

Obesity Prevention Program for University Students: A Randomized Controlled Study Protocol*

Üniversite Öğrencileri İçin Obezite Önleme Programı: Randomize Kontrollü Çalışma Protokolü

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ABSTRACT

Aim: The purpose of this study was to determine the effects of protective nursing interventions, such as education, healthy nutrition and physical activities for reducing obesity risk, and motivational messages sent via social media on the reduction of obesity risk in university students.

Methods: This randomized controlled study, which has two parallel sections, was conducted with seventy university students in the risk group for obesity. Experimental and control groups were randomly selected and assigned. Interventions regarding nutritional habits, physical activities, and motivational social media messages lasted for eleven weeks. The primary outcome measures were scores for nutrition-exercise attitudes, nutrition-exercise behaviors, and exercise benefits/obstacles. The secondary outcome measures were body mass indexes, waist-to-hip ratios, and body fat percentages. Data were collected by the assistant investigator, not knowing who was in the experimental and control groups. This study ensured blinding in terms of data collectors, statistical analyses, and reporting. The data were analyzed using the SPSS 20 software package.

Conclusion: This study is important as a model that can provide evidence for further studies to be conducted to reduce obesity risk.

Keywords: Obesity, physical activity, nutrition, nursing, randomized controlled trials, university students.

ÖZ

Amaç: Bu çalışmanın amacı; obezite yönünden risk grubunda bulunan üniversite öğrencilerinde obezite riskini azaltmaya yönelik sağlıklı beslenme ve fiziksel aktiviteyi içeren eğitim/uygulamalardan ve sosyal medya aracılığıyla gönderilen motivasyonel mesajlardan oluşan koruyucu hemşirelik girişimlerinin obezite riskini azaltma üzerine etkisini belirlemektir.

Yöntem: Müdahale ve kontrol grubu olarak iki paralel kolu bulunan çalışma üniversite öğrencileri ile Randomize Kontrollü Bir Araştırma şeklinde yürütülmüştür. Araştırmaya obezite riski bulunan 70 üniversite öğrencisi alınmıştır. Müdahale ve kontrol grubu randomize olarak seçilmiş ve atanmıştır. Deney grubuna yönelik beslenme alışkanlıkları, fiziksel aktivite uygulamaları ve sosyal medya aracılığıyla gönderilen motivasyonel mesajlarla ilgili uygulamalar 11 hafta sürmüştür. Birincil sonuç çıktıları; Beslenme-Egzersiz Tutum Puanı, Beslenme-Egzersiz Davranış Puanı ve Egzersiz Yarar Engel Puanıdır. İkincil sonuç çıktıları; Beden kütle indeksi, Bel/Kalça Oranı ve Vücut yağ yüzdesidir. Veriler deney ve kontrol grubunda kimlerin olduğunu bilmeyen yardımcı araştırmacı tarafından toplanmıştır. Deney ve kontrol grubu belirtilmeden bilgisayara kayıt edilen verilerin analizi bir istatistik uzmanı tarafından yapılmıştır. Bu şekilde veri toplayıcılar, istatistiksel analizler ve rapor yazımı yönünden körleme sağlanmıştır. Veriler SPSS 20 paket programı ile hesaplanmıştır.

Sonuç: Bu çalışma üniversite öğrencilerinde obezite riskini azaltmak için yapılacak olan çalışmalara örnek olması ve kanıt sağlaması yönünden önem taşımaktadır.

Anahtar kelimeler: Hemşirelik; beslenme; obezite; fiziksel aktivite; randomize kontrollü çalışma; üniversite öğrencisi.

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Obesity is defined as a condition of abnormal or excessive fat accumulation in the body to the extent that health is impaired.⁽¹⁾ Overweight and obesity are among nine basic factors causing non-communicable diseases.⁽²⁾ Around the world, overweight and obesity cause more deaths compared to lowbody weight. Overweight and obesity are ranked fifth risk among global mortality risks.⁽³⁾

Obesity is a common health problem in all societies and is becoming a global epidemic. The MONICA (The WHO Multinational MONItoring of Trends and Determinants in

Cardiovascular Disease) study, which was conducted by the WHO between 1980 and 1990 in 21 countries located in six different areas of Asia, Africa, and Europe, reported that there was an increase of 10-30% in the prevalence of obesity.⁽⁴⁾ The obesity tendency rate is at an alarming level, especially in children and adolescents. The yearly increase in childhood obesity is gradually growing. Currently, the prevalence of childhood obesity is ten times greater than in the 1970s. The WHO Regional Office for Europe stated that 30-80% of adults and about 20% of children in Europe were overweight. Moreover, a third of them were obese.⁽⁵⁾

The Turkey Nutrition and Health Survey (TBSA) found in 2010(6) that the prevalence of obesity in Turkey was 20.5% and 41.0% in males and females, respectively, and 30.3% overall. The total prevalence of overweight and obesity was found to be 34.6% and 64.9%, respectively. According to Turkish Statistical Institution data from 2012, 34.8% of the population were overweight and 17.2% were obese. Analysis of the results of the Turkey Population and Health Research (TNSA 2013) showed that obesity has gradually increased in women aged 15 to 49 in Turkey. The prevalence of overweight in women aged 15 to 49 was found to be 33.4%, 34.2%, 34.4%, and 55.0% in 1998, 2003, 2008, and 2013, respectively; the prevalence of obesity was found to be 18.8%, 22.7%, 23.9%, and 27.0%, respectively.⁽⁷⁾ With this increasing prevalence of obesity, many other health problems emerge. Overweight and obesity cause half of deaths worldwide and at least 2.8 million adults die annually because of these reasons. Overweight and obesity cause diabetes, ischemic heart disease, and cancer.⁽³⁾

As discussed above, obesity brings about many diseases and an associated financial burden. Thus, the development of various protective and preventative measures, especially for people in obesity risk groups, has gained importance to eliminate this disease and its financial burden. In this sense, it is necessary to focus on preventing patients from becoming obese rather than obesity treatment. Losing weight is difficult and can take a long time owing to the need for long-term behavioral change, balanced/healthy nutrition, and increased physical activity.⁽⁸⁾ It has been reported that it is beneficial to inform people about the health problems linked to obesity⁽⁹⁾ and to encourage young people to take part in exercise by telling healthy people about the importance of healthy nutrition and physical activity, and to organize education programs about reducing the

consumption of high-energy fast foods.^(9,10) It is necessary to deal with young people at risk of obesity in their university years, which is an important period for improving and maintaining health protective and preventative behaviors for weight management and control. For behavioral change, it is necessary to use methods that young people can easily accept and to conduct prevention studies with students in obesity risk groups based on behavioral change to protect them from obesity.

Aim of the study: The purpose of this study is to determine the effect of protective nursing interventions for reducing obesity risk, such as education/practices including healthy nutrition and physical activity and motivational messages that are sent via social media on the reduction of obesity risk in at-risk university students.

Methods

Type of Study

This is a randomized controlled experimental study using a pretest-posttest design.

Study Population/Sample and Inclusion/Exclusion Criteria

Before the experimental study was carried out, a descriptive study was conducted to identify students who were studying in Health Management Department of Health Sciences Faculty, Selcuk University and were at risk of obesity. Analyses performed showed that 103 of 152 students screened had at least one inclusion criterion for this randomized controlled trial. The study population included students whose body mass index (BMI) was between 25.0 and 29.9 or those with a BMI between 18.5 and 24.9 and at risk of obesity according to the risk rating scales.

Inclusion criteria

Those with at least one of these three criteria

- Pre-obese people with a BMI between 25.0 and 29.9
- BMI of 18.5-24.9 and scored above the mean (24-36 points high risk) on the nutritional habits subscale of the Risky Behavior Scale University Form
- BMI of 18.5-24.9 and score below the mean score (8-20 points high risk) on the exercise subscale of the Healthy Lifestyle Behavior Scale

Exclusion criteria

- BMI below 18.5 and above 29.9
- Younger than 19 or older than 24
- Regular drug use
- Any pre-existing health problems
- Pregnant

- Has participated in any weight management program in the last 2 months

Study Group and Power Analysis

The sample size of this randomized controlled trial was determined using power analysis, which was performed by a statistics expert using the GPower 3.1 software. The effect size was calculated to be .2, .5, and .8 with a 5% margin of error. With a power of 95% and an effect size of .8, the sample size was determined to be 35 for both groups. Initially, in case the students refused to participate in the study, the researchers identified ten substitutes for each group.

Randomization and Blinding

Randomization

To reduce selection bias and to control variables that may affect the results, control and experimental groups were assigned by a statistician who did not know the students names or characteristics. In line with the sample size determined using power analysis, 35 students were assigned to each group; a total of 70 students were randomly selected out of 103 students. These 70 randomly selected students were then randomly assigned to the control and experimental groups were 35 students in each group. This study used a stratified sampling method (in terms of gender) to ensure randomization. After the stratification process was completed, the control and experimental groups were randomly assigned by the statistical expert using a table of random numbers. For this method, the statistical expert assigned a number to each student. If any numbers were selected more than once from the random numbers table, the statistician used the table again and determined the control and experimental groups. Experimental and control groups randomization show on Figure 1.

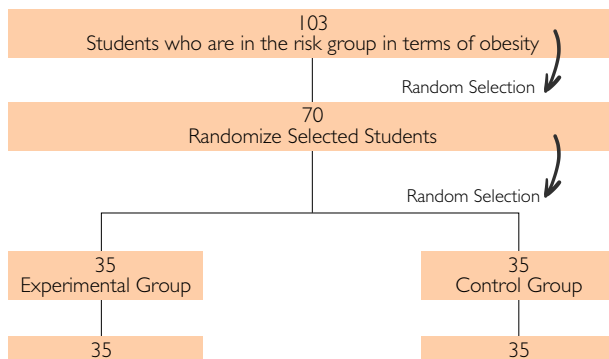


Figure 1. Distribution of experimental and control groups

Before initiating the study, the researchers informed students in both the experimental and control groups about the study and obtained their general consent regarding study participation.

The experimental and control groups had several characteristics

in common. After the separation according to randomization, the groups were determined to be similar (Table 1).

Table 1. Distribution of Similarities in Socio-demographic and Health Characteristics of Students in the Experimental and Control Groups (Pre-Intervention)

Socio-demographic Characteristics	Experiment Group (n: 35)		Control Group (n: 35)		X ²	p
	n	%	n	%		
Gender						
Female	26	74.3	26	74.3	0.000	1.000
Male	9	25.7	9	25.7		
Grade						
1.Grade	11	31.4	10	28.6	4.667	0.097
2.Grade	14	40	7	20.0		
3.Grade	10	28.6	18	51.4		
Perceived Economic Status						
Good	6	17.1	5	14.3	0.108	0.743
Moderate	29	82.9	30	85.7		
Presence of obesity in first degree relatives						
Yes	8	22.9	11	31.4	0.650	0.420
No	27	77.1	24	68.6		

Blinding

Study data were collected and recorded by the assistant investigator, who did not know who was in the experimental and control groups. A statistics expert analyzed the data encoded in terms of groups. After the statistical analyses were performed and the research report was written, the assistant investigator explained the coding used for the experimental and control groups. In this way, this study ensured blinding in terms of data collectors, statistical analyses, and reporting.

Data Collection Tools and Data Collection Method

An information form developed by the researcher, a nutrition–exercise attitude scale, a nutrition–exercise behavior scale, and an exercise benefit/obstacle scale, 24-hour dietary recall form and beverage consumption form were used. This study obtained physical measurements using a body analyzer for body fat percentage and BMI, a pedometer for counting steps, and a tape measure for height, waist, and hip circumferences. Study data were collected by the assistant investigator, who did not know who was in the experimental and control groups. Research flowchart show on Figure 2.

Nursing Interventions for the Experimental Group: The interventions performed for the experimental group for 11 weeks were divided into three categories as follows: education and practices for nutritional habits, education and practices for physical activity, and motivational messages sent via social

media. The interventions were carried out between 7 March and 27 May 2016.

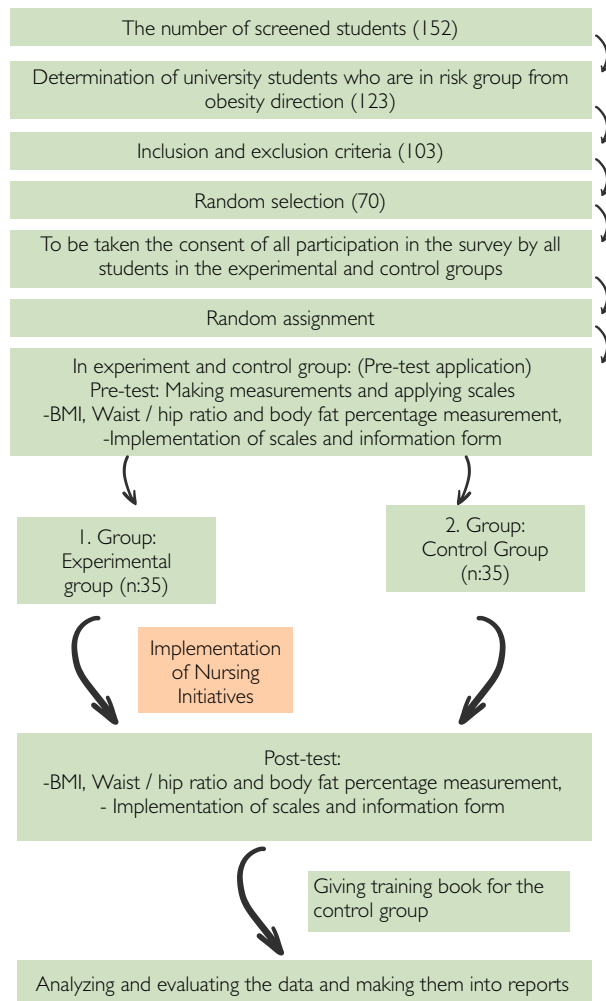


Figure 2. Researchflowchart

Interventions for nutritional habits

Interventions for nutritional habits consisted of group training, individual interventions, and collective events.

- **Group Training:** During the first three weeks, the seminars detailed in Table 2, which included six sessions of 45 minutes about obesity, nutritional habits, and physical activity, were provided to students in the experimental group (Table 2).
- **Individual Interventions:** The researcher held counseling sessions with each student regarding protection from obesity for about 15 minutes every week, and collected information from students using the 24-hour dietary recall form and beverage consumption form. Individual practices also consisted of motivational interviews to encourage students towards healthy nutritional habits and to give counseling them about this issue.
- **Collective Events:** The researchers organized salad eating

contests to increase fruit/vegetable consumption and to improve the motivation of students towards healthy nutrition.

Table 2. Seminar for The Experimental Group

Seminar	Seminar Topics	Educational Guides
Session 1 (9 March 2016)	Information about Obesity	Turkey-specific Food and Nutrition Guide
Session 2 (11 March 2016)	Importance of Nutrition in the Prevention of Obesity	Turkey-specific Food and Nutrition Guide
Session 3 (14 March 2016)	“Super size me” watching and False Nutrition Habits Related to Nutrition	Turkey-specific Food and Nutrition Guide
Session 4 (16 March 2016)	Factors Affecting Healthy Nutrition, Teaching Nutrition Storage and Cooking Techniques and Practice	Turkey-specific Food and Nutrition Guide
Session 5 (21 March 2016)	Importance of Exercise in the Prevention of Obesity	Turkey Physical Activity Guidelines
Session 6 (23 March 2016)	Assessment of Physical Activity Behaviors of Students and Determination of Physical Activities Suitable for Their Own, Perceived Benefits and Obstacles to Continue Physical Activity	Turkey Physical Activity Guidelines

Interventions for physical activity

- **Group training, group exercises, individual interventions, and collective events** were applied for 8 weeks by a specialized sports coach. Group exercises was done at different times for male and female students.
- **Group Training:** During the first 3 weeks, six seminars of 45 minutes about obesity, nutritional habits, and physical activity were provided to students in the experimental group.
- **Group Exercises:** Physical activities were provided 3 days a week for 8 weeks and lasted for 45–60 minutes. Exercises such as aerobics/step and Pilates were offered to students in the experimental group in a sports hall. Students in the experimental group performed physical activities in the sports hall located in campus by a specialized sports coach. The protocol for these exercise types was as follows: Aerobic/Step and Pilates: Students exercised three times a week. This exercise started with a 40-minute practice and extended to 60 minutes. The exercise protocol included a 10-minute warm-up, a 35-minute main phase (aerobic dance), a 15-minute cool down, and stretching/balance (each stretch: 10-15 seconds).
- **Individual Interventions:** These practices included

motivational interviews to increase the numbers of steps walked daily and to increase the amount of physical activity performed by students.

- **Collective Events:** To improve the motivation of the experimental group students regarding physical activity, within the 11-week program, this study organized collective trekking twice, jogging in a stadium located on the campus twice, and four cycling events.

Interventions performed via social media

The researcher sent motivational messages to students about physical activity and healthy nutrition twice a week for 11 weeks. Almost 100 motivational messages were sent using a mobile phone, via WhatsApp and Facebook to the students. Motivational messages about the importance of healthy nutrition and physical activity to avoid obesity were sent twice a week, while messages reminding the students to drink water and to have breakfast were sent every day. Reminders about events and competitions were also sent. In this context, this study shared newspaper articles, brochures, posters about obesity (posters were designed as being similar in terms of content and appearance to short messages sent to students), short videos, public service announcements, and information from the Food and Nutrition Guide Specific to Turkey and the Turkey Physical Activity Guide. Brochure were distributed to students at the training.

Data Analysis

The collected study data were analyzed by computer using SPSS 20.0 statistical analysis software. Kolmogorov-Smirnov, Shapiro-Wilk, and Anderson-Darling tests were used to assess the normality of the data. Cronbach Alpha analysis was applied to determine the reliability of the scales in order to assess internal consistency, and percentages, mean and standard deviation calculations were used for analyzing findings regarding the individual characteristics of the students. Appropriate statistical analyses were used to examine the relationship between the independent variables of the control and experimental groups and anthropometric measurement results and scale scores. A dependent samples t-test was performed to assess the pre- and post-test results of the groups, and an independent samples t-test was used to assess the relationship between the control and experimental groups. The data obtained were tested at the $p < .05$ significance level. Intention to treat (ITT) analysis was also applied. For the ITT analysis, the researcher administered post-tests to three students who left the experimental group during this study to complete the data. To prevent bias when assessing the data encoded by the assistant investigator in the experimental and control groups, data recorded in the database were analyzed by a statistician who was independent of the researcher and the study.

Primary and Secondary Outputs

Primary and Secondary Outputs of the Research were given in Table 3.

Table 3. Primary and Secondary Outputs of the Research

Primary outputs	Secondary outputs
Nutrition-Exercise Attitude Score,	BMI (Height / Weight)
Nutrition-Exercise Behavior Score	Waist / Hip ratio
Exercise Benefit / Obstacle Score	Body fat percentage

Ethical Considerations and Dissemination: The study reported according to the Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) 2013 checklist.⁽¹¹⁾ The study has been approved by Selcuk University, Faculty of Health Sciences Ethics Committee (date: 21.12.2015 and no: 2015/75). This study kept the information obtained from students confidential and informed consent from students. To protect privacy, anthropometric measurements of students were performed in private and were recorded. Study data are used only for the present study; however, if it is desired to carry out an advanced international study, the data may be shared with other researchers. The researcher plans to issue the study findings and results as a report at international conferences and in journals to make a contribution to other researchers and society. The researchers and the fund raising institution do not have any competing or conflicting financial interests. Interventions carried out within this study had no negative effects and no participants were harmed during the study.

Discussion and Conclusion

This study was conducted to determine the effects of protective nursing interventions, such as education and practices regarding healthy nutrition and physical activity, as well as motivational messages sent via social media, on reducing obesity risk in university students. The results showed that the nutrition-exercise attitudes of the students changed positively, control group students experienced a negative change in psychological (dependent) eating behaviors by the end of the 11-week period, interventions had positive effects on the healthy nutrition-exercise behaviors of students, students believed in the benefits of exercise, perceived obstacles regarding exercise were reduced, and the BMI decreased.

Various intervention studies have been conducted to prevent obesity. A systematic review and a meta-analysis study including studies on the prevention of weight gain with life style interventions in young adults examined 771 studies that were conducted about weight management in young adults between 1980 and 2011. A total of nine and eight studies were included in the review and meta-analysis, respectively, taking inclusion and exclusion criteria into consideration. According to the analysis of data collected from the included studies, the experimental group participants lost .87 kg on average (95% CI: -1.56, -0.18), and the control group participants gained .86 kg on average (95% CI: .14, 1.57). Advanced statistical tests determined that interventions made for 4 months or longer ensured more weight loss.⁽¹²⁾ A randomized control study that made some interventions via the internet to prevent obesity in adolescents did not find any difference between the experimental

and control groups in terms of BMI, while it found a difference in terms of sedentary life style, physical activity, healthy nutrition, consumption of fruit, vegetables, sugar, and junk foods, and self-efficiency.⁽¹³⁾ Another study assessed the efficiency of some online interventions in preventing weight gain in university students and determined that online practices are effective and applicable in preventing weight gain.⁽¹⁴⁾ In another study; it has been found that fast food consumption decreases with online interventions to university students. There was a limited effect on the measurement criteria at the end of four months, but the effect of intervention was found to increase over time.⁽¹⁵⁾ In a systematic review of studies involving computer-based obesity-related nutrition education, it was determined that computer-based programs positively affected diet, physical activity, knowledge and self-efficacy.⁽¹⁶⁾

It is stated that health education given to university students about obesity is successful in preventing obesity.⁽¹⁷⁻¹⁹⁾ In a meta-analysis study involving training to reduce body weight and behavior changes, it was found that training given to individuals gave significant positive changes in behavior towards body weight reduction.⁽²⁰⁾ Encouraging healthy lifestyles for the prevention of obesity in young people is a public health priority.⁽²¹⁾ When the literature is examined; it has been determined that education and practices related to healthy nutrition and exercise have an important effect on the healthy life style of the individuals and especially on developing healthy eating behaviors and attitudes. In this respect, our study seems to have similar characteristics to the literature. It is thought that education and practices about healthy eating and regular physical activity reduce the risk of unhealthy eating and physical inactivity.

As a result of social changes, the consumption of high-calorie foods has increased and physical activity has decreased. Thus, the prevalence of obesity has also increased.⁽²²⁾ This study is important because it is a randomized controlled nursing intervention to prevent obesity, which is a global problem. It is believed that this study will act as an example for intervention studies to be conducted for preventing obesity in young people. The study results showed that training and interventions have very important effects on the prevention of obesity and other outcome measures. However, in the future these programs should be administered for more appropriate time durations to be more effective by providing greater decreases in waist to hip ratio and body fat percentage.

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