ORJİNAL ARAŞTIRMA

GUNCEL PEDİATRİ *JCP 2018;16(2):55-71*

Davranış-İmaj Modele Dayanan Kısa Görüşmelerin Adolesanların Sağlık Davranışlarına Etkisi

The Effect of Behavior-Image Model-Based Brief Interventions on Health Behaviors in Adolescents

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ÖZ:

GİRİŞ ve AMAÇ: Sağlığı geliştirme programları adolesanlarda önlenebilir sağlık problemlerinin sayısının azaltılmasında çok etkili bir yaklaşımdır. Kısa görüşmeler, adolesanlar için tasarlanmış, kanıta dayalı sağlığı geliştirme programlarıdır. Davranış-imaj Model, planlı çoklu davranış müdahaleleri ve kısa sağlık girişimleri için tasarlanmış yeni bir modeldir. Bu araştırma, Davranış-imaj Modele dayanan kısa görüşmelerin, adolesanların sağlık davranışlarına etkisini belirlemek amacıyla gerçekleştirildi.

YÖNTEM ve GEREÇLER: Bu deneysel çalışma, ön test-son test kontrol gruplu bir araştırma tasarımıdır. Araştırma İstanbul'da bir devlet lisesinde gerçekleştirildi. Araştırmaya 15-18 yaşları arasında 214 öğrenci (deney grubu=103, kontrol grubu=111) katıldı. Veriler, Öğrenci Soru Formu, Adolesan Yaşam Biçimi Ölçeği II (AYB II), Egzersiz Öz-etkililik Ölçeği, Çocuk Beslenme Öz-yeterlik Ölçeği ve Hastalık Kontrol Merkezi Sağlıkla İlişkili Yaşam Kalitesi-4 Ölçeği kullanılarak toplandı.

BULGULAR: Kısa görüşmelerden sonra deney grubunun fiziksel aktivite, beslenme ve sağlık sorumluluğu alt boyutları ve toplam AYB II puan ortalamaları istatistiksel olarak anlamlı derecede arttı. Deney grubunun egzersiz öz-etkililik ve beslenme öz-yeterlilik ölçeği puan ortalamaları da anlamlı şekilde arttı ($p< 0.05$). Kısa görüşmelerden sonra, son 30 gün içinde ruh sağlığının iyi olmadığı ve aktivite sınırlılığının olduğu gün sayısında azalma oldu.

TARTIŞMA ve SONUÇ: Bu çalışmada, Davranış-imaj modele dayanan kısa görüşmelerin adolesanların sağlık davranışlarını geliştirmede etkili olduğu belirlendi.

A***nahtar Kelimeler:*** Adolesan, sağlık davranışları, Davranış-İmaj Model, okul hemşireliği

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SUMMARY:

INTRODUCTION: Health promotion programs are a very effective approach to lowering the number of preventable health problems among adolescents. Brief interventions are evidence-based, health-promoting programs designed for adolescents. The Behavior-Image Model (BIM) is a new model devised for planned multiple behavior interventions and brief health interventions. This study was conducted to determine the effect of brief interventions based on the Behavior-Image Model on adolescent health behaviors.

METHODS: This experimental study was of pretest-posttest control group design. The study was carried out in a public high school in Istanbul. Two hundred and fourteen students (intervention group=103, control group=111) between the ages of 15 and 18 participated in the study. The data was collected using the Student Questionnaire, The Adolescent Life Style Profile II (ALP R2), The Exercise Self-Efficacy Scale (ESES), The Dietary Self-Efficacy Scale and The Center for Disease Control Health-related Quality of Life-4 (CDC HRQOL-4). The intervention group received a brief intervention based on the BIM. Each student was interviewed for 30 minutes. Data were collected before the brief intervention and at 3 months post-intervention.

RESULTS: After the brief interventions, there were statistically significant increase in the mean scores in the intervention group for the subscales of physical activity, nutrition, health responsibility and total ALP-R2. There were statistically significant increase in the mean scores in the intervention group for exercise self-efficacy and dietary self-efficacy. After the brief interventions, the number of days that mental health was not good and activity limitation days decreased during the past 30 days.

DISCUSSION and CONCLUSION: In this study, it was determined that brief interventions based on the BIM were effective in promoting the health behaviors of adolescents.

Keywords: Adolescent, health behaviors, Behavior-image model, brief intervention, school nursing.

Introduction

Adolescence is a transitional period of physical and psychological human development that occurs during the period from childhood to adulthood, between ages 10 to 19 (1,2). During this period, adolescents' behaviors and life style options change that effect both their current and adulthood health (3). Risky health behaviors which are generally adopted during adolescence result in a considerable increase in mortality and morbidity rates in this period (4,5). Several studies have emphasized that adolescent health can be improved when health risk behaviors are prevented and health behaviors are promoted (6-9). Health promotion behaviors entail a positive approach to living and a means of increasing wellbeing and self-actualization. Health-promoting behaviors prevent diseases, decrease morbidity, improve the quality of life, and decrease healthcare costs (10). In this respect, health promotion programs that can enhance the adoption of healthy behaviors are a very effective approach to lowering the number of preventable health problems among adolescents (11-14).

Brief interventions are evidence-based, health-promoting programs designed for adolescents. The World Health Organization (WHO) and the American National Institutes of Health (NIH) suggest that short-term motivational programs are an effective strategy in terms of health promotion (15,16). Since brief programs can be conducted in the space of a short period of time, they are very well suited to adolescents. Brief interventions are based on The Behavior-Image Model (BIM) (16-18). The BIM is a new model devised for planned multiple behavior interventions and short-term health interventions (Figure 1).

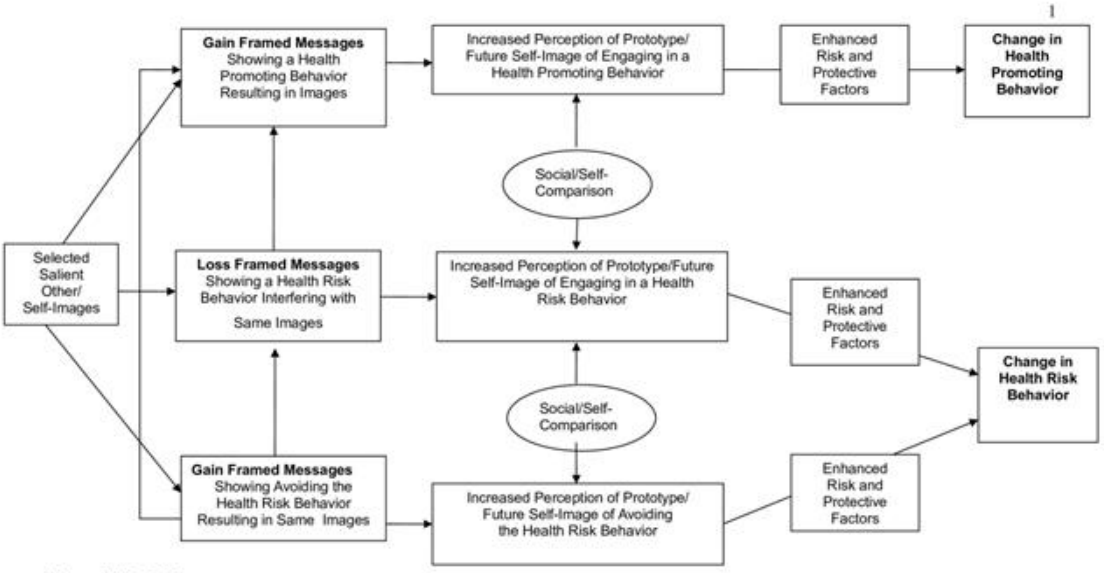

Figure 1. The BIM

Reference: Werch C. The BIM: a paradigm for integrating prevention and health promotion in brief interventions. Health Education Research 2007; 22: 677-90. doi: 10.1093/her/cyl146

The literature indicates that image is an important motivating factor for adolescents in their starting to adopt positive health behaviors, maintaining these behaviors over the long term (17). It is stressed that other people's social images may be an important factor that can be used to explain certain health behaviors. The BIM employs both gain-framed and loss-framed messages to promote health behavior. The recommendation of the model is to use gain-framed messages to show the effects of health-promoting behavior on an individual's social and personal image and to use loss-framed messages to show the effects of health-risk behaviors on image and explain how these act as a barrier to health-promoting habits (17,18).

Gain-framed messages that direct the individual to a desired health-promoting behavior cause an enhanced perception in the individual of persons who are already engaging in the projected health-promoting behavior or lead the individual to create new prototypes that support the new behavior in the form of activating a positive image of oneself in the future engaging in that same behavior. On the other hand, loss-framed messages that point to targeted health-risk behavior increase the individual's perception of a typical person taking on a risk by engaging in a particular health behavior, creating enhanced awareness of the image of oneself in the future displaying the same behavior (17,18). Many studies indicate that brief interventions based on the BIM reduce drug abuse, help to make significant improvements in dietary habits and physical activity and enhance the quality of life (11-13, 19-21).

Health promotion programs for adolescents have not been regularly implemented in Turkey's schools and there is therefore a need for brief, short-term health promotion programs in the schools. Since brief programs based on the BIM can be conducted for short periods of time, they are very well suited to adolescents (16,17).

This study was conducted to determine the effect of brief interventions based on the BIM on the health behaviors of adolescents in a sample of Turkish adolescents. The hypotheses were: (1) adolescents introduced to a brief intervention program would exhibit an increase in mean scores in the subscales of physical activity, nutrition and in total ALP-R2; (2) the adolescents would exhibit an increase in mean scores in the exercise self-efficacy; (3) adolescents would exhibit an increase in mean scores in the dietary self-efficacy; (4) the adolescents would exhibit a decrease in the mean number of days their physical and mental health was not good and in the mean number of days their activity was limited.

Materials and Methods

This experimental study was of pretest-posttest control group design. Participants were randomly divided to an intervention group or control group. The subjects in the intervention group

participated in the brief interventions based on the BIM. Subjects in the control group did not participate in the brief interventions.

The study was conducted in a public high school in Istanbul, Turkey in the period between February and June 2011. There were 8 classes in the 10th and 11th grades at the school. The students in all classes were similar in terms of sociodemographic characteristics (age, gender, mother's education, academic achievement, time spent at the computer/TV during the day and others). The health education course was not a part of their school curriculum.

Power analysis was performed to define sampling size. The sampling size to consider for both groups was found to be at least 49 people according to the calculation of 95% beta, and 95% alpha reliability levels, based on the results of a previous study (11). [https://www.dssresearch.com/KnowledgeCenter/toolkitcalculators/samplesizecalculators.aspx].

The 10th and 11th grades were listed and then classes were selected randomly by drawing lots. The first two classes of the 10th grade were selected for the intervention group and the next two classes were selected for the control group. The same procedure was applied to the 11th grade. At the end of this process, there were 4 classes in the intervention group (n = 143) and 4 classes in the control group (n = 138). A large number of students were included in the sample against the possibility that data loss could occur during the observation process in the research. The study flow diagram is shown in Figure 2.

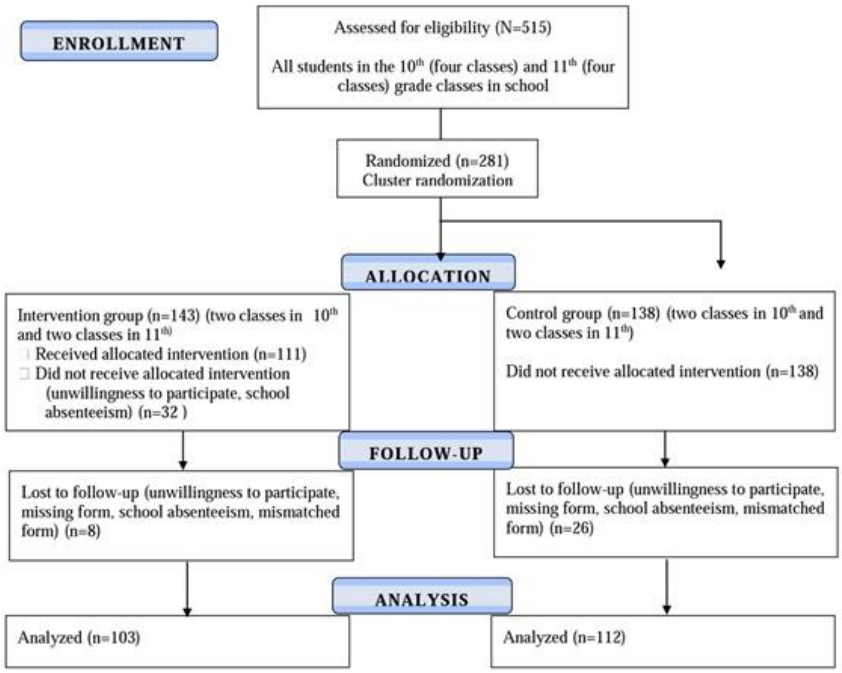

Figure 2. Consort flow diagram

Brief interventions were conducted with 111 students who were in intervention group and accepted to participate in the research. Eight students from the intervention group and 26 from the control group were excluded from the study due to incomplete questionnaires, unmatched codes and absence on the day the study was conducted. As a result, 103 students in the intervention group and 112 students in the control group completed the final interview at the end of three months.

Ethical Considerations

This research was approved by the Marmara University Faculty of Medicine Research Ethics Committee (IRB approval number: MAR-YÇ-2009-0238). Written and oral permissions were obtained from the institutions where the study would take place. The participating students were informed about the purpose of the study, how long data collection would take and other aspects of the study, after which their verbal consent was obtained. The written legal permission necessary to allow the students' participation in the study was also obtained from the students' parents. The students' names were not included in the questionnaires.

Intervention

The Brief Health Program for Adolescents developed by Werch was used in this study. The aim of brief intervention programs is to both promote healthy behavior such as physical activity, balanced diet and sufficient sleep, and to reduce health-risk behaviors such as the intake of alcohol, drugs and smoking. Unlike other preventive and health-promoting programs, these programs do not merely focus on one health behavior. Instead, a variety of behaviors affecting health are targeted (16,17).

Before the beginning of the study, students were informed about the study and its purpose. The intervention group was given a flyer about the Brief Health Program. The permission of the families was received to allow their children to participate in the research. All of the students, both in the control and intervention group, were asked to fill out data collection forms. Upon the completion of the questionnaires, a researcher held brief intervention sessions based on the BIM with the intervention group students. The researcher held the brief intervention sessions on a one-on-one basis with each student. Each student was interviewed in one 30-minute session. The intervention was performed during school hours.

The brief intervention consisted of an in-person health behavior screening, a one-on-one consultation, and a goal plan. The average implementation period including the combined screening, consultation, recommendations and goal setting strategies was approximately 30 minutes. The brief, seven-item screening was used to provide tailored image feedback on six health behavior fields. This behavior fields consist of exercise, sport, physical activity, physical activity norms, breakfast and nutrition, alcohol initiation and use, sleep and rest. The screening took only a few minutes to complete. The consultation is applied using a standardized protocol.

The intervention is applied to adolescents one-on-one. Different messages were given according to the answers of yes or no. In the content of the interviews, messages were given about physical activities, friends' effects on physical activity, friend selection, exercise, sleep and rest, breakfast, and alcohol consumption.

During the consultation, the adolescent was shown colorful key fact slides that highlighted essential information and modeling of health behaviors. Following the brief intervention, a goal plan was signed by the student and then by the researcher. One copy was given to the adolescent and the other retained by the researcher. The student was told to hang up this plan somewhere where he/she would be able to see it and enact the behaviors they promised to perform. After the intervention, an information card that included details about the students' participation in the brief intervention and a "Parent communication card were given to the students to deliver to their parents. Parent communication cards were sent to the families via the students after the completion of the interventions over a three-week period, and families were asked to read these cards and talk to their children. Just after starting to send the cards, the parents were called on the phone and informed about the Parent communication cards. Within three months of this process, the questionnaires were given out to both the intervention and the control group once again.

Measures:Five tools were used for data collection in this study.

1. The Student Questionnaire were eight questions designed to determine the participants' sociodemographic characteristics (age, gender, class, and school performance, school transportation, working status, mother's education and father's education).

2. The Adolescent Lifestyle Profile II (ALP-R2) was used to measure the health behaviors of students. The ALP was developed by Hendricks, Murdaugh and Pender in 2006 to assess healthy life style domains in adolescents (22). It was revised in 2009 (ALP-R2). The Turkish adaptation of ALP-R2 was developed by İlhan (2012) (Cronbach alpha= 0.88) (23). The ALP-R2 is a Likert-type scale consisting of 44 items. Responses to the statements are "Never", "Sometimes", "Often" and "Always", which are scored as 1, 2, 3, and 4, respectively. The scale consists of 44 items and 7 sub-scales. The sub-scales are as follows: the health responsibility subscale, physical activity subscale, nutrition subscale, positive life perspective subscale, interpersonal relations subscale, stress management subscale, and the spiritual health subscale. Minimum and maximum scores range between 44 and 176. The higher the score, the higher is the level of positive health behavior (22). In this study, Cronbach's alpha coefficient for the ALP-R2 was 0.90.

3. The Exercise Self-Efficacy Scale (ESES) was used to measure the students' exercise self-efficacy. The ESES was developed by Marcus, Cloudio, Nigg and Corneya (1998) to determine individual self-confidence prior to starting exercise (24). It was adapted into Turkish by Kafalı (2009) (Cronbach's Alpha: 0.92) (24). The scale has 10 items and it is a Likert-type scale with

responses ranging from 0- "Not at all confident" to 10- "Highly confident". The lowest and highest possible scores are 0 and 100, respectively. Higher scores indicate the existence of a high level of self-confidence and better chances of success at changing the situation (24). In this study, Cronbach's alpha coefficient for ESES was 0.92.

4. The Dietary Self-Efficacy Scale measures the self-efficacy level of children and young people in consuming nutritional foods (low fat and low salt) that improve heart health. The scale was developed as part of the Central Mass Access to Child Health Information (CATCH), which is a research project that aims to promote the heart health of children and young people and reduce the risks of cardiovascular disease. It was adapted to Turkish by Öztürk (2010) (Cronbach's Alpha: 0.79) (25). Scale item scores range from -1 to +1 (-1: not sure, 0: somewhat sure, +1: highly sure) and the total score varies from -15 to +15. The higher the scores are, the higher the self-efficacy level is (25). Cronbach's alpha coefficient for the scale was 0.80 in this study.

5. The Center for Disease Control Health-related Quality of Life-4 (CDC HRQOL-4) was used to measure the health-related quality of life of the student. CDC HRQOL-4 were developed by the CDC in the U.S The tool consists of four questions and assess a person's sense of wellbeing. The CDC HRQOL-4 was adapted into Turkish by Aslan et al. (2010) (Cronbach's Alpha=.69) (26). The focus of Question 1 is on self-rated health that has been found to be predictive of mortality. Question 2 and Question 3 relate to recent physical and mental health symptoms. Question 4 provides activity limitation days in the last 30 days. Lower scores show that the quality of life is better. In this study, Cronbach's alpha coefficient for CDC HRQOL-4 was .64 (26).

Statistical analysis

The data were analyzed by using SPSS, version 15.0 (SPSS, Inc., Chicago, IL, USA). Numbers, percentages, means and standard deviations were used to analyze the study data for descriptive statistics, whereas the paired sample t test, Wilcoxon analysis, the independent sample t-test, Mann Whitney U test and Two-way Repeated-measures ANOVA were used to compare pre- and posttest scores of the control and intervention groups. Inter-group homogeneity in terms of the independent variables was analyzed by using chi-square analysis (Pearson chi-square, Yates correction chi-square). The level of statistical significance was $p < 0.05$.

Results

Two hundred and fifteen students participated in the study, 103 in the intervention group and 112 in the control group. It was found that when the characteristics of the intervention and control groups, such as age, gender, class level, mother's education, academic achievement, time spent at the computer/TV during the day and others were compared, there was no statistically significant difference ($p > 0.05$) (Table-1). Both participant groups demonstrated similar characteristics.

Table 1. Comparison of Intervention and Control Groups in terms of Distribution by Socio-demographic Characteristics

Characteristics	Control		Intervention			
	Mean±SD		Mean ±SD		t*	p
Age	16.59 ± .73		16.48 ± .64		1.209	.228
	n	%	n	%	χ^2	p
Gender						
Girl	60	53.6	49	47.6	0.772	0.379
Boy	52	46.4	54	52.4	(sd: 1)	
Grade						
10th grade	56	50.0	51	49.5	0.005	0.943
11th grade	56	50.0	52	50.5	(sd: 1)	
Mother's education						
Illiterate	8	7.1	8	7.8		
Primary education	71	63.4	65	63.1	2.022	0.568
High School	28	25.0	22	21.3	(sd: 3)	
University	4	3.6	8	7.8		
No mother	1	.9	-	-		
Status of Academic Achievement						
Good	7	6.3	5	4.8	1.258	0.533
Medium	94	83.9	83	80.6	(sd: 2)	
Poor	11	9.8	15	14.6		
Time spent at the computer/TV during the day						
Less than 2 hours	38	33.9	31	30.1	0.772	0.680
2-4 hours	52	46.5	54	52.4	(sd: 2)	
5 hours and more	22	19.6	18	17.5		
Total	112	100	103	100		

** Independent- samples t test*

Yates correction chi-square test and Pearson's chi-square test were conducted.

Table-2 shows the total mean scores of the intervention and control groups for the ALP-R2 and subscales in the pre- and post-brief interventions. There was a statistically significant increase in scores obtained from the subscales of physical activity, nutrition, health responsibility and total ALP-R2 in the intervention group compared to the pre-brief intervention stage ($p< 0.05$), whereas in the control group, there was no change ($p>0.05$). The increase in the subscales and total of ALP-R2 mean scores over time was not statistically significant ($p< 0.05$). There was no difference between the scores of the intervention and the control group on the subscales of interpersonal relations, positive life perspective, spiritual health and stress management following the brief intervention.

Table 2. Comparison of Intervention and Control Groups in terms of Mean Scores on ALP-R2

ALP-R2 and Sub Scale	Pretest Mean ±SD	Posttest Mean ±SD	t**	p	***F/p
Health responsibility					
Control	15.70±3.52	15.96±3.50	0.938	0.350	F=3,555
Intervention	15.98±3.39	17.01±3.82	3.620	0.000	p=0.061
	*t=0.602	*t=2.095			
	p= 0.547	p=0 .038			
Physical activity					
Control	13.89±3.73	14.44±3.88	1.922	0.057	F=1.949
Intervention	14.36±3.73	15.50±3.61	3.590	0.001	p= 0.164
	*t=0.916	*t=2.065			
	p= 0.361	p= 0.040			
Nutrition					
Control	18.35±3.01	18.57±2.96	0.873	0.385	F=1.849
Intervention	18.75±2.84	19.48±2.78	2.703	0.008	p=0.175
	*t=0.998	*t= 2.302			
	p= 0.319	p=0.022			
Positive life perspective					
Control	19.06±3.17	19.21±3.55	0.519	0.605	F= 0.038
Intervention	18.81±3.50	18.87±3.80	0.257	0.798	p= 0.845
	*t= 0.565	*t= 0.661			
	p= 0.573	p= 0.509			
Interpersonal relations					
Control	18.04±2.73	18.51±2.80	1.896	0.061	F= 0.026
Intervention	17.87±3.02	18.28±3.17	1.616	0.109	p= 0.873
	*t= 0.436	*t= 0.558			
	p= 0.663	p= 0.577			
Stress management					
Control	17.53±2.88	17.60±3.11	0.293	0.770	F= 0.542
Intervention	17.84±2.98	18.17±3.46	1.304	0.195	p=0.462
	*t= 0.795	*t= 1.286			
	p= 0.428	p= 0.200			
Spiritual health					
Control	15.63±3.67	16.19±3.51	1.962	0.052	F= 0.181
Intervention	15.93±3.53	16.31±3.43	1.264	0.209	p= 0.671
	*t= 0.605	*t= 0.260			
	p= 0.546	p= 0.795			
ALP-R2 Total Points					
Control (n: 112)	118.21±15.39	120.47±16.45	1.920	0.057	F=1.226
Intervention (n: 103)	119.54±16.80	123.62±17.29	3.640	0.000	p= 0.269
	*t= 0.610	*t= 1.368			
	p= 0.543	p= 0.173			

Independent- samples t test* ***Paired-samples t test* ** Two-way Repeated-Measures ANOVA*

After the brief interventions, there was a statistically significant increase in the mean scores in the intervention group for exercise self-efficacy compared to the pretest scores ($p<0.01$). No change was observed in the control group. Mean scores on the Dietary Self-Efficacy Scale for both groups were higher than the pretest results ($p< 0.01$). The increase in the ESES and Dietary Self-Efficacy Scale mean scores over time was not statistically significant ($p> 0.05$) (Table-3).

Table 3. Comparison of Intervention and the Control Groups in terms of Mean Scores for Exercise Self-Efficacy Scale and Dietary Self-Efficacy Scale

Scale	Pretest Mean ±SD	Posttest Mean ±SD	Z	p	***F/p
Exercise Self-Efficacy Scale					
Control	32.96±25.56	34.95±25.13	0.718	0.472	F=3.095 p=0.08
Intervention	38.46±26.74	45.71±24.29	2.657	0.008	
	U= 5070.000 p= 0.12	U=4380.000 p=0.002			
Dietary Self-Efficacy Scale					
Control	0.55±5.78	1.79±5.90	2.689	0.007	F= 0.069 p= 0.793
Intervention	1.61±5.22	3.01±5.33	2.776	0.006	
	U= 5155.500 p= 0.178	U=5095.500 p= 0.139			

*Wilcoxon test and Mann-Whitney U test were conducted. *** Two-way Repeated-Measures ANOVA*

After the brief interventions, it was found that the mean number of days on which the mental health of the students in the intervention group was not good and the number of days when their activity was limited due to poor physical or mental health in the past 30 days ($p< 0.05$) were fewer than in the control group. The increases in the mean number of days mental health was not good and the number of activity limitation days over time was not statistically significant ($p> 0.05$) in the intervention group. On the other hand, there was no change after the intervention in the control group (Table 4).

Table 4. Comparison of Intervention and Control Groups in terms ofMean Scores on the CDC HRQOL-4 (Control (n):112, Intervention (n):103)

CDC HRQOL-4 Questions	Group	Pretest $\bar{X}$±Sd	Posttest $\bar{X}$±Sd	Z	p	***F/p
Days when physical health not good during the past 30 days	Control	3.59±5.46	3.73±5.63	.098	.922	F= .830 p= .363
	Intervention	3.65±5.52	3.04±4.46	.915	.360	
		U= 5617.000 p= .733	U=5411.000 p= .421			
Days when mental health not good during the past 30 days	Control	8.16±9.57	7.11±9.05	1.395	.163	F= .937 p= .334
	Intervention	7.44±8.85	5.33±6.75	2.355	**.019**	
		U= 5521.000 p= .584	U=5432.000 p= .455			
Days of activity limitation during the past 30 days	Control	3.95±6.22	3.79±6.14	.302	.763	F= 2.417 p= .122
	Intervention	4.25±6.46	2.93±4.81	2.200	**.028**	
		U= 5385.500 p= .377	U=5564.000 p=.640			

Wilcoxon test and Mann-Whitney U test were conducted. *** Two-way Repeated-Measures ANOVA

Discussion

In this study, it was determined that brief interventions based on the BIM were effective in promoting the health behaviors of adolescents about physical activity, nutrition, health responsibility, total ALP- R2, exercise self-efficacy, dietary self-efficacy and quality of life. Physical activity is essential for a healthy life. After the brief interventions, there was an increase in the mean scores of students from the intervention group on the physical activity subscale of the ALP-R2. Similar studies also show an increase in scores for physical activity and exercise with the intervention (6,7,9). There was no significant increase in the physical activity subscale of the ALP-R2 in the control group.

It is stated in the literature that self-efficacy is an important determinant of behavioral change and is very influential on an individual's decision to start a certain behavior (27). Exercise self-efficacy relates to an individual’s self-confidence about implementing exercise in certain situations (24). For this reason, determining exercise self-efficacy is very important in studies related to physical activity. After the brief intervention, a significant increase was found in the exercise self-efficacy of the intervention group. This result showed that brief interventions aimed at promoting physical activity and other health behaviors help to increase exercise self-efficacy

and physical activity scores, which in turn indicates that highlighting the effect of health-promoting behaviors on social and personal image and providing positive feedback messages are very effective in increasing exercise self-efficacy and physical activity (Positive feedback message: *I see that you exercise regularly. That's great!)*.

After the brief interventions, there was an increase in the mean scores of students from the intervention group on the nutrition subscale of the ALP-R2. The studies of Werch et al. (11,21) and Olson et al.(6) show that there was an increase in positive dietary habits following the brief interventions. After the interventions, there was an increase of 0.74 portions in the daily consumption of fruits and vegetables in the study by Werch et al.(13). Families were included in the study in a different way. The parent communication card sent to families included messages about healthy diets. The families were called on the telephone and asked to read these messages and implement the program. Although such practices have effects on dietary habits, it is thought that they will enhance the application of comprehensive nutrition programs for families and promote positive dietary habits.

Dietary self-efficacy is an individual's perception that he/she can choose healthier nutrition and it is an essential factor that requires consideration while planning attempts to promote nutrition (25). According to the study findings, there was an increase in the dietary self-efficacy scale for both groups. Students in the control group may have deduced the intent of the study and thus provided socially desirable responses on post testing. Similar studies show that children's self-efficacy levels rise in association with dieting after nutrition programs and brief interventions (8,13). These findings are in line with of the results of our study.

In parallel to increases in nutrition and the physical activity results, there was also an increase in the mean scores obtained from the health responsibility subscale of the ALP-R2. During the brief interventions, emphasizing the effects of nutrition, physical activity, sleep and harmful habits on health and personal image in the future increased the scores on this subscale. There was also an increase in total scores obtained on the ALP-R2 in the intervention group. Increases in the health responsibility, nutrition and physical activity subscales led to an increase in the scores of total health behaviors. No increase in the total mean scores was seen in the ALP-R2 subscales of stress management, interpersonal relations, positive life perspective and spiritual health. No intervention was attempted in the domains of the stress management, positive life perspective, spiritual health and interpersonal relations subscales. As opposed to the results of the current study, a study by Werch et al.(13,21) revealed a significant increase in the mean scores for stress management. The Werch et al. study had a different design than ours in that stress management and adopting a positive attitude were emphasized in the brochure given to students after the intervention, which is thought may have enhanced their skills in using stress management techniques.

Quality of life is a multidimensional concept that includes physical health, psychological wellbeing, independence level and social relationships (28,29). Assessment of life quality related to health in attempts to promote health and prevent diseases is of great importance (18). After the intervention, the intervention group displayed a decrease in the number of mean days when their mental health was not good and in the number of activity limitations due to poor physical or mental health in the past 30 days. The same finding was also observed in studies conducted by Werch et al. (11,17,18). Findings by Werch et al. support our findings about mental health and activity limitation. Based on the study results, we can say that brief interventions affect health-related quality of life positively in terms of mental health and activity limitation.

Limitations: The results of the research were based on the students' self-assessments. No objective evaluations, such as of body mass index, were made. One of the limitations of the research was that the parents could only be included in a restricted way. The study also relied on a small sample of adolescents in one school, and thus it has limited generalizability. The study should be repeated with a larger adolescent group. The short-term follow-up period (only 3 months after the intervention) is also a substantial limitation. The study should be repeated with a long-term follow-up period (at 6 months and at one year).

Conclusion

The study findings show that brief interventions increased the intervention group students' scores on the subscales of physical activity, nutrition, health responsibility, total ALP-R2, exercise self-efficacy and dietary self-efficacy. In this study, it was seen that brief interventions based on the BIM are effective in promoting adolescents' health behaviors in a sample of Turkish adolescents.

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