 320 adolescents to adapt the adolescent healthy habits questionnaire to the Turkish language and to test its validity and reliability, showed the Turkish version of the HHQ is a valid and reliable tool. It was found 91.8% of the adolescents' vegetables consumption, 76.9% of their fruit consumption daily, 66.4% their daily water amount, 30.2% of their sleep time, 47.6% of their physical activity time were insufficient. Also, 40.2% of the adolescents' daily screen time, 86.1% of their fast food consumption was above the recommended level.

Content validity is the main validity criterion that should be done first in data collection tool adaptations. It shows to what extent the questions define the concept to be evaluated (20).

In this study, the content validity index of the HHQ in adolescents was found to be 0.96. In the literature, it is stated that the content validity index value should be 0.80 and above (20). It was determined the content validity of the Turkish HHQ was at a high level.

In this study, the test-retest method was examined to show the invariance of the questionnaire items over time. In the literature, the interval between two tests is recommended to be two to four weeks. Test-retest correlation of 0.40 is stated as an acceptable level (21). In this study, the test-retest correlations of the questionnaire items made with a two-week interval were found to be within acceptable limits between 0.44 and 0.91.

Since the types of questions in the questionnaire are in different forms, internal consistency cannot be evaluated (eight questions are open-ended, one question is two-choice, and the other is multiple-choice).

In this study, it was determined that approximately two out of three adolescents did not consume the five servings of F&V recommended by the CDC, and the median F&V consumption was three servings (vegetable one, fruit two) (14). Similar to our results in a study conducted by Laska et al. in Minnesota, F&V consumption median of adolescents aged 11-19 was found to be three portions (22). In a study conducted by Gur et al. in Istanbul, the median of vegetable consumption was found to be 1.3 servings and fruit consumption as 1.1 servings (23). These results were shown the inadequacy of F&V consumption in adolescents is a significant level. Since vegetables and fruits are rich in vitamins, minerals, and fiber, they are especially important for health (24). In this study, daily F&V consumption of 72.5% of adolescents was found to be insufficient. Similarly, in a study conducted by Sidoti et al. 37% of the sample stated that they rarely consume F&V (25). In another study, it was reported that 24.96% of adolescents consume fruit once a day, 17.95% consume fruits twice a day, and vegetable consumption is at most once a day (26). These results support that F&V consumption is a problem for a large group of adolescents and emphasize the necessity of programs to increase F&V consumption. Programs and interventional studies are recommended to increase the consumption of F&V. In addition, public and institutional policies are needed to increase F&V consumption. In order to increase F&V consumption, it is recommended to sell F&V in the canteen, to include F&V in school meals, and to keep F&V at home as prepared.

The median adolescents' eating dinner with their families was seven days per week in this study, however, 68.3% of the adolescents reported that they did not eat dinner with their families seven days a week. In a study conducted by Wong et al. in Hong Kong, 55.6% of adolescents reported that they ate dinner with their families every day (27). In a study conducted by Berge et al. in Minnesota, when asked about eating dinner

with their families per week, 43% of adolescents stated that they ate five or more times a week (28). In a study conducted by Akman et al in Istanbul, 68.4% of adolescents stated that they ate together with their families (29). Study results show that adolescents mostly eat dinner with their families. Eating with the family is significant in terms of preventing obesity and protecting physical and mental health in adolescents (28). Therefore, school nurses can encourage adolescents and their families to have dinner together regularly.

It was determined that the median weekly consumption of breakfast of adolescents was seven day in this study, however, 37.1% of adolescents did not consume breakfast every day. In a similar study conducted by Olatona et al. in Nigeria, only 56.7% of adolescents stated they had daily breakfast (30). In a study conducted by Colak and Ergun in Istanbul, it was reported that 76.6% of adolescents had breakfast (31). Similarly, in a study conducted by Gökler et al. in Eskisehir, it was stated that only 37.6% of adolescents had breakfast (32). In our study, the rate of adolescents who had breakfast was found to be higher than the studies conducted in Nigeria and Eskişehir. However, our results are similar to the study conducted in Istanbul. It is thought that the regional and socioeconomic level differences may cause the frequency of having breakfast to be different. In this study, although the majority of adolescents eat breakfast, the rate of adolescents who do not have breakfast is high. These results show that there is a need for this topic of health education for adolescents who do not have regular breakfast habits.

In this study, 86.2% of the adolescents received outside food/fast food at least once a week. In a study of adolescents living in 54 low – and middle-income countries conducted by Li et al. it was reported that 55.2% of them had food/ fast food taken out at least once a week (33). In a study conducted by Koca and Arkan in Izmir, it was reported that 88.2% of adolescents consume fast food (34). It is recommended to conduct education programs to reduce fast food consumption in adolescents.

The median daily screen time of adolescents was two hours in our study. In addition, 40.2% of the adolescents in our study had a daily screen time above the recommended limit of two hours. According to the data of the American Academy of Child and Adolescent Psychiatry, the time that adolescents spend in front of the screen can increase by up to nine hours (35). In a study conducted by Nagata et al. in the USA, the time spent by adolescents in front of the screen was found to be 2.42 hours (36). These results are similar to our study. These results show the need for educational programs for adolescents and their families with more than two hours of daily screen time.

In this study, it was determined that 73.4% of the students had an electronic media device in their bedroom. In a study conducted by Tezol in Mersin the adolescents living, 56.3% of adolescents stated that there is a television and computer in their bedroom (37). In a study conducted by Gilbert-Diamond et al. in the USA, it was stated that 64.5% of adolescents had a television in their bedroom (38). The presence of

an electronic media device in the bedroom of adolescents makes it possible to use the screen before sleep. In the literature, there are studies on the negative effects of screen use time on sleep time (39). For this reason, it is important that electronic media devices are not used in bedrooms, and it is recommended to keep banners and posters in schools and implement educational programs.

In this study, it was determined that the median sleep duration was eight, and 30.2% of the adolescents slept less than the recommended sleep duration. Similarly, in a study conducted by Tezol in Mersin province, it was stated that the sleep duration of adolescents was eight hours (37). In a study conducted by Bay and Ergun in Istanbul, the median sleep duration was found to be seven hours (40). Similarly, in a study conducted on adolescents in Sweden, the median sleep duration was found to be 7.75 (41). According to the Centers for Disease Control and Prevention, the ideal sleep time for adolescents is 8-10 hours (18). These results indicate there is a significant number of adolescents with insufficient sleep duration. Programs to increase sleep duration are recommended for these groups.

The physical activity duration of 47.6% of the adolescents was found to be less than one hour which is the daily recommended limit in this study. In a study conducted by Kandola et al. in England, 79% of adolescents were reported to be inactive (42). In a study conducted by Yilmazel and Bozdogan in Çorum, it was stated that 72.9% of adolescents are inactive (43). Sedentary life causes various physical and mental problems such as obesity. Therefore, there is a need for programs that support adolescents to be physically active. In addition, there is a need for developing the health policies. The designed bike lanes and parks should be increased. For this, intersectoral cooperation is significant. Different sectors (health care, transportation/planning, parks/public spaces, and school) can create a physical activity policy that can impact physical activity.

In this study, 66.4% of the adolescents had insufficient water consumption to be less than eight glasses (1600 ml). In a similar study conducted in Çorum, 70.7% of adolescents were found to consume insufficient water (43). Similarly, in the HELENA study conducted in eight European cities, the daily amount of water consumed by adolescents was stated as 788 ml (44). In a study conducted by Franken et al. in the Netherlands, the median daily consumption of water was stated as three glasses (45). These results show that the water consumption of adolescents is below the recommended amount. Increasing the consumption of water by limiting the consumption of sugary drinks is extremely important for the protection of adolescents from chronic diseases such as Type 2 diabetes and hypertension (45). For this reason, it is recommended that education programs to increase water consumption be implemented in schools. At the same time, it is necessary to develop policies that allow adolescents to consume water free of charge at school. Also, in this study, the consumption of sugary drinks was found to be above the recommended limit. 77.1% of adolescents consumed at least

one glass of sugary beverage per day. Similarly, in a study conducted in the Netherlands, the median daily consumption of sugary beverages consumed by adolescents was stated as 1.1 glasses (45). In a study conducted by Gur et al. in Istanbul, it was reported that 76.6% of adolescents consumed instant fruit juice, and 77.71% consumed carbonated beverages (31). Consumption of sugary drinks causes dental caries, Type 2 diabetes, and obesity in adolescents (45). It is stated in the literature that water consumption has a positive effect on the weight management of adolescents (46). For these reasons, limiting the consumption of sugary drinks with low vitamin and mineral content and unnecessary calories and increasing water consumption is extremely significant for the protection of adolescents from chronic diseases such as obesity, Type 2 diabetes, and hypertension.

Milk consumption of 80.5% of the adolescents was found to be less than the recommended two glasses per day and the median milk consumption was one glass and insufficient in this study. Similarly, in a study conducted by Lee et al. in Korea, it was stated that the rates of milk consumption were low and only 14.7% of male adolescents and 8.1% of female adolescents consumed two glasses or more of milk (47). In a study conducted by Tucker et al.in the USA, the median milk consumption was stated as 0 cups (13). In a study conducted in Corum, it was stated that 78.8% of adolescents consumed less than two glasses of milk (43). Milk and dairy products are essential nutrients that must be consumed adequately at all ages. Therefore, education programs are needed to increase milk consumption in adolescents. Besides, it is recommended that the school milk program, which has been implemented since 2016 to support the milk consumption of children in kindergarten and primary schools, be extended to include adolescents.

When asked about the habits they want to change; 24.8% of the adolescents stated they sleep more, 20.8% are more active-exercise, and 16.4% spend less time watching TV or using a tablet/smartphone. Similar to our study results, in a different study conducted on adolescents by Aslan in Ankara, when asked about the behaviors they want to change, they answered eating too much junk food, drinking little water, doing insufficient physical activity, not being able to communicate adequately with friends, going to bed late, playing too many computer games (48). These results are an important finding showing that adolescents are aware of their unhealthy behaviors. For this reason, it is thought that programs that include helping to change behavior rather than knowledge and awareness educational programs will be more useful.

5. CONCLUSION

HHQ was found to be a valid and reliable measurement tool that can be used in adolescents over the age of 10, including diet, physical activity, screen time, and sleep habits. The questionnaire can be used by nurses and other health professionals working in primary care, pediatric clinics, and schools.

In addition, according to our study results evaluated with HHQ, approximately two-thirds of adolescents were found to have insufficient consumption of vegetables, fruits, water, and milk. In addition, nearly half of the adolescents had more than two hours of screen time and less than one hour of physical activity. Approximately one-third of adolescents had insufficient sleeping time. In line with these results, school-based behavior change programs are recommended for adolescents to gain healthy habits.

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