

## The Effect of Online Family-Centered Care on the Lifestyle of Adolescent Girls with Obesity

\*Fatemeh Sadat Seyed Nematollah Roshan<sup>1</sup>, Marjan Akhavan Amjadi<sup>2</sup>, Sahar Mahjoub Vagheae Dashti<sup>3</sup>

<sup>1</sup>PhD, RN, Assistant Professor, Department of Nursing, Faculty of Nursing and Midwifery, Tehran Medical Sciences Branch, Islamic Azad University, Tehran, Iran

<sup>2</sup>PhD, Assistant Professor, Department of Midwifery, Faculty of Nursing and Midwifery, Tehran Medical Sciences Branch, Islamic Azad University, Tehran, Iran.

<sup>3</sup>MSN Student, Department of Nursing, Faculty of Nursing and Midwifery, Tehran Medical Sciences Branch, Islamic Azad University, Tehran, Iran.

ARTICLE INFO	ABSTRACT
<p><b>Article type:</b> Original Article</p> <hr/> <p><b>Article History:</b> <b>Received:</b> 01 Des 2022 <b>Accepted:</b> 28 May 2023</p> <hr/> <p><b>Key words:</b> Empowerment, Teenagers, Overweight, Technology</p>	<p><b>Introduction:</b> Obesity is associated with many adverse health consequences. Apart from the problem of genetics, an unfavorable lifestyle can be the main cause. Due to significant technological advances and widespread acceptance by adolescents, technology can now be used to improve their lifestyles. This study assessed the effectiveness of online family-centered care on the lifestyle of adolescent girls with obesity.</p> <p><b>Materials and Methods:</b> This semi-experimental study was conducted after choosing 60 adolescent girls with obesity divided into two groups randomly. The research tools included demographic and HPLP_II questionnaires. 11 online sessions were held for the case group. The post-test was carried out after 1.5 months.</p> <p><b>Results:</b> After the intervention, there was a significant difference between the control (112.23±8.53) and case (125.8±10.91) in the mean score of the Lifestyle (P&lt;0.001). In contrast, before the intervention independent t-test showed no significant difference between the two groups (P=0.397). Before the study, the mean weight and BMI were not statistically significant between the two groups (P=0.511 and P=0.063). After the intervention, there were significant changes in girls' weight (P=0.023) and BMI (P=0.144).</p> <p><b>Conclusion:</b> Results showed that family-centered care through new communication technologies effectively improved the lifestyle of adolescent girls with obesity.</p>
<p>► <b>Please cite this paper as:</b> Seyed Nematollah Roshan FS, Akhavan Amjadi M, Mahjoub Vagheae Dashti S. The Effect of Online Family-Centered Care on the Lifestyle of Adolescent Girls with Obesity. Journal of Patient Safety and Quality Improvement. 2023; 11(2): 127-133. Doi: 10.22038/PSJ.2023.69322.1383</p>	

### \*Corresponding Author:

Department of Nursing, Faculty of Nursing and Midwifery, Tehran Medical Sciences Branch, Islamic Azad University, Tehran, Iran. E-mail: f.roshan@iautmu.ac.ir

## Introduction

Until a few years ago, obesity worldwide was limited to adults; however, it has also affected children and adolescents in the last two decades. Obesity and overweight are seen among children of all races and social and economic classes. Findings show that about 80 to 90% of obese adolescents become obese adults with obesity-related diseases (1). Obesity is a multifactorial metabolic disorder associated with increased body fat that begins and progresses due to multiple interactions between genetic, economic, social, cultural, and behavioral factors. According to some findings, adolescents are more prone to healthy lifestyle changes than adults. The important point is that the role of the family in this matter cannot be ignored (2). Studies on the factors affecting childhood obesity have found that parents are involved in the development of childhood obesity. The finding of Fuller's study has shown that having an inappropriate role model in the family can also lead to changes in a healthy lifestyle in the children of that family (3). Unfortunately, in the last three years in Iran, obesity in adolescent boys and girls has increased globally due to lifestyle changes during the Corona epidemic.

Staying at home for a long time, anxiety and stress, changing sleep patterns, limited access to some foods as a result of food hoarding and food insecurity, increased consumption of processed foods with higher calorie content, reduced activity at home, a significant reduction in outdoor physical activity and the closure of sports centers and the sharp increase in the intake of various vitamins to prevent the covid virus can increase the prevalence of obesity in this age group. During this period, adolescents have been more in touch with their parents,

making them the most important role models in their lifestyle.

It should be noted that if obesity is not treated, its consequences can affect people throughout their life cycle and, like other chronic diseases, affect the person affected by this disease and his family members. Therefore, patients should be empowered better to control their weight (4, 5). In recent years, family-centered care has had special importance in nursing research and is considered necessary.

In addition to focusing on the needs of children and adolescents, family-centered interventions also focus on the needs of parents and the entire family system. The duties of a nurse are to provide family-oriented care, interaction and communication with family members, and the ability to make positive changes in the family by using each member's strength and power.

With the continuation of this relationship, parents find a fundamental and positive role in making decisions in important and fateful matters for their children. The nurse's duty in this context is not to interfere and influence the family's decisions but to support and realize them (6). Because adolescent girls will be future mothers in each society, the health of this population can affect the health of the next generation (7). The present study assessed the effectiveness of online family-centered care on the lifestyle of adolescent girls with obesity.

## Materials & Methods

The present semi-experimental case and control study was conducted on 60 obese teenage girls and their active family members living in Tehran who were selected by random cluster sampling (with 95% confidence; test power of 80% and counting 10% loss) (8).

$$n = \frac{(z_{1-\alpha/2} + z_{1-\beta})^2 (s_1^2 + s_2^2)}{(\bar{x}_1 - \bar{x}_2)^2} = \frac{(1/96 + 0/84)^2 (0/65^2 + 0/6^2)}{(3/72 - 4/2)^2} = 25/7 \cong 26$$

$$\Rightarrow 26 + 0/10(26) \cong 30$$

$$30 \times 2 = 60$$

The inclusion criteria in this study were:

- 1- teenage girls between 12-18 years of age,
- 2- having obesity based on the school health records and clinical assessment performed by the researcher, and height and weight control and BMI calculation (body mass index of  $25 < \text{BMI} < 29.9 \text{ kg/m}^2$  according to the criteria of the World Health Organization) (9),
- 3- willingness to participate in research (written consent was achieved from all participants),
- 4- the ability to work with digital platforms and internet access,
- 5- having a specified address and phone number for follow-up.

Meanwhile, girls with a history of physical/ mental ailments, genetic disorders, hearing or visual disorders, and history of surgery and using a special diet, weight loss medication, or any medication with weight gain side effects and also those whose parents were members of the health team were excluded from the study. The research tools had two sections: A) the demographic questionnaire, including 11 questions for girls and their parents. B) HPLP II - Health Promoting Lifestyle Profile - II (an instrument designed by Walker, S.N., & Hill-Polerecky, D.M. 1987) (10).

The 52-item HPLP<sub>II</sub> composes a full scale and six subscales to measure behaviors in the theorized dimensions of a health-promoting lifestyle (spiritual growth, interpersonal relations, nutrition, physical activity, health responsibility, and stress management). The response criterion is a 4-point Likert scale (Never, sometimes, often, always). The total score range of health-promoting behaviors is between 52 and 208 (10). The HPLP<sub>II</sub> is a standard questionnaire used several times in Iran. Mohammadi Zaidi reported a Cronbach's alpha coefficient of 0.82 for the whole instrument and 0.79 to 0.91 for the subscales (11). In this research, the tool was given to 10 students to measure the reliability. Cronbach's alpha calculated for the whole scale was 0.908, and subscales (0.60-0.81).

After the ethics approval by the university, one of the six districts of Tehran city was selected using the cluster random sampling method. There are 11 high schools in the selected area, one of which was randomly selected. Out of 350 students in that school, 87 were overweight according to the health record, and 17 did not meet the entry criteria

according to the clinical examinations conducted with meters and calibrated weights. The remaining 60 subjects were randomly divided into two groups control and case. The study group was divided into six equal groups, and 11 online training sessions were held for each group for six weeks with the help of a team link. In each session, the researcher spoke for the first half hour. After a few minutes of rest, the teenagers were asked to talk about the pamphlet presented to them in the meeting, and in the last 45 minutes, parents and teenagers discussed, and their questions were answered. The final evaluation was performed 1.5 months after the intervention in both groups. The data were analyzed using SPSS version 16 software, descriptive statistics, Chi-square test, paired sample T-test, and independent sample T-test. The Kolmogorov-Smirnov and Fisher tests were used to normalize the data, and statistical significance was considered at  $P < 0.05$ . Finally, regarding ethical considerations, the research results were provided to the study participants in both groups. In terms of observing the ethical issues of the research, an online training session was held for 2 hours for the control group, and all educational issues about obesity were taught, their questions were answered, and an educational electronic booklet was provided to them.

## Results

In this study, the mean age of the adolescents in the control group was  $14.13 \pm 0.81$ , and in the case group was  $14.13 \pm 0.73$ . No significant statistical difference was observed in age with the chi-square test, and the two groups were homogeneous regarding age.

The mean BMI of adolescents in the control group was  $27.54 \pm 2.01$ , and in the case group was  $27.27 \pm 1.01$ . Before the study, the height, weight, and body mass index of adolescents in both groups were assessed, which was not statistically significant between the mean of them. However, after the intervention, there were significant changes in the weight ( $P=0.023$ ) and body mass index ( $P=0.144$ ) of adolescents after 1.5 months (Table 1).

**Table 1:** Comparison of demographic information in adolescent girls with obesity in case and control groups

Age	Control Frequency (%)	Case Frequency (%)	P-value
12-14	8(26.7)	6(20.0)	P*=0.567
14-16	10(33.3)	14(46.7)	
16-18	12(40.0)	10(33.3)	
Mean ± SD	14.14±0.81	14.13±0.73	
p**	P=0.001		
Weight	Mean ± SD	Mean ± SD	P**
Before	72.76±7.52	69.36±6.34	P=0.511
After	72.70±7.62	68.40±6.63	P=0.023
p***	P=0.489	P<0.001	
BMI	Mean ± SD	Mean ± SD	P**
Before	27.54±2.01	27.27±1.01	P=0.063
After	27.52±2.06	26.88±1.10	P=0.144
p***	P=0.476	P<0.001	

P \*\*= Chi – squared te P \*\*\*= Independent t – test P\*\*\*= paired t-test BMI=Body mass index

Chi-squared test ( $\chi^2$ ) showed that there was no significant difference between the case and control groups in terms of other demographic characteristics ( $p>0.05$ ). Based on the independent t-test, there was no significant difference between the total score of HPLP<sub>II</sub> in the case & control group before intervention ( $P=0.397$ ). However, after the intervention, it was significant ( $P<0.001$ ). Paired t-test showed there was a significant difference in the case group in the level of HPLP<sub>II</sub> mean score of the girls in all dimensions before and after intervention

( $p<0.05$ ); It is noteworthy that this difference was insignificant in all dimensions in the control group except to stress management ( $P=0.002$ ) and interpersonal relationships ( $P=0.055$ ) before and after of the study. Based on the results, the change score in all dimensions before and after the intervention in the case group was positively significant ( $P<0.001$ ), while in the control group, there were no significant changes, except for physical activity, which was negatively significant ( $P<0.001$ ) (Table 2).

**Table 2:** The change score of total and sub-dimensions of HPLII in adolescent girls with obesity in the case and control group

Dimensions	Before Mean ± SD	After Mean ± SD	Change score Mean ± SD	P**
Nutrition				
Control	20.86 ± 2.27	21.00 ± 2.69	0.14±0.42	0.838
Case	20.26 ± 2.33	23.03 ± 3.36	2.77±1.03	<0.001
P*	0.317	0.012		
Health responsibility				
Control	31.33 ± 5.72	33.31 ± 4.71	1.98±1.01	0.091
Case	33.33 ± 4.71	36.76 ± 4.84	3.43±0.13	<0.001
P*	0.110	0.007		
Physical Activity				
Control	25.50 ± 4.27	19.93 ± 4.75	-5.57±0.5	<0.001
Case	19.30 ± 5.05	27.63 ± 3.55	8.33±1.5	<0.001
P*	<0.001	<0.001		
stress management				
Control	12.00 ± 2.37	14.06 ± 3.00	2.06±0.63	0.002
Case	13.00±1.98	18.46 ± 3.57	5.46±1.59	<0.001
P*	0.082	<0.001		
Spiritual growth				
Control	17.56 ± 4.24	19.03 ± 3.29	1.47±0.95	0.150
Case	18.46 ± 3.58	21.70 ± 4.49	3.24±0.91	<0.001
P*	0.379	0.011		
Interpersonal relationships				
Control	16.16 ± 2.98	17.10 ± 2.38	0.94±0.6	0.055
Case	16.30 ± 2.84	18.50 ± 2.75	2.2±0.09	<0.001
P*	0.860	0.039		
Total HPLII				
Control	107.63± 9.93	112.23± 8.53	4.6±1.4	0.051
Case	109.66± 8.45	125.8 ± 10.91	16.14±2.46	<0.001
P*	0.397	<0.001		

P\*=Independent t-test P\*\*=paired t-test

### Discussion

Previous research shows the causal role of families in shaping obesity-related behaviors in children. Consequently, all childhood obesity prevention programs should be family-centered. Evidence supports the benefits of involving the family as a whole, rather than children alone, in preventing childhood obesity, as it empowers families to make healthier lifestyle choices (12).

Therefore, in this study, we asked parents to actively participate in changing the lifestyle of obese girls. Based on the results, the implementation of family-centered care positively affected the lifestyle of the case group. The level of lifestyle in girls increased significantly after the study in the case group and reached  $109.66 \pm 8.45$  to  $125.8 \pm 10.91$ .

Also, the average weight score of girls in the case group decreased from  $72.70 \pm 7.62$  to  $68.40 \pm 6.63$  after the study, while this change was not significant in the control group ( $P=0.511$ ). Although the BMI in the case group did not reach the optimal level, which may be due to the short interval between the time of weight and height control, the average is slightly closer to the optimal level. It is consistent with the results obtained by Cohen et al., which indicated the significant effect of family-oriented lifestyle intervention in improving body composition and bone mass of obese children (13).

In the mentioned study, the researcher only focused on the diet, and the intervention was done face-to-face. In contrast, in the present study, an attempt was made to change the whole lifestyle dimensions with the online participation of teenagers and parents in the intervention to reduce teenagers' weight. Christina Oh et al. also stated in their study that digital media had been increasingly used to deliver clinical treatments and therapies. However, there is not much evidence for the impact of digital interventions on health promotion (14).

Due to the corona epidemic and school closures, the use of digital methods (Team-Link program) in changing the lifestyle of teenagers was an innovation in this study during this critical period.

In the online nutrition training session, teenagers were taught how to consciously

choose and consume essential foods for health. It includes choosing low-fat foods, white meat, fruits, and dairy products. They were also taught how to calculate the daily calorie requirement. After the intervention, there was a significant difference between the lifestyle score in the nutrition dimension in the control and case groups ( $P=0.012$ ). A study has shown that the use of smartphone applications and texting has been effective in changing eating habits (15).

Also, a study was conducted by Robson et al. in which parents and children participated in a 10-week cooking class program to encourage less eating out. The results of this study showed that the proportion of dinners eaten outside the home by families decreased significantly from 56% at baseline to 25% after the intervention. They concluded that a culinary intervention with behavior modification might be a successful way to help families become healthier (16). The data from our study support the findings of these two studies. The result of the semi-experimental study by Metaji Amirrouf showed that the use of the family-oriented empowerment model in educational classes for obese women was effective in changing their eating behavior in such a way that good eating behavior increased from 21.4% to 61.9% ( $P=0.002$ ) (17) which is in line with our data. The health responsibility training session emphasized the importance of responsibility in finding correct health information, paying attention to health, health education, consulting with medical staff on health-related issues, and searching for reliable medical information.

After the intervention, a noticeable change in the girls' responsibility for their health was observed. In contrast, this value was insignificant in the control group ( $P<0.001$ ). Adolescence is the most sensitive phase of a person's life, and there is a possibility of widespread psychological problems such as depression, antisocial behavior, academic failure due to the dynamic changes of puberty, and hidden diseases such as anemia. In order to change this situation, it is necessary to accept teenagers responsibly and, at the same time, involve families in health programs. Khatirpasha et al. state that

adolescents should be self-sufficient in assessing their health status and receiving health information (18).

In the physical activity session, due to the spread of covid and the need for home quarantine, only muscle relaxation methods, participation in light, moderate activities and fitness sports related to educational videos such as stretching exercises at home, fast walking in the room and avoiding sitting for a long time was emphasized. By assessing the level of physical activity in the case group ( $P < 0.001$ ), we found the empowerment intervention useful in this study. According to the study of Rad et al., family-based empowerment programs can be beneficial for improving physical activity among people with asthma (19), which is consistent with the findings of our study. Unbelievably, the changes in the control group were also significant but negative. The average score went from  $25.50 \pm 4.27$  to  $19.93 \pm 4.75$ .

In the stress management session, parents were recommended as the main supporters of the teenager. Stress management techniques, active listening, and allowing adolescents to express problems were taught. Rest and sleep, reading books, and listening to music were recommended during stress and fatigue. After checking the data, there was a significant difference before and after the intervention in the case group ( $P < 0.001$ ) and in the control group ( $P = 0.002$ ), which may be due to the attention to pre-test questions and personal search for stress management techniques.

The spiritual growth session focused on self-satisfaction, hope for the future, and the importance of losing weight and striving to achieve the goal. In this dimension, there was a significant difference between the case and control groups after the intervention ( $P = 0.011$ ).

In the interpersonal relationship session, teenagers were told to discuss their goals with their families. In this session, the importance of expressing concern, love, and sharing thoughts and feelings through verbal and non-verbal messages, using communication to achieve meaningful closeness and intimacy, was trained. After a month and a half, the interpersonal relationship mean score increased

significantly in the case group, while it was insignificant in the control group ( $P = 0.055$ ).

In each session, it was clear that communication between parents and adolescents improved, leading to support for positive health behaviors that affect obesity. Smith et al. also stated in their study that individual family-centered intervention improves parent-child relationships. This positive behavior supports dietary habits and mediates obesity in children aged 6 to 12 (20). These findings are consistent with the present study. According to the results of the present study, the change score in all dimensions before and after the intervention in the control and case groups was positive, except for physical activity in the control group, which decreased after one and a half months. The reason may be that teenagers were forced to stay home due to the coronavirus quarantine and the closure of sports centers.

Finally, the findings of this study showed that family-oriented care with the help of digital communication tools is effective in improving the lifestyle of adolescent girls with obesity. However, due to the small sample size of this study, our conclusions are not conclusive and cannot be generalized. Adolescents completed the questionnaires with the help of their parents, and they may have self-medicated without the knowledge of the researcher, which was one of the limitations of this research. Also, the difference in the individual characteristics and psychological conditions of teenagers and their parents in response to the intervention was another limitation of this research. Another limitation of this study was the lack of studies conducted to increase the overall lifestyle of adolescents with obesity.

In conclusion, given the lifestyle differences during epidemics and the need for appropriate interventions, government officials should improve online programs encouraging families to promote healthy living. Extensive studies with larger sample sizes and evaluation of the long-term effects of such family-oriented programs with digital platforms to promote public health are recommended.

### Acknowledgments

This study was approved by the Research Council and Ethics Committee of the Medical Sciences Branch, Islamic Azad University, Tehran, Iran (Code IR. IAU. TMU. REC. 1400.243. Date 03/01/2022). We would like to thank the research administration of the Tehran Medical Sciences Branch, Islamic Azad University, and all girls and their parents who dedicated their valuable time to participate in this study.

### Reference

1. Abdollahi F, Rouhani Otaghsara S, Yazdani-Charati J. Prevalence of obesity and overweightness among adolescents in Mazandaran Province. *Journal of Guilan University of Medical Sciences*. 2017;25(100):28-37. [In persian].
2. Birjandi Bardsakan R, Adhami Moghaddam F, Sahebalzamani M. Investigating the relationship between the lifestyle of parents and obese children and its comparison in single and multi-child families in primary schools of Mashhad City. *Medical Science Journal of Islamic Azad University-Tehran Medical Branch*. 2020;30(2):185-192.
3. Fuller AB, Byrne RA, Golley RK, Trost SG. Supporting healthy lifestyle behaviors in families attending community playgroups: parents' perceptions of facilitators and barriers. *BMC Public Health*. 2019;19(1):1-11.
4. Bhattacharya S, Aggarwal P, Bera OP, Saleem SM, Shikha D, Vallabh V, Juyal R, Singh A. COVID-19 and childhood obesity (CO-BESITY) in the era of new normal life: A need for a policy research. *Journal of Public Health Research*. 2021;10(21):2673.
5. Patterson RR, Sornalingam S, Cooper M. Consequences of covid-19 on the childhood obesity epidemic. *BMJ: British Med J (Online)*. 2021;373.
6. Nasrabadi H, Nikraftar F, Gholami M, Mahmoudirad G. Effect of Family-centered Empowerment Model on Eating Habits, Weight, Hemoglobin A1C, and Blood Glucose in Iranian Patients with Type 2 Diabetes. *Evidence Based Care*. 2021;11(1):25-34.
7. Ghorbannejad H, Alizadeh M, Didarloo A, Bakhshimoghaddam F. Association between food habits and overweight and obesity in 12-15 years old adolescent female students in Urmia. *Journal of Sabzevar University of Medical Sciences*. 2020;27(2):121-129. [In persian].
8. SeyedNematollahRoshan Fs, Navipor H. , Alhani F. "Effect of Family-Centered Empowerment Model (FCEM) on quality of life of mothers having teenagers with iron deficiency anemia. 2014;3 (2): 27-40. [In persian].
9. Großschädl F, Haditsch B, Stronegger WJ. Validity of self-reported weight and height in Austrian adults: sociodemographic determinants and consequences for the classification of BMI

categories. *Public health nutrition*. 2012;15(1):20-27.

10. Tanjani PT, Azadbakht M, Garmaroudi G, Sahaf R, Fekrizadeh Z. Validity and reliability of health promoting lifestyle profile II in the Iranian elderly. *International journal of preventive medicine*. 2016;7:74.

11. Jafari Varjoshani N, Avazeh A, Alizadeh S, Kamali K. A Comparative Study of Health-Promoting Lifestyle and Quality of Life among Nurses and High School Teachers in Zanjan, Iran in 2018. *Preventive Care in Nursing & Midwifery Journal Zanjan University of Medical Science*. 2020;10(3):1-10.

12. Davison KK, Lawson HA, Coatsworth JD. The family-centered action model of intervention layout and implementation (FAMILI) the example of childhood obesity. *Health promotion practice*. 2012;13(4):454-61.

13. Cohen TR, Hazell TJ, Vanstone CA, Plourde H, Rodd CJ, Weiler HA. A family-centered lifestyle intervention to improve body composition and bone mass in overweight and obese children 6 through 8 years: a randomized controlled trial study protocol. *BMC Public Health*. 2013;13(1):1-5.

14. Oh C, Carducci B, Vaivada T, Bhutta ZA. Digital interventions for universal health promotion in children and adolescents: a systematic review. *Pediatrics*. 2022;149.

15. Schoeppe S, Alley S, Van Lippevelde W, et al. Efficacy of interventions that use apps to improve diet, physical activity and sedentary behaviour: a systematic review. *Int J Behav Nutr Phys Act*. 2016;13(1):127.

16. Robson SM, Stough CO, Stark LJ. The impact of a pilot cooking intervention for parent-child dyads on the consumption of foods prepared away from home. *Appetite*. 2016;99:177-184.

17. Mataji Amirrood M, Taghdisi MH, Shidfar F, Gohari MR. The impact of training on women's capabilities in modifying their obesity-related dietary behaviors: Applying family-centered empowerment model. *Journal of research in health sciences*. 2014;14(1):76-81.

18. Khatirpasha S, Farahani-Nia M, Nikpour S, Haghani H. Puberty health education and female students' self-efficacy. *Journal of Client-Centered Nursing Care*. 2019;5(4):231-238.

19. Rad GH, Mahmoud FK, Nemati A. Evaluation of the effects of the familycentered empowerment model on the nutrition style and physical activity of patients with asthma. *Medical-Surgical Nursing Journal*. 2016;5(2):35-41.

20. Smith JD, Berkel C, Jordan N, Atkins DC, Narayanan SS, Gallo C, Grimm KJ, Dishion TJ, Mauricio AM, Rudo-Stern J, Meachum MK. An individually tailored family-centered intervention for pediatric obesity in primary care: study protocol of a randomized type II hybrid effectiveness-implementation trial (Raising Healthy Children study). *Implementation Science*. 2018;13(1):1-5.