RESEARCH ARTICLE

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Psychometric Properties of the Turkish Version of the Adolescent Health Promotion Scale: Short Form

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Abstract

BACKGROUND/AIMS: This study was conducted with the aim of testing the psychometric properties of the Adolescent Health Development Scale-Short Form in Türkiye as a methodological study.

MATERIALS AND METHODS: This study included 814 students attending grades 7 to 11 in three different secondary schools and two different high schools selected out of secondary and high schools located in Western Türkiye which were attached to the Directorate of Education of İzmir Province and it used simple random sampling method. The data from this study were evaluated using percentage, mean analysis, and validity-reliability analysis.

RESULTS: The total Cronbach's alpha coefficient of the Turkish scale was 0.85. Strong correlations were found between test and re-test (r=0.85, p<0.001). The results of Confirmatory Factor Analysis revealed that the model fit index of the scale had a goodness-of-fit index of 0.95 and a comparative fit index of 0.97.

CONCLUSION: Validity and reliability analyses demonstrated that the scale was a valid and reliable means of measurement which can be used to determine the health promotion behaviors of adolescents in a Turkish sample.

Keywords: Health promotion, adolescents, psychometrics

INTRODUCTION

The World Health Organization (WHO) defines the age group 10 to 19 as the "adolescent period" and reported that adolescents make up 20% of the world population.[1] According to WHO data, there are approximately 1.2 billion adolescents in the world. In particular, in some countries, one-fourth of the population is made up of adolescents, and this number is expected to increase gradually until 2050. According to data from the Türkiye Demographic and Health Survey,[2] the number of children under 15 years of age makes up 15% of the total population, and the proportion of adolescents aged 10 to 19 constitutes 16% of the population in Türkiye.

The adolescent period is one of rapid development in terms of physical, psychological, and social aspects; however, it is also a period of

opportunity in which positive behaviors become habits.[3] The ability of adolescents, who are regarded as the future of societies, to maintain their health in this development period is an important determinant of their individual and social development. Therefore, determining the health promotion behaviors of adolescents is crucial.[4]

Health promotion is defined as the increasing control over an individual's health and improving their health.[5] It focuses on promoting individual abilities and skills, as well as changing social, environmental, and economic conditions affecting the health of individuals and society. Health promotion in adolescents seeks to improve their control over their health, thereby reducing diseases and improving their quality of life in all health-related aspects.[4] During the transition from childhood to adulthood, adolescents form behavioral patterns and make lifestyle choices which affect their health in the future.[6] In particular, health

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problems and risky health behaviors (such as smoking and alcohol use) which emerge during adolescence affect the physical and cognitive development of adolescents.[4] Adolescents may exhibit some risky health behaviors. For example, normally preventable risk behaviors such as tobacco use, unhealthy food or snack consumption, alcohol consumption and other drug use, and inadequate physical activity occur frequently during adolescence and continue to prevail in adulthood and thus cause health problems. These risky health behaviors may adversely affect the health of both adolescents and young adults, and they may develop serious health problems (such as violence, substance abuse etc.).[7] Furthermore, studies have shown that these health problems also lead to serious financial burdens.[8,9]

According to a previous Youth Risk Behavior Surveillance System (2017) report, 14.8% of adolescents aged 10 to 24 were obese, 29.8% were alcohol users, 19.8% were substance users, 8.8% smoked, and 13.2% were electronic cigarette users; furthermore, 19% experienced bullying and 7.4% had attempted suicide in the previous year.[7] In addition, according to the WHO (2016)[10] report, more than 80% of adolescents did not perform any physical activity, and the obesity rate among adolescents had increased 10-fold over the last 40 years. Additionally, adolescents mostly skipped their breakfast meals. A study conducted in the USA found that one out of every 10 adults using cigarettes started smoking before the age of 18, and every day, 2,000 children under the age of 18 have their first cigarette experience, and more than 300 of these children became active smokers. Studies have also found that one in four children had a chronic disease (diabetes, epilepsy, etc.), with an obesity rate of 20.6%, particularly in adolescents.[11]

Studies have revealed that these behaviors seen in adolescence constitute a risk in adulthood. For example, the literature demonstrates that children with high body mass indices may have increased risk of cardiovascular disease in their adulthood and that individuals who consume alcohol during adolescence are at greater risk of experiencing chronic illness and mental health problems in adulthood.[12] Developing healthy behavior in childhood is easier and more effective than trying to change unhealthy behaviors in adulthood.[6] Evidence-based studies have shown that in adolescents, in particular, bad health habits can be prevented in adulthood, and this situation will not only promote the health of adolescents, but also the health of the society and will encourage lifestyle changes. For all these stated reasons, the state of health promotion in adolescents warrants examination.

The school environment is an important area where adolescent behavior and routines are shaped, helping adolescents to become aware of their health and adopt health-related attitudes and behaviors as a lifelong habit.[13] Adolescents spend about 6 hours a day at school; therefore, the school is a unique environment in which the health of adolescents can be promoted and risky health behaviors can be determined. The National Health Education Standards also emphasize that secondary and high school students should have course content aimed at promoting and improving health in their curriculum.[7] Therefore, evaluating the health improvement behaviors of adolescence, which is a risky period, is crucial.[11]

The reliability and validity for the development of health in adolescents in Türkiye were made using a scale.[14] This scale consists of 40 items, and the Cronbach's alpha coefficient of the social support, nutrition behaviors, exercise, and stress management subdimensions of this scale is less than 0.70; item load values of the scale are between 0.13

and 0.51, and the explanatory variance ratio is 38.48%. Furthermore, it is assumed that adolescents can safely fill in the items in the scale due to the high number of items in the scale. The Adolescent Health Promotion Scale: Short Form (AHPS-SF) is a 21-item scale which was developed by Chen et al.[15]. This scale is the only one with proven validity and reliability to determine the health promotion behaviors of all adolescents aged 13 to 19. The lack of Turkish validity and reliability for this scale which evaluates the health promotion behaviors of adolescents is a major deficiency in the field. In this context, the aim of this study titled "Adolescent Health Development Scale: Short Form" was to test the psychometric properties of this scale in Türkiye.

Research Questions

- Is the Adolescent Health Development Scale: Short Form valid in Türkiye?

- Is Adolescent Health Development Scale: Short Form reliable in Türkiye?

MATERIALS AND METHODS

Participants and Procedures

This study was conducted with the aim of testing the psychometric properties of the Adolescent Health Development Scale: Short Form in Türkiye as a methodological study. The data for this study were obtained from students attending grades 7 to 11 in three different secondary schools and two different high schools between September-December 2019. Students were selected from secondary and high schools which were attached to the Directorate of Education of İzmir Province located in Western Türkiye.

In this study, a total of 900 students from 11 schools affiliated to the Narlıdere District National Education Directorate were included in three different secondary schools and two different high schools determined by a simple random sampling method. However, only 814 children who agreed to participate in this study, had parental consent, and completed the scales properly were included. During the process, there were no students without parental consent, but 76 students were not included in this study due to missing items in the scale forms. The scales were applied by the researchers at the hours permitted by the school administration. Data was collected between September and December, 2019. The inclusion criteria were the following: a) aged 13 to 18 years, b) voluntarily agreeing to participate in this study, with signed parental consent forms. The exclusion criteria were as follows: a) adolescents with special learning difficulties, b) adolescents wishing to quit the study at any stage of the study, and c) adolescents without signed parental consent forms. There was a method which was suggested for the sample size and it included three rules, namely the 5s, 10s and 100s rule. It was emphasized that the researcher should include at least five individuals for each item in order to perform the factor analysis. There should also be 10 individuals for each item unless there was a problem about connecting with people.[16] Therefore, the scale was administered to those who met the inclusion criteria and submitted written consent for participation in this study.

Instruments

Data were collected using the Descriptive Information Form (four questions including age, gender, economic status, and education level) and the AHPS-SF.

Descriptive Information Form

The form prepared by the researchers was in line with the literature[12-15] and consisted of 13 questions relating to the following: age, gender, class, educational status of their mother and father, whether he or she has breakfast in the morning, has a computer, can connect to the internet via his or her computer, has a smart phone, and can connect to the internet with their phone.

Adolescent Health Promotion Scale: Short Form

The Adolescent Health Promotion Scale was developed by Chen et al.[17] in 2003 and it is used to assess the health promotion behavior of adolescents. This scale consists of 40 items and six subscales. The subscales can be listed as nutrition (six items), interpersonal support (seven items), health responsibility (eight items), self-realization (eight items), exercise (four items), and stress management (six items). The scale items are evaluated using a Likert-type scaling method; namely, "1: never, 2: sometimes, 3: usually, 4: frequently, 5: always". The scale score related to a specific area is obtained by adding the scores of the items in the subscale, and the total score of the scale is obtained by adding all the subscale scores. The scores which can be obtained from this scale range between 40 and 200. Higher scores suggest that adolescents possess good health promotion behaviors.[17]

The AHPS-SF was developed by Chen et al.[15] and it is based on the original form; its psychometric properties were examined. The scale consists of 21 items in total. The scale items are evaluated using the following Likert-type scaling method: "1: never, 2: sometimes, 3: usually, 4: frequently, 5: always". The factor load values of the original scale are between 0.51 and 0.76. The total Cronbach's alpha value of the scale is 0.90. The model fit indices of the scale are the following: goodness of fit index (GFI): 0.95, normed fit index (NFI): 0.93, non-normed fit index (NNFI): 0.98, comparative fit index (CFI): 0.98, and the Root Mean Square Error of Approximation (RMSEA) value was determined to be 0.028.[15]

Adaptation of the Short-Form Adolescent Health Promotion Scale

Three linguists independently translated the scale into Turkish. A separate linguist then translated the Turkish edition back into English. Seven nursing faculty members were canvassed for their expert opinions. The experts were shown the original and translated scale versions and asked to evaluate the compatibility of items on a scale from 1 (very compatible) to 4 (requires major modification). The instrument was tested by research team members on 20 adolescents after linguistic validity was confirmed. The remaining sample did not include those adolescents who participated in the pilot study. We concluded that the scale could be used with a large enough sample to test its reliability and validity as the adolescents had no negative feedback. For the test-retest reliability analysis, the scales were re-applied to the same 20 children eight weeks later.

Compliance with Ethical Standards

For validity and reliability, permission was obtained from the original scale owner through e-mail. Approval of the Dokuz Eylül University Non-Interventional Research Ethics Committee (approval number: 2019/26-33, protocol number: 4884-GOA) and institutional approval were received before this research started. Following the approval of the ethics committee and institution, the purpose of this study was explained to the adolescents included in the sample and to their

parents. A thorough explanation of the study aim was provided to the parents, and written permission of those who agreed to participate in the study was obtained.

Statistical Analysis

The Social Sciences Statistical System version 22.0 (SPSS Inc, Chicago, IL, USA) was used to test the data statistically. The adolescent sociodemographic data were analyzed by frequency, percentage, and mean. The Cronbach's alpha, test-retest and item-total correlations of Cronbach were used to assess reliability. For new measures, a Cronbach's alpha of 0.70 was acceptable.[18] In the item-total analysis, the appropriate coefficient had to be higher than 0.30.[19] The content validity index (CVI), confirmatory factor analysis (CFA) and exploratory factor analysis (EFA) were used to test the validity of the ratings. CVI was used to determine the accuracy of the views of the experts. The CVI for the total instrument, based on a 4-point scale, was the percentage of the total items assessed by the experts as being fair or very relevant.[20] The significance level was accepted as $p<0.05$.

RESULTS

Sample Characteristics

In this study, 52.6% of the adolescents involved were male, and their mean age was 14.46±1.57. Furthermore, 29.5% of the students (n=240) attended grade 8, and 33.7% (n=27) of the mothers of adolescents were high school graduates, whereas 34.2% (n=278) of the fathers were. When the income level of the children included in this study was examined; 6.2% (n=51) reported low income, 83.6% (n=684) middle income, and 9.7% (n=79) high income. It was determined that 23.3% (n=190) of the adolescents did not have breakfast in the morning. In addition, 64.9% of the adolescents (n=528) had their own computers and access to the internet. It was found that 56.6% (n=461) of adolescents were connected to the internet every day, 83.3% (n=719) had smart phones, and all of them could connect to the internet with their smart phones.

Validity Analysis

The scale was translated into Turkish by three linguists independently. Following this, the translation was reviewed and evaluated by the researchers. Then, the scale was revised by a Turkish language expert. The draft Turkish version of the AHPS-SF was translated back into English by two independent bilingual, bicultural translators whose native language was English and who had experience in health terminology and the linguistic and cultural aspects of the English language, producing two independent back-translated versions of the scale.[16,19,21]

Content Validity

For the content validity of the Turkish scale, seven experts were asked for their opinions. The item-level CVI and scale-level scale validity index (S-CVI) for the overall scale were determined to fall within the range of 0.90 to 1.00.

EFA revealed that the Kaiser-Meyer-Olkin (KMO) coefficient of the Turkish scale was 0.862 and the Bartlett test chi-squared (χ^2) test was 4,240,743 ($p<0.001$). EFA results demonstrated that the Turkish scale consisted of six subdimensions, and the total explanation variance of the scale was 56.197%. When the factor load values of the scale were examined, the range of the nutritional factor load values of the first subdimension was 0.54 to 0.75; the second subdimension (social support) was 0.44 to

0.83; the third subdimension (health responsibility) was 0.60 to 0.72; the fourth subdimension (life appreciation) was 0.47 to 0.72; the fifth sub-dimension (exercise) was 0.47 to 0.85; and the sixth subdimension factor load values (stress management) were 0.59 to 0.64 (Table 1).

Construct Validity

CFA noted that the sub-scale load values of the scale were the following: for the nutrition sub-scale, 0.50 to 0.53; for the social support sub-scale, 0.40 to 0.66; for the health responsibility sub-scale, 0.50 to 0.62; for the life appreciation sub-scale, 0.57 to 0.71; for the exercise sub-scale, 0.58 to 0.64; and for the stress management sub-scale, 0.51 to 0.56. From the results of the CFA, model fit indexes of the scale were the following: Model χ^2 was 449.58; df was 170 and RMSEA was equal to 0.045. Another model parameter was calculated by dividing the χ^2 value by the degree of freedom. If the outcome is less than 5, the model is deemed satisfactory.[19] This calculation was less than five (χ^2/df=2.64)

(Table 2). As for the indices, the following values were determined: GFI: 95, adjusted GFI: 93, CFI: 97, incremental fit index: 97, relative fit index: 0.94, NFI: 95, and NNFI: 0.96 (Figure 1).

Reliability Analysis

Whereas the total Cronbach's alpha coefficient of the scale was 0.85, the Cronbach's alpha coefficient of the scale sub-scales were as follows: for the first sub-scale, 0.712; for the second sub-scale, 0.697; for the third sub-scale, 0.700; for the fourth sub-scale, 0.730; for the fifth sub-scale, 0.701; and for the sixth sub-scale, 0.702. Strong correlations were found between test and re-test (r=0.85, p<0.001). When analyzing item-total scale correlations, they ranged from 0.302 to 0.533 and they were statistically significant (p<0.001). The t-squared test of Hotelling was used to assess whether the measure had a bias in answer. The t-squared value of Hotelling was 1,842,675; F: 89.981 (p<0.001). Therefore, there was no bias in response in this scale.

Table 1. Factor Analysis and corrected item-total correlation of the Turkish Short-Form Adolescent Health Promotion Scale							
Item description	Nutrition	Social support	Health responsibility	Life appreciation	Exercise	Stress management	Corrected item total correlations
1. I choose foods without too much oil	0.696						0.362
2. I include dietary fiber (e.g. fruits or vegetables)	0.753						0.310
3. Each meal includes the five food groups (e.g. bread, meat, milk, fruit, vegetable)	0.541						0.364
4. I speak up & share my feelings with others		0.828					0.302
5. I care about other people		0.525					0.354
6. I talk about my concerns with others		0.822					0.388
7. I make an effort to have good friendships		0.439					0.422
8. I read food labels when I shop			0.605				0.427
9. I watch my weight			0.667				0.469
10. I discuss my health concerns with a doctor or nurse			0.602				0.455
11. I check my body at least once a month			0.720				0.430
12. I usually think positively				0.466			0.473
13. I make an attempt to correct my defects				0.684			0.528
14. I make an effort to know what's important for me				0.721			0.533
15. I make an effort to feel interesting and challenged every day				0.542			0.499
16. I exercise rigorously for 30 minutes at least 3 times per week					0.817		0.438
17. I warm up before rigorous exercise					0.845		0.426
18. I make an effort to stand or sit up straight					0.474		0.453
19. I make an effort to determine the source of my stress						0.641	0.483
20. I make schedules and set priorities						0.632	0.466
21. I try not to lose control when things happen that are unfair						0.594	0.429
Explained variance (%)	56.197						

Table 2. Model fit indices for confirmatory factor analysis										
χ^2	df	p	χ^2/df	GFI	AGFI	CFI	IFI	RFI	NFI	NNFI
449.58	170	<0.001	2.64	0.95	0.93	0.97	0.97	0.94	0.95	0.96

GFI: Goodness of fit index, AGFI: Adjusted goodness of fit index, CFI: Comparative fit index, IFI: Incremental fit index, RFI: Relative fit index, NFI: Normed fit index, NNFI: Non-normed fit index.
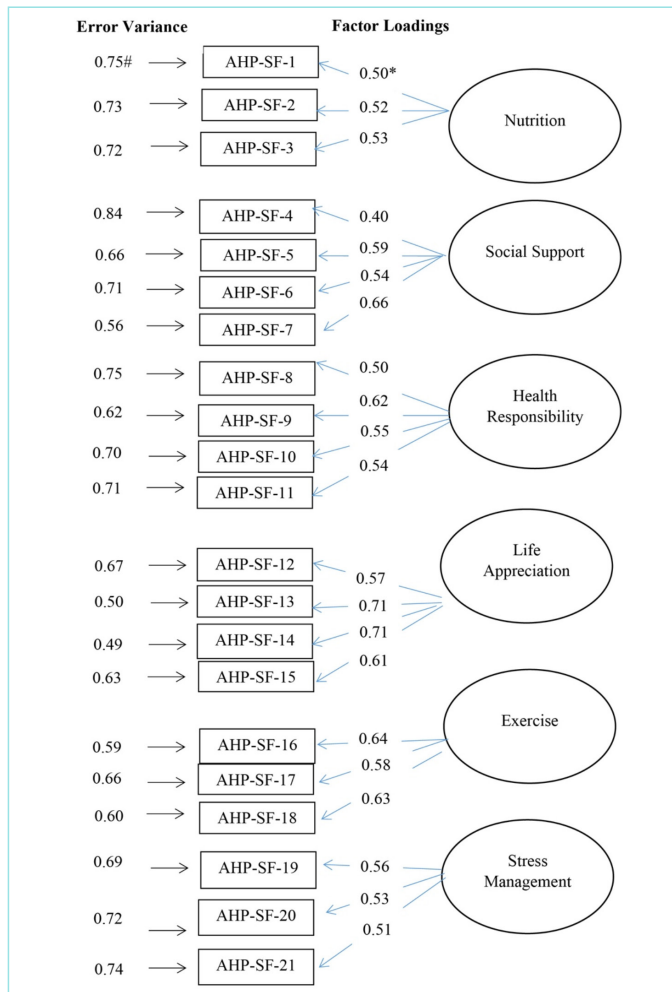

Figure 1. As for the indices, the following values were determined.

AHP-SF: Adolescent Health Promotion: Short Form.

DISCUSSION

In the literature, no adaptation of the Health Promotion Scale: Short Form developed by Chen et al.[15] to another culture was found. Therefore, the discussion part of this study was based on the original scale (short form of health promotion scale-21 items). Content validity relates to whether the items constituting the test are sufficient in terms of quantity and quality to assess the behavior or property it aims to measure. In this study, expert opinion was consulted to ensure content validity. Evaluation of compliance among the experts demonstrated that the content and index validity indices were above 0.80, and there was a high level of agreement among the experts.[21] In light of these results, it was concluded that the expressions of the scale were appropriate to Turkish culture, adequately representing the areas to be measured and providing content validity.

The convenience of the data for factor analysis was examined using the KMO coefficient and Bartlett Sphericity test. In the literature, KMO values between 0.80 and 0.90 show that the sample is large enough to provide correlation reliability and is suitable for factor analysis.[22] If the KMO value is less than 0.50, then the factor analysis cannot be continued.[23] The data in this study were found to be suitable for factor analysis, and the sample size was sufficient.[21,24] It was determined that the KMO value was not considered in the original scale.[15]

The descriptive variance of the original health promotion scale was 51.14%, and it consisted of six subdimensions, and the variance of explanation was similar to the original in the Turkish scale and it consisted of six similar subdimensions. An analysis explaining 50% to 75% of the total variance in the literature is accepted as a valid analysis.[19] According to these results, the explanation variance of the Turkish scale was within an acceptable range and resembled the structure of the original scale.

Factor load is the coefficient which explains the relationship of the item with the factors. The factor loads pertaining to the items accounting for the factors are expected to be high. In order to say that an item measures a structure or factor well, this factor load value should be 0.30 or higher.[19,21,24] In this study, because the factor loadings of all items in the scale were greater than 0.30 and similar to the factor loads in the original scale, it can be said that the Turkish version retained the original structure and had a strong factor structure for the Turkish sample.

The literature indicates that the model compliance indicators GFI, NFI, NNFI, and CFI should be >0.90 and RMSA should be <0.08.[25] In this study, it was shown that these values were suitable, and that the data were compatible with the model; furthermore, results revealed that it was a good model, and it confirmed the single factor structure.[21] Since the model fit indices were not examined in the original scale, no comparison could be made with the Turkish scale. Cronbach's alpha coefficient and test-retest reliability analysis are the most commonly used methods for determining reliability levels in the literature. Whereas a Cronbach's alpha coefficient less than 0.60 means that the scale has lower reliability, when it is between 0.60 and 0.80, it is reliable enough, and when it is between 0.80 and 1.00, it indicates highly reliable.[26] The total Cronbach's alpha coefficient in this study was above 0.80, and the Cronbach's alpha coefficients of the subdimensions were above 0.70, indicating that the scale had a high level of reliability. The Cronbach's alpha value of the Turkish scale was found to be higher than the original scale. In addition, the Cronbach's alpha value of the Turkish scale and the original scale[15] are considered to be consistent. As a result of the test-retest analysis of the Turkish scale, its correlation coefficient was found to be above 0.80, and it had a high level of correlation. The lack of test-retest analysis in the original scale is one of the strengths of our study compared to the original scale. When the item-total score correlations of the Turkish scale were examined, it was seen that all items of the scale exhibited a sufficient correlation with the total score of its own subdimension, and the item-total score correlations of the

subdimensions were high (p<0.001, Table 1). Since the item total score correlation was not calculated in the original scale, any similarities or differences with the Turkish scale could not be discussed.

It is assumed that response bias has an adverse effect on the reliability and validity of scales. Therefore, the Hotelling test was performed in this study in order to determine whether or not there was a response bias. The Hotelling t-squared test was used to assess whether or not the answers people gave to the things on the scale were equivalent. The test results demonstrated that adolescents did not interpret every item the same, and there was no response bias while answering the questions.

Study Limitations

This study had several limitations. Concurrent, convergent, and divergent validity were not examined. Moreover, due to the lack of scales organized in different languages, no comparisons of scales could not be made between different cultures; therefore, only the original scale was reviewed in the discussion section of this article.

CONCLUSION

Adolescence is a special period in which health-related behaviors and attitudes develop. Therefore, it is recommended that adolescent health promotion behaviors be determined and adolescents with risky health behaviors be identified using the AHPS-SF. Acquiring positive health behaviors during adolescence is also important in terms of achieving healthy behavior for individuals in the future; therefore, the health promotion behaviors of adolescents should be monitored at certain intervals.

Adolescents, parents, and teachers should be provided with training and counseling relating to risky health behaviors and health promotion behaviors. In addition, it is recommended that nurses working in the field of school health should plan training for risky health behaviors and factors affecting adolescents, and non-invasive interventional studies should be conducted. In addition, determining the factors which affect the health promotion behaviors of adolescents and increasing the awareness of teachers and school health nurses about risky health behaviors which may be detected during adolescence are further recommended. The Health Promotion Behavior Scale: Short Form is believed to have a guiding role in determining the priorities of the content and subjects for training programs intended to prevent or reduce risky health behavior.

MAIN POINTS

- The scale is a valid and reliable means of measurement which can be used to determine the health promotion behaviors of adolescents in a Turkish sample.

- Adolescence is a special period in which health-related behaviors and attitudes develop.

- Adolescent health promotion behaviors can be determined and adolescents with risky health behaviors can be identified using the Adolescent Health Promotion Scale: Short Form.

ETHICS

Ethics Committee Approval: Approval of the Dokuz Eylül University Non-Interventional Research Ethics Committee (approval number:

2019/26-33, protocol number: 4884-GOA) and institutional approval were received before this research started.

Informed Consent: It was obtained.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: D.A., İ.B., A.A.K., M.B., Design: D.A., İ.B., A.A.K., M.B., Supervision: D.A., M.B., Materials: D.A., Data Collection and/or Processing: D.A., İ.B., A.A.K., M.B., Analysis and/or Interpretation: D.A., İ.B., A.A.K., M.B., Literature Search: D.A., İ.B., A.A.K., M.B., Writing: D.A., İ.B., A.A.K., M.B.

DISCLOSURES

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