The Effect of Counseling on Menstrual Hygiene, Physical Activity, and Nutritional Status of Female Adolescent Students: A Randomized Controlled Field Trial

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Abstract

Objectives: Adolescence is a period of maturity between childhood and adulthood and thus is considered as a key step for the establishment of health behaviors. Therefore, the present study aimed to evaluate the effect of consultation on the healthy behaviors of girl adolescents.

Methods: This randomized controlled field trial was conducted on 120 eligible girls aged 14-18 years old who studied in one of the ten stratified randomly selected schools among five districts of Tabriz-Iran from October 2017 to January 2018. The schools were randomly assigned to counseling (n=60) or control (n=60) groups as one pair in each district. The intervention group participated in three 45-60-minute counseling sessions about health behaviors in groups of six students. In addition, demographic, menstrual hygiene questionnaire, food frequency questionnaire (FFQ), as well as the international physical activity questionnaire were completed by participants before and 8 weeks after the intervention. All analyses were based on the intention to evaluate the healthy behaviors of girl adolescents.

Results: Both counseling and control groups were similar in terms of socio-demographic characteristics (*P*>0.05). The adjusted analysis of covariance (ANCOVA) for the baseline scores indicated a significant increase in the mean score of menstrual hygiene in the counseling group compared to the control group (adjusted mean difference =26.63, 95% confidence interval =25.39-27.87). Further, the consumption of milk and vegetable groups increased in the intervention group as compared to the control group (*P*<0.001). However, the mean score of physical activity was not statistically significant between the two groups after the intervention (*P*=0.686) while, based on within-group analysis, a significant increase was observed in the physical activity score in the intervention group (*P*=0.002).

Conclusions: Based on the results of this study, counseling sessions for adolescent girls seem to be a good way to improve their health behaviors and promote the health of future mothers.

Keywords: Counseling, Adolescent girls, Menstrual hygiene, Nutrition, Physical activity

Introduction

Currently, about one-sixth of the world population (1) and, according to the census of 2016, about 14 percent of the population of Iran is composed of adolescents aged 10-19 years old (2). Many of the physical, mental, and social problems, along with unhealthy behaviors arise from the adolescence (3). Adolescence is a life course with distinct physiological signs (4) and is regarded as a critical stage for the establishment of lifestyle (3). In this period, physical, psychological, and emotional maturity begins and continues (3). In addition, adaptation to physical changes in puberty, as well as the new and unexpected reactions of others in social relationships is considered as one of the major responsibilities of adolescent girls (5). Puberty is a

period in which secondary sexual characteristics develop and reproductive ability is acquired (6). This critical stage of growth and development is dependent on genetic, environmental, and physiological factors (7), hormonal changes, general health status, and previous exposures (8).

Health behaviors are those that are expressed to promote the individual's health (9). Further, the health behaviors of adolescent girls who are mothers of tomorrow have a significant impact on the health of the children, family, society, and their environment. Therefore, establishing health behaviors while preventing non-health behaviors in the community are viewed among the main responsibilities of all stakeholders in health and medical professions (10).

Furthermore, menstruation is a recurring physiological

event and its onset is one of the most important changes that occurs in the adolescent girls (11), which may be considered positive or negative in some societies (12). With the onset of the first menarche, the role of adolescent girls in society and their expectations about their responsibilities became different (13). Accordingly, the proper hygiene of this age prevents genital diseases (14) whereas the lack of menstrual hygiene leads to the contamination of the urethra and vagina and pelvic infection (15), causing many women to suffer from gynecology complications throughout their lives (16).

A healthy diet, adequate exercise, and personal hygiene can be highlighted as health promotion behaviors (15, 16). Moreover, promoting a healthy lifestyle is required among the adolescence by encouraging them to adhere to a healthy diet and doing physical activities in order to avoid health problems in their adulthood.

On the other hand, cultural poverty and the lack of awareness can lead to many complicated and costly problems and thus raising awareness through counseling and education is one of the ways for dealing with such problems (17). Counseling is conducted to promote the physical and mental health of adolescents and aims to prevent physical and mental illness (18). In other words, counseling seems to have a huge impact on the health of adolescent girls as future mothers. The World Health Organization identified the educational needs of women and girls as a priority, especially in the field of health. Therefore, implementing a study regarding the adolescent girls' health and its turning point, namely, puberty hygiene in girls, is considered as an obvious necessity (19).

As mentioned earlier, creating health behaviors while preventing unhealthy behaviors in the community are among the responsibilities and duties of all health care and medical professionals including the midwives (10). Previous studies in this field are more descriptive and no field trial has evaluated the effect of education and counseling on a set of health behaviors in the studied population. As a result, the need for a study on adolescent health and puberty hygiene in girls is undeniable (19).

Considering that there is currently no proper framework for counseling about the health behaviors among the adolescents in schools and health care centers, the current study was conducted to determine the effect of counseling on menstrual hygiene, physical activity, and nutritional status of female adolescent students.

Materials and Methods
Study Type and Participants
The present single-blind randomized field trial sought to investigate the impact of counseling on menstrual hygiene, physical activity, and nutritional status of female adolescent students in high schools of Tabriz, Iran. The inclusion criteria included students aged 14-18 years old, studying at high schools and having lower pre-test scores (less than 69 in the menstrual hygiene questionnaire),

showing willingness and having parents' permission to participate in the study, as well as being able to follow up by telephone call. The exclusion criteria encompassed any determined physical and mental illness. The minimum sample size was obtained 60 using G*POWER software, version 3.1.2 and considering 95% confidence, 90% power of the test (two-tail test), and correlation coefficient of 0.28 (17).

Sampling
After obtaining permission from the Ethics Committee (IR.TBZMED.REC.1396.177) and registering the study at Iranian Registry of Clinical Trials (identifier: IRCT2017052034052N1; https://www.irct.ir/trial/26138), multi-stage sampling was performed by obtaining permission from the Education Department of Tabriz. Thus, 10 (2 schools from each district) out of 180 girl's schools (105 governmental and 75 non-governmental schools in five districts) in Tabriz (including 24 626 female students) were selected by stratified random sampling using www.randomizer.org and then the researcher selected the high schools to prepare a list of 14-18 years-old from each high school and 12 students from each school were randomly selected using the mentioned website. To avoid contamination, one of the schools in each district was randomly selected as the control group and the other school as the intervention group. Then, the researcher introduced herself to the authorities of the selected schools, presented the permission letter, and took a good time to hold the consultation. During the visit with the students after studying the criteria of the study, the goals of the study were explained if the students were eligible and informed consent was obtained from the students and one of their parents if they were willing to participate in the study. Then, qualified individuals completed demographic, menstrual hygiene, nutrition (FFQ: Food Frequency Questionnaire), physical activity (IPAQ-sf: International Physical Activity Questionnaire, short form), along with social and economic status questionnaires. Eight weeks after the completion of the consultation, the menstrual hygiene questionnaire, FFQ, and IPAQ-sf were once more completed by the participants.

Randomization and Intervention
A total of 10 schools including 2 schools in each district were randomly assigned to counseling or control groups using the www.randomizer.org website by a person not involved in the research. In addition, to hide the allocation of schools to the counseling or control group, the type of intervention was written by a person, not involved in the study, on a sheet and put inside the closed and opaque envelopes, which were numbered 1 and 2. The researcher assigned numbers 1 and 2 to the envelope for the first and second school in each district. The envelopes were opened after checking the inclusion and exclusion criteria, obtaining the informed consent letter, and completing

the pre-consultation questionnaire. Therefore, none of the researcher or the students were aware of the type of intervention before the consultation. Further, the statistical analyzer was unaware of the type of intervention until after the analysis. Counseling content included training on healthy behaviors and consultation was held on a training-based basis in 3 sessions for 45-60 minutes in the relevant counseling room of the high school. Six participants attended the meeting and the last 20 minutes were dedicated to questioning and answering process. The first session focused on puberty and menstrual hygiene and its impact on adolescent health in the upcoming life stages and the second session was about safe nutritional behaviors and the recommended daily consumption of main food groups in the adolescents. Furthermore, the third session included necessary information about physical activity in this course, along with reviewing the issues discussed in previous sessions. The most important menstrual hygiene issues encompassed changing the hygienic pad and underwear regularly, taking regular shower and using clean clothes, as well as providing information on how to wash the genitalia and hands at each change of hygienic pad, clean the genitalia from front to back, refer to a doctor/ health care personnel during annoying dysmenorrhea, go to school and attend the ceremonies during menstruation, and use medicine and herbal medicines properly in order to reduce dysmenorrhea, nutrition, and supplements and thus prevent iron deficient anemia. Eight weeks after the intervention, the students completed the questionnaires for the second time. At the end of the consultation sessions, the intervention pamphlet was provided to the participants in the intervention group. Moreover, considering the ethical considerations after the completion of the study, a counseling session was organized for the control group, and they were provided with educational pamphlets.

Research Instruments

The individual and demographic data including age, education, parental age, parents' education and occupation, height and weight, and the number of children in the family, were measured using a demographic questionnaire. Additionally, menstrual hygiene was estimated by the menstrual health questionnaire. This questionnaire contains 21 questions on a 4-point Likert-type scale ranging from always, usually, sometimes, and never with a score range of 21 to 84 and a reliability of 0.56. The scores were considered as good, average, and weak in the case they were above 80%, 69%-79%, and less than 69% (13). The questionnaire was translated through the forward and backward method and standardized after permission of the inventor. In addition, the content validity of the questionnaire was approved by 10 professors and experts and the formal validity of the questionnaire was completed by 20 students asking about ambiguous questions. Further, the reliability of the questionnaire was evaluated in 2 dimensions of internal consistency using Cronbach's

alpha and repeatability using intra-class correlation (ICC) on 30 students at a 15-day interval in the form of a test re-test and the ICC (95% confidence interval) and the value of Cronbach's alpha were 0.94 (0.92-0.96) and 0.86, respectively. The frequency of food intake during the last 24 hours was evaluated using FFQ, which included 42 questions. The share of consumption was calculated for each food subcategory and the gained information was entered into a checklist with five options. FFQ is regarded as the best possible instrument for classifying individuals based on the levels of dietary intake and nutrition (20-23). In this questionnaire, 9-11, 2-3, 3-4, 4-5 and 4-5 portions for the bread and cereals groups, the meat subgroup, the milk and dairy groups, the subgroup of vegetables, and the subgroup of fruits are considered as acceptable criteria for adolescents, respectively. Furthermore, the consumed amount less than the above-mentioned levels of nutrition (less than the quorum) was regarded as unhealthy nutrition (23).

Hosseini-Esfahani et al examined the reliability of the FFQ questionnaire and found a correlation coefficient of 0.51 and 0.59 for men and women, respectively (22). In the study by Eslami et al, the ICC value as the coefficient of reliability was 0.98, 0.99, 0.96, 0.85, and 0.94 for bread and cereals group, meat, milk and dairy products, vegetables, and fruits, respectively (23).

In the current study, the ICC value as the coefficient of reliability for the bread and cereals group, meat, milk and dairy products, vegetables, and fruit was 0.97, 0.89, 0.95, 0.91, and 0.88, respectively. Moreover, the average score of physical activity was measured by using the IPAQ short form. The questionnaire includes seven questions related to severe, moderate, and light physical activities (each containing 2 items) and sitting (n=1) and the level of physical activity of the individuals is classified into mild, moderate, and severe levels. Metabolic equivalents for physical activities were calculated using the metabolic equivalent of task (MET). The MET equation was 3.3, 4, and 8 for light, moderate, and severe activities, respectively. Then, these numbers were multiplied by the duration of the mentioned physical activity in minutes and the number of days of doing that activity (24, 25). Finally, those with a physical activity level (METs-min/wk) of less than 600 were considered as a poor physical activity while physical activity levels between 600-3000 and more than 3000 were classified as moderate and severe physical activities (26). Additionally, the total physical activity of the individual during the previous week (MET min/ week) = severe activity (Metabolic equivalent × minute × day) + moderate activity (Metabolic equivalent × minute × day) + light activity (Metabolic equivalent × minute × day). For this questionnaire, the Cronbach's Alpha for reliability was reported 0.7 by Baghiani-Moghaddam et al and its reliability was obtained 0.9 in Iran (27) and 0.61 by Eslami et al (23). In the present study, the reliability of the physical activity questionnaire using Cronbach's alpha was

0.90 and the ICC reached 0.83.

In addition, the socioeconomic status questionnaire was used to assess the socioeconomic status, which had 4 components of income, education, economic class, and housing situation (a total of 6 demographic questions and five main questions). This is a 5-choice questionnaire and its scoring method is very low, that is, equal to 1 to very much equal to 5. Grades 5-11 are considered low whereas grades 12-18 and 19-25 are regarded average and high (28, 29). The validity and reliability of this questionnaire were investigated by Eslami et al and the formal and content validity of the questionnaire were confirmed by 12 sports experts. Further, the reliability of the questionnaire was 83% using Cronbach's alpha (23).

Data Analysis
After completing the questionnaires, the data were analyzed using SPSS software, version 23 at a significant level of 0.05. Furthermore, the normality of quantitative variables was investigated with the Kolmogorov-Smirnov test, showing the lack of normal distribution of physical activity. Moreover, the data were reported as frequency and percent, as well as mean (standard deviation) and median (quartile: Q25-Q75) for qualitative and quantitative variables, respectively. Chi-square and Fisher exact tests and independent t-test were utilized to compare the socio-demographic characteristics as well. Additionally, Wilcoxon and Mann-Whitney tests were employed to compare the average of physical activity in each group

and the mean of physical activity between the 2 groups before and after the intervention, respectively. Similarly, chi-square and Fisher exact tests were used to compare the frequencies of food groups and physical activity between the groups. In addition, independent t test and covariance analysis were applied by controlling the confounders and the baseline score in order to compare the mean of menstrual hygiene scores before and after the intervention and eight weeks after the completion of the study (29). Likewise, paired t test, along with Mann-Whitney test was used to compare the intra-group variables of the study in each group and the menstrual hygiene status between the counseling and control groups. Eventually, the comparison of every menstrual health question was performed using chi-square test or Fisher exact test, followed by comparing demographic characteristics employing independent t-test, as well as chi-square and Fisher exact tests. All analyses were based on the intention to evaluate the healthy behaviors of girl adolescents.

Results
In the current study, 120 female students were randomly selected based on eligibility criteria and randomly assigned to intervention and control groups during (October) 2017-(January) 2018. As shown in Figure 1, there is no sample drop in any of the intervention and control groups. Table 1 demonstrates the demographic characteristics of female adolescent students. Based on the data, the mean (SD) age of the participants in the intervention and control
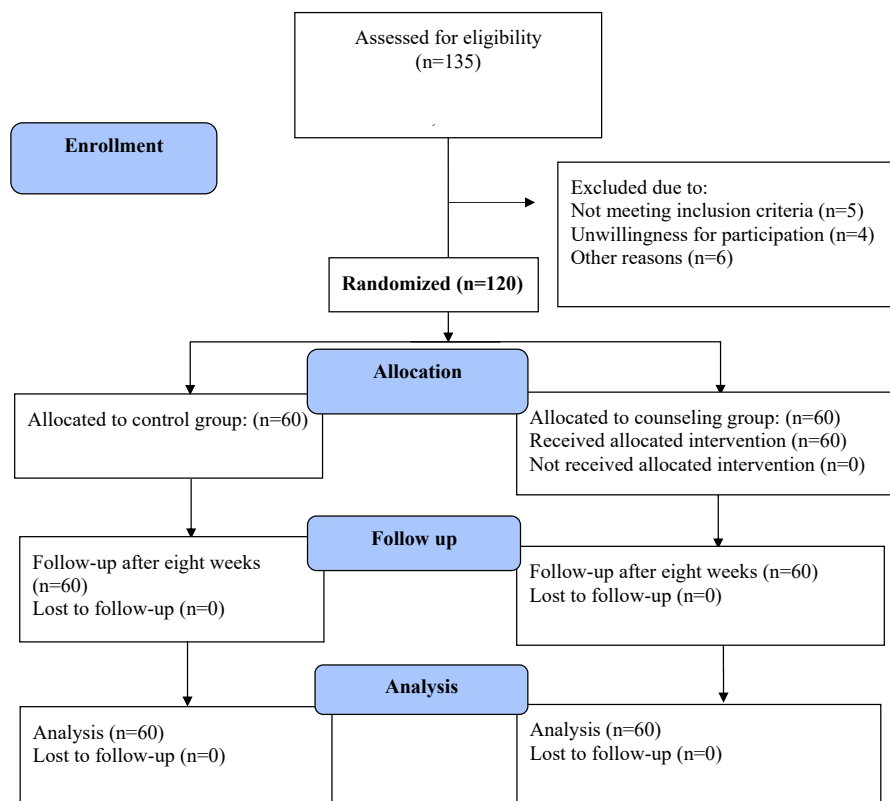
Figure 1. The flow diagram of the progress through the phases of the randomized controlled trial.

Table 1. Demographic Characteristics of Female Adolescent Students

Characteristics	Counselling (n=60), No. (%)	Control Group (n=60), No. (%)	P Value
Age (y)	16.1 (0.79)[a]	16.3 (0.89)[a]	0.197[b]
Father age (y)	47.3 (5.1)[a]	48.4 (5.2)[a]	0.226[b]
Mother age (y)	41.6 (4.9)[a]	42.7 (5.6)[a]	0.244[b]
Economic situation	14.6 (3.2)[a]	15.0 (3.11)[a]	0.897[b]
Father education			0.039[d]
Illiterate	1 (1.7)	1 (1.7)	
Elementary	6 (10.0)	14 (23.3)	
High school	12 (20.0)	2 (3.3)	
Middle school	5 (8.3)	5 (8.3)	
Diploma	18 (30.0)	14 (23.3)	
Academic	18 (30.0)	24 (40.0)	
Father job			0.053[c]
Manual worker	3 (5.0)	5 (8.3)	
Employee	14 (23.3)	20 (33.4)	
Shopkeeper	7 (11.7)	2 (3.3)	
Retired	5 (8.3)	12 (20.0)	
Self-employed	31 (51.7)	21 (35.0)	
Mother education			0.695[d]
Illiterate	0 (0.0)	1 (1.0)	
Elementary	12 (20.0)	9 (15.0)	
High school	8 (13.3)	12 (20.0)	
Middle school	6 (10.0)	5 (8.3)	
Diploma	26 (43.4)	22 (36.7)	
Academic	8 (13.3)	11 (18.3)	
Mother job			0.872[c]
Housewife	49 (81.7)	48 (80.0)	
Working indoors	3 (5.0)	2 (3.3)	
Working outdoors	8 (13.3)	10 (16.7)	
Adequacy of income			0.326[d]
Enough	39 (65.0)	40 (66.7)	
Fairly sufficient	21 (35.0)	18 (30.0)	
Inadequate	0 (0.0)	2 (3.3)	
Living condition			0.820[c]
Mother and father	53 (88.3)	52 (86.7)	
Father	4 (6.7)	3 (5.0)	
Mother and grandfather	1 (1.7)	0 (0.0)	
Mother	2 (3.3)	4 (6.6)	
Father and grandma	0 (0.0)	1 (1.7)	
Number of family members			0.750[d]
Three and less	14 (24.1)	12 (20.0)	
Four	30 (51.8)	35 (58.3)	
Five and more	14 (24.1)	13 (21.7)	
The order of child birth			0.596[d]
First	34 (56.7)	29 (48.3)	
Second	16 (26.7)	19 (31.7)	
Third	7 (11.6)	7 (11.7)	
Fourth and more	3 (4.0)	5 (8.3)	

[a] Mean (standard deviation); [b] Independent t-test; [c] Fisher exact test; [d] Chi-square test.

groups is 16.1 (0.79) and 16.3 (0.89) years and that of the fathers is 47.3 (5.1) and 48.4 (5.2) in the intervention and control groups, respectively. Further, the mean (SD) age of the mothers is 41.6 (4.9) and 42.7 (5.6) in the intervention and control group, respectively. The mean (SD) of the socioeconomic index in the intervention group is 14.6 (3.2) and 15.1 (3.1) in the control group. Most fathers and

mothers in both groups have university degree and diploma (60% and 63.7% for fathers vs. 43% and 26% for mothers in the intervention and the control groups, respectively). The majority of fathers in both groups have a free job (51% and 35% in intervention and control groups). Conversely, most of the mothers in both groups are housewives (81% in the intervention group and 80% in the control group). As regards the family income and living condition, most of the families in both groups have sufficient family income (65% in the intervention group and 66% in the control group) and the majority of the students live with their parents (88% in the intervention group and 86% in the control group). Regarding the number of family members, there are 4 individuals in more than half of the participants' families in both intervention (50%) and control (58%) groups. Furthermore, most of the students are the first child of the family (56% in the intervention group and 48% in the control group). Therefore, there is no significant difference between the 2 groups in terms of demographic information ($P > 0.05$).

Moreover, as indicated in Table 2, the mean (SD) of menstrual hygiene score is 49.19 (4.02) and 54.35 (4.7) before the intervention in the intervention and control groups, which is significantly different ($P < 0.001$). Using analysis of covariance (ANCOVA) test while controlling the baseline scores, the mean score of menstrual hygiene is found to be 79.8 (1.75) after the intervention in the counseling group whereas that of the control group is 55.66 (4.62), showing a significant difference between the 2 groups in this regard ($P < 0.001$; adjusted mean difference (aMD): 26.63, 95% CI of 25.39-27.87). Therefore, the mean (SD) score of menstrual hygiene demonstrates an increase from 49.19 (4.02) to 79.80 (1.85) in the intervention group (MD = 30.1, 95% CI of 31.0-29.0) whereas within-group analysis indicates no significant difference in the control group in this respect (MD = 1.3, 95% CI of 1.8-0.76). The comparison of the frequency of menstrual hygiene status in teenage girls before and eight weeks after the intervention is presented in Table 3. Based on the results, menstrual hygiene status is similar (weak) in 2 intervention and control groups ($P = 1.000$) before the intervention while there is a significant difference between the 2 groups after eight weeks following the intervention ($P < 0.001$). In other words, menstrual hygiene status is moderate in 34 (56.7%) and week in 26 (43.3) girls in the intervention group whereas it is week among the entire participants in the control group. Additionally, the results of the Wilcoxon test show a significant improvement in the menstrual hygiene status of the intervention group eight weeks after the intervention ($P < 0.001$). In addition, significant differences are observed between the 2 groups regarding questions 10, 11, and 14-21 before the intervention ($P < 0.05$). Further, based on the results of Mann-Whitney test, the participants of the intervention group demonstrate significantly better responses to all questions compared to the control group after 8 weeks of

Table 2. The Mean Score of Menstrual Hygiene in Teenage Girls Before and 8 Weeks After the Intervention

Menstrual Hygiene	Intervention (n=60) Mean (SD)	Control (n=60) Mean (SD)	aMD (95% CI)	P
Before intervention	49.19 (4.02)	54.35 (4.70)	-5.0 (-6.0--3.0)	<0.001[a]
8 Weeks After intervention	79.80 (1.85)	55.66 (4.62)	26.0 (25.0-27.0)	<0.001[b]
MD (95% CI)[$]	30.1 (31.0-29.0)	1.3 (1.8-0.76)		
P	<0.001[c]	<0.001[c]		

Abbreviations: MD: Mean difference; aMD: adjusted mean difference.
[a] Independent t-test; [b] Covariance analysis with baseline and adjacent control; [c] Paired t test; CI: Confidence interval.

Table 3. The Comparison of the Frequency of Menstrual Hygiene Status in Teenage Girls Before and Eight Weeks After the Intervention

Menstrual Hygiene	Intervention (n=60)			Control (n=60)			P
	Good, No. (%)	Moderate No. (%)	Weak No. (%)	Good No. (%)	Moderate No. (%)	Weak No. (%)	
Before intervention	0	0	60 (100)	0	0	60 (100)	1.000[a]
8 weeks after intervention	0	34 (56.7)	26 (43.3)	0	0	60 (100)	<0.001[b]
P	<0.001[b]			1.0[b]			

[a]Mann-Whitney test; [b]Wilcoxon test;
The score above 80%, 69%-79%, and less than 69% are considered as good, average and, weak, respectively (24).

follow up ($P < 0.001$). Wearing clean and dry underwear during menstruation, replacing the hygiene pad overnight, cleaning the genital system from front to back, using the bathroom during menstruation, and cleansing the genitalia when replacing the hygiene pad are of the most important menstrual health issues which indicate a significant improvement after the intervention in the training group.

Regarding the physical activity, the median (Q25-Q75) of its score is 454.5 (625.5-299.29) and 475.5 (757.5 to 233.2) in the intervention and control groups before the intervention, which according to the results of the Mann-Whitney test it fails to have a significant difference ($P = 0.663$). Furthermore, the median (Q25-Q75) of physical activity score is 477 (729.7-0.318) in the counseling group after the intervention, which is not significantly different from the control group with a median (Q25-Q75) of 492.5 (693.5-260.2) ($P = 0.686$). According to the results of the Wilcoxon test, the difference in mean score is significant in the level of physical activity in the counseling group ($P = 0.002$) while the difference in median score is not significant in the control group ($P = 0.138$). Moreover, none of the people in the intervention group have severe physical activities before and after the counseling program. However, in the control group, 6.7% and 3.3% of the participants have severe physical activities before the beginning of the study and eight weeks after the study. No statistically significant difference is found between the 2 groups ($P = 0.119$). Additionally, moderate physical activity among the participants is 43.3% and 50% in the intervention and control groups, respectively, before the intervention ($P = 0.583$), which reaches 58.3% and 41.7% after the intervention ($P = 0.100$). The frequency of mild physical activity (walking) is found to be 96.7% and 93.3%,

respectively, in intervention and control groups before the intervention ($P = 0.997$) whereas these percentages are 95% and 98.3% after the intervention, ($P = 0.619$), the details of which are provided in Table 4.

Table 5 represents the nutritional status of the girls eight weeks after the intervention. Bread and cereal group consumption in two-thirds of the girls (66%) is 9-11 portions per week in both groups before the intervention ($P = 0.535$). Therefore, no significant difference is observed in bread and cereals between the 2 groups after the intervention ($P = 0.078$). Based on the results, the counseling group consumes less meat and alternative group before the intervention compared to the control group ($P = 0.046$). Conversely, there is no significant difference regarding the consumption of meat and alternative group between the 2 groups after the intervention ($P = 0.681$). As regards the intake of milk and dairy products, the results show an improvement in the counseling group after the intervention compared to before the intervention. In other words, the consumption of less than 3 portions of milk per week from 31% before the intervention reduces to 3% after the intervention and the consumption of 3-4 portions of milk per week from 50% increased to 86% ($P < 0.001$). Similarly, vegetable consumption demonstrates an increase in counseling group after the intervention compared to before the intervention so that consuming less than 4 portions of vegetables per week decreases from 70% before the intervention to 28% after the intervention while the consumption of 4-5 portions of vegetables per week from 23.3% demonstrates an increase to 0.63% ($P < 0.001$). Based on the results, the pattern of fruit consumption is similar in both groups before the intervention and most students consume more than 3 portions per week. In addition, there is no significant

Table 4. The Comparison of Mean Score and the Frequency of Physical Activities in Adolescent Girls Before and Eight Weeks After the Intervention in Counseling and Control Groups

Physical Activity (MET-min/wk)		Intervention n=60		Control n=60		P	P
		Baseline	8 Weeks After Intervention	Baseline	8 Weeks After Intervention		
Median (Q75-Q25)		445.5 (297.0-625.5)	477.0 (318.0-729.7)	475.5 (233.2-757.5)	492.5 (260.2-693.5)	0.563[a]	0.686[a]
P		0.002[b]		0.138[b]			
Physical activity, No. (%)							
Severe	Positive	0 (0.0)	0 (0.0)	4 (6.7)	2 (3.3)	0.119[c]	0.496[c]
	Negative	60 (100.0)	60 (100.0)	56 (93.3)	58 (96.7)		
Moderate activity	Positive	26 (43.3)	35 (58.3)	30 (50.0)	25 (41.7)	0.583[c]	0.100[c]
	Negative	34 (56.7)	25 (41.7)	30 (50.0)	35 (58.3)		
Mild activity (walking)	Positive	58 (96.7)	57 (95.0)	56 (93.3)	59 (98.3)	0.679[c]	0.619[c]
	Negative	2 (3.3)	3 (5.0)	4 (6.7)	1 (1.7)		

Abbreviation: MET: Metabolic equivalent of task.
[a] Mann-Whitney test; [b] Wilcoxon test; [c] Fisher exact test.
Physical activity level less than 600 METs-min/wk: poor physical activity, between 3000-600: moderate physical activity, and more than 3000: severe physical activity.

Table 5. The Nutritional Status of Girls 8 Weeks After the Intervention in Counseling and Control Groups

Food groups[a]	Before Intervention, n=60			Eight Weeks After Intervention, n=60		
	Intervention No. (%)	Control No. (%)	P	Intervention No. (%)	Control No. (%)	P
Bread and cereals			0.535 [b]			0.078 [b]
<9	17 (28.3)	14 (23.3)		24 (40.0)	19 (31.7)	
9-11	40 (66.7)	40 (66.7)		35 (58.3)	34 (56.7)	
>11	3 (5.0)	6 (10.0)		1 (1.7)	7 (11.6)	
Meat and alternatives			0.046 [b]			0.681 [b]
None	2 (3.3)	1 (1.7)		0 (0.0)	1 (1.7)	
<2	6 (10.0)	9 (15.0)		1 (1.7)	2 (3.3)	
2-3	28 (46.7)	14 (23.3)		31 (51.7)	28 (46.7)	
>3	24 (40.0)	36 (60.0)		28 (46.6)	29 (48.3)	
Milk and dairy products			0.450 [b]			<0.001 [b]
None	1 (1.7)	2 (3.3)		0 (0.0)	1 (1.7)	
<3	19 (31.7)	12 (20.0)		2 (3.3)	16 (26.7)	
3-4	30 (50.0)	32 (53.3)		52 (86.7)	29 (48.3)	
>4	10 (16.6)	14 (23.4)		6 (10.0)	14 (23.4)	
Vegetables			0.082[b]			<0.001[b]
None	4 (6.7)	9 (15.0)		0 (0.0)	5 (8.3)	
<4	42 (70.0)	29 (48.3)		17 (28.3)	43 (71.7)	
4-5	14 (23.3)	21 (35.0)		38 (63.3)	10 (16.7)	
>5	0 (0.0)	1 (1.7)		5 (8.3)	2 (3.3)	
Fruits			0.820 [b]			0.200 [b]
None	2 (3.3)	3 (5.0)		4 (6.7)	11 (18.3)	
<3	9 (15.0)	12 (20.0)		29 (48.3)	25 (41.7)	
3-4	19 (31.7)	19 (31.7)		26 (43.3)	24 (40.0)	
>4	30 (50.0)	26 (43.3)		1 (1.7)	0 (0.0)	

[a] Daily consumption of food groups is expressed as the frequency of consumed portions.
[b] Fisher Exact test.
Each portion of bread and grains: a slice of bread in the size of the palm of her hand, half a glass of cooked rice or pasta, three-fourths of the glass of cooked grains.
Each portion of milk and dairy group: one glass of milk or yogurt, 30-45 g cheese, 2 glasses of sour milk.
Each portion of meat group: 60 g of very low-fat meat, cooked birds or fish, one egg or one second of a glass of cooked beans or a quarter of nuts.
Each portion of vegetable group: a glass of raw vegetables, or half a glass of cooked vegetables.
Each portion of fruit group: one medium fruit number or one cut of watermelon or cantaloupe; half a glass of fruit juice; half a glass of compote of fruits; one quarter of dried fruit glasses.

difference in the level of fruit consumption in both groups after the intervention ($P < 0.001$).

Discussion

The tendency toward healthy behaviors and correct lifestyle can be created in people by education (30). Although various studies emphasize that many human behaviors and norms in later years of life are formed in adolescence and can be corrected in this age, few studies are conducted regarding improving the health behaviors of teenage girls (10,19). Therefore, the current study attempted to determine the effect of counseling on menstrual hygiene, physical activity, and nutritional status of female adolescent students.

The results of this study showed that consultation significantly improved the status of menstruation health, as well as its mean score in the participants of the counseling group as compared to the control group ($P < 0.001$). Conversely, the mean score of physical activity was not statistically significant between the 2 groups after intervention. However, based on within-group analysis, a significant increase was observed in the physical activity score of the intervention group ($P = 0.002$). Further, the consumption of milk and vegetable groups increased in the intervention group in comparison to the control group ($P < 0.001$).

Therefore, the consultation can modify health behaviors in adolescent girls. After the intervention, there was a significant difference between the 2 groups concerning all menstrual health questions. According to the experts, teaching and giving information about health behaviors to the teenagers improved the health behaviors and contributed to academic achievement (23). Spear et al in a review of 34 studies on teenage health behaviors and related factors showed that providing health information, especially from health care providers and nurses to the teenagers, leads to the promotion of health behaviors (31) Similarly, Auemaneekul et al (13), as well as Sudeshna et al (14) and Yasmin et al (32) reported that teenage girls need special education about menstruation and education has a great impact on menstrual hygiene. Auemaneekul et al emphasized that health education is a must-have for educational inadequacies. Furthermore, providing sanitary toilets for health care is important for promoting the health of teenage girls and correcting their habits (13). Talk about menstrual problems with friends, teachers, and health educators is easier for teenage girls and health education is a necessity, thus training is essential for health educators of the schools (13,32). Ali et al concluded that unsanitary practices and misconceptions about girls need correction by education (33). Moreover, Shahbazi et al showed that designing appropriate educational programs is critical for promoting health behaviors (34). Additionally, Zabihi indicated that education on puberty and menstruation health has a positive effect on the girls'

health behaviors, which is in line with the results of the current study (35). Based on the reports of another study, teenage girls prefer not to go to school and stay at home because of the fear of bleeding during menstruation (36). In the present study, like the study by Auemaneekul and Adhikari (13,37), girls preferred to use a bath during menstruation.

The recommended amount of main food groups including bread and cereal group, meat subgroup, milk and dairy group, vegetable subgroup, and fruit subgroup for the adolescents is 9-11, 2-3, 3-4, 4-5, and 4-5 portions, respectively (23). A limited number of necessary educational interventions were conducted to improve the dietary intakes and increase physical activity in teenage girls who were suffering from nutrition disorders and the lack of physical activity. Several studies emphasized that many of the behaviors and norms of humans are formed in adolescence and thus can be reformed in this age (1, 3). According to the results of the present study, it is notable that the mean physical activity was generally at a poor level in the 2 groups. Investigating the impact of educational programs on teenager's awareness, attitude, and general health, Keramati et al found that educational programs have a positive effect on teenage girls' awareness, attitude, and general health (38). In this regard, Niazi et al evaluated the status of primary school students and concluded that education based on health belief model has an important role in increasing the level of awareness about the necessity of physical activity and the amount of physical activity for the students (39). Additionally, Teymouri et al examined the effect of school-based intervention using the Pender Health Promotion model in order to increase the physical activity of female students in Sanandaj-Iran and found a significant increase in the level of physical activity of the students in the intervention group (40). Similarly, Afghari et al showed that educational interventions lead to an increase in teenage girls' awareness in relation to health issues (41). In addition, Eisenstein et al demonstrated that educational interventions not only increase the awareness and the hygiene performance of the individuals (42). In another study by M'Imunya et al, counseling and education were found to be effective in preventing and continuing the treatment of diseases in teenagers (43). Further, Ozer et al concluded that counseling prevents high-risk behaviors in adolescents (44), which is compatible with the results of the present study. However, based on the result of the current study, the participants showed a low level of physical activity (poor physical activity in both groups of the study, that is, less than 600 MET-min/wk in average). Therefore, considering the adverse and undesirable health consequences of low physical activity due to urban and industrial lifestyle, and on the other hand, because of the significant effect of educational interventions in increasing the physical activity of the students, the pursuit of compassionate interventions

by authorities and experts respecting charging the situation seems necessary. Therefore, according to the results of existing studies in different countries regarding the weakness of knowledge and behaviors of teenage girls, and the results of the present study respecting the positive impact of health counseling on these people, health counseling is recommended in schools, especially by the health personnel. Considering the significance of the results and the lack of suitable counseling sessions in schools as the most important learning base in the current era, the authorities are required to make appropriate programs in line with these results. The educational and counseling planning of the schools and collaboration with health personnel is very important in this regard.

The present study had some limitations which need to be acknowledged. A relatively small sample size, short term intervention, and investigation of the status of teenage girls in Tabriz were among the limitations of this study, which limit the generalizability of the results to the community. Therefore, more studies with more sample size and long-term interventions in different cities with various cultures and ethnic backgrounds are suggested to evaluate the effect of education on healthy behaviors among teenage girls. Furthermore, the low tendency of adolescent girls to fill in the questionnaires was considered as another limitation that was solved by giving appropriate awards. However, the lack of sample loss and the blindness of the data analyst are regarded as the strengths of this study.

Conclusions
In general, the results of this study showed that teaching in a plain and understandable language to adolescent girls can improve menstrual hygiene in this age group. Moreover, counseling can modify the amount of receiving the recommended dietary in adolescent girls. Therefore, training on the necessity of menstrual hygiene and its importance in teenage girls is suggested while considering the participation of schools and health authorities in education. Finally, schools and health officials in the education department are recommended to conduct necessary training regarding the importance of adhering to healthy nutritional principles in teenager girls, as well as educational warnings about the consequences of poor physical activity in this age group.

Conflict of Interests
Authors have no conflict of interests.

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