Original Article

Evaluating the Effect of Lifestyle Education Based on Health Belief Model for Mothers of Obese and Overweight School-age Children on Obesity-Related Behaviors

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Abstract

Background: Nowadays, childhood obesity is a matter of significant concern because of its negative effects on personal health and harmful socioeconomic consequences. The purpose of the present study was to evaluate the effectiveness of lifestyle education based on the health belief model for mothers of obese and overweight school-age children on obesity-related behaviors. **Materials and Methods:** In this quasi-experimental study, 64 obese and overweight elementary students and their mothers who met the inclusion criteria participated. The participants were randomly categorized into two groups (experimental and control). The experimental group received the considered interference, which consisted of four educational sessions based on the health belief model. Data collection tool was a standard questionnaire. The questionnaire filled by the participants during interviews conducted before, immediately after, and two months after the intervention. Data were analyzed using Mann–Whitney, Chi-square, student's *t*-test, repeated-measures analysis of variance, and least significant difference tests. **Results:** Mean scores of obesity-related behavior before the intervention were not significantly different between the experimental and control group (53.41 (6.78). vs 54.72 (4.63); $P = 0.37$), however, were different immediately after (58.41 (6.88) vs 54.81 (4.66); $P = 0.02$) and two months after the intervention (62.34 (8.62) vs 55.84 (7.59); $P = 0.002$). **Conclusions:** This study indicated the effectiveness of lifestyle education based on the health belief model for improving obesity-related behaviors. Therefore, the use of this educational program is recommended for mothers.

Keywords: *Childhood obesity, education, health belief model, Iran, mothers, nursing*

Introduction

Obesity is one of the main global health problems.[1] Obesity and overweight among children has been tripled during the past 3 decades.[2] According to World Health Organization, in 2013, more than 40 million children were overweight.[3]

Obesity during childhood can cause respiratory problems, orthopedic problems, high blood pressure, cardiovascular diseases, insulin resistance, and psychological problems. In addition, it leads to obesity during adulthood.[3,4] Lifestyle has a significant role on either causing or preventing obesity.[5] Because educational programs have a positive effect on weight control and having healthy behaviors among children and their parents,[1,6] the risk of this problem can be reduced by appropriate and consistent training.

Because eating habits and parents' health beliefs can affect the child's weight, parents have a fundamental role in maintaining their childrens' weight; hence, designing educational programs for mothers can lead to weight control in children.[4] In fact, if training can help parents become more sensitive about obesity, its complications, and severity and lead them toward the correct behavior, it is mostly probable that both the parents and the child would choose the correct behavior.[7]

Unfortunately, despite all trainings concerning obesity, the prevalence of obesity is still increasing; therefore, it appears that if a health training has a theoretical basis, it could be more effective.[8]

Health belief model (HBM) is one of the oldest health behavior theories,[9] which has positive effects on lifestyle modification.[10-12] On the other hand, behavioral recommendations for controlling obesity among children, which are based

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on this model[14] are simple and practical and can easily be transferred to children by their mothers. Most of the previous studies regarding controlling obesity provided training for obese children, and despite the fundamental role of mothers in children's weight management, their education has mostly been ignored. Therefore, the present study was conducted to evaluate the effect of lifestyle training based on the health belief model for mothers of obese and overweight children regarding obesity-related behaviors.

Materials and Methods

In a semi-experimental study, which was conducted in 2014 (August 23 to December 22), 64 mothers of obese and overweight students of the fifth and sixth grades were enrolled after obtaining their written consent. Sample size was calculated using an appropriate formula with a confidence interval of 95% and test power of 80%. Sampling was conducted after taking permission from the ethics committee of Isfahan University of Medical Sciences. For sampling, through drawing, first from the six educational districts of Isfahan, one district was selected, and then from the schools of the selected district, 4 elementary schools (2 for boys and 2 for girls) were randomly selected. Selected schools were considered for random allocation to both the groups of control (32 participants) and intervention (32 participants). Then, after referring to the selected schools, fifth and sixth grades students who met the inclusion criteria were selected through continuous simple sampling. The inclusion criteria were having a body mass index (BMI) of more than 85th percentile, not having any hormonal or diagnosed disease related to obesity, and having mentally and psychologically healthy mothers. BMI was calculated by dividing the weight (kilograms) by the square of height (meter). The weights were measured using one scale, which was calibrated with a 1-kg weight, and measurement was conducted with the least clothing and no shoes. Height was measured while standing, without bending the knees, and from the top of the head to the heels using a tape measure that was embedded on the wall. Then, the percentile of children's BMI was checked on reference charts.[13]

The intervention included proving healthy lifestyle training for controlling children's obesity based on the health belief model to mothers of the intervention group in two groups of 16 persons during 4 sessions (each session lasted 45–50 min) for each group, along with providing educational notes and pamphlets regarding obesity in children. At the end of the study, the control group also received the educational intervention.

Topics such as the definition of obesity, effective factors of obesity, role of healthy diet and physical activities in preventing obesity, solutions for having a healthy diet and increased physical activity, healthy management of watching television, and the importance of family exercise were discussed during educational sessions. Regarding the perceived threats, topics such as the high prevalence of obesity, children's obesity or overweight, and negative consequences of problems of childhood obesity were discussed. The perceived benefits of the importance of maintaining appropriate weight in children's health were also discussed. Regarding the perceived barriers, mothers were introduced to some of the existing barriers, including lack of educational programs on healthy diets, insufficient space and time for exercising at school, TV advertisements about unhealthy snacks, consuming junk food by friends' child, and high costs of sports classes.

Data collection tools were demographic characteristics questionnaire and a standard questionnaire for evaluating knowledge, attitude (perceived threat, benefits, and barriers structures), and performance related to obesity among children,[14] which were completed at three stages, i.e. before, immediately after, and 2 months after the intervention by interviewing the mothers. Eight questions of knowledge domain were answered as "correct," "wrong," or "don't know," and 16 questions of attitude and 17 questions of performance domains were scored based on a 5-point Likert scale. Higher scores indicated mothers' high knowledge and better attitude as well as desirable behaviors of parents and child for controlling obesity.

Data were analyzed using Mann–Whitney, Chi-square, independent *t*-test, repeated-measures analysis of variance (ANOVA), and post-hoc least significant difference (LSD) tests with the Statistical Package for the Social Sciences version 15 (SPSS Inc., Chicago, IL, USA).

Ethical considerations

All subjects were enrolled in the study after obtaining the necessary permissions from authorities and written Consent from the subjects.

Results

In this study 150 mothers who met the inclusion criteria participated. After providing written consent, the subjects were randomly allocated into two groups (control and intervention). During 4 months of intervention and follow-up, 57 mothers in the control group and 29 in the intervention group were excluded from the study because of absence during one or more educational sessions, and eventually, data of 32 participants in each group were analyzed. Demographic data of the participants are shown in Table 1.

The mean scores of obesity-related behaviors in children in the intervention group before, immediately after, and 2 months after the intervention were 28.92 (5), 32.83 (5.87), and 35.64 (6.14), respectively, and in the control group were 24.66 (3.14), 24.04 (3.58), and 24.16 (2.84), respectively. Independent *t*-test showed that this score had no significant difference between both the

Table 1: Comparison of experimental and control group in terms of demographic characteristics

Variable	Experimental (n=32) Mean (SD)	Control (n=32) Mean (SD)	P (Test)
Father's BMI	27.85 (4.67)	28.31 (4.99)	0.70 (t-test)
Mother's BMI	28.11 (3.73)	28.21 (4.41)	0.92 (t-test)
Number of family members	3.94(0.95)	3.84 (0.68)	0.65 (t-test)
Father's Education level	Z=0.007		0.99 (Mann-Whitney)
Mother's Education level	Z=0.19		0.85 (Mann-Whitney)
Father's job*	χ^2=7.84		0.35 (Chi-square)

*All mothers were housewives

groups before the intervention (P = 0.33), however, the differences between both the groups were significant after (0.02) and 2 months after the intervention (0.01). Repeated-measures ANOVA showed that this score had a significant difference in the intervention group among the three time intervals, and it was significantly higher at the times of immediately after (P = 0.006) and 2 months after (P < 0.001) the intervention compared to before the intervention; however, the difference between the score of immediately after and 2 months after the intervention was not significant (P = 0.08). These scores had no significant differences in the control group (P = 0.35).

In the intervention group, the mean scores of obesity-related behaviors before, immediately after, and 2 months after the intervention were 24.42 (3.5), 25.63 (2.87), and 26.84 (3.28), respectively, and in the control group were 24.66 (3.14), 24.04 (3.58), and 24.16 (2.84), respectively. Independent t-test showed no significant difference between both the groups regarding this score before (P = 0.7) and immediately after the intervention (P = 0.06); however, it was significantly higher in the intervention group 2 months after the intervention compared to the control group (P = 0.001). Repeated-measures ANOVA and LSD showed that these scores had significant differences among the three time intervals in the intervention group and was significantly higher 2 months after the intervention compared to before the intervention (P = 0.01); however, the difference between the scores of before and immediately after the intervention (P = 0.15) and immediately after and 2 months after the intervention (P = 0.18) were not significant. The mean scores of different structures of the health belief model are shown in Table 2.

Discussion

Results showed that the mean scores of obesity-related behaviors in children had no significant difference between both the groups before the intervention, however, their differences were significant immediately after and 2 months after the intervention. Moreover, the mean scores of obesity-related behaviors in mothers had no significant difference between both the groups at the times of before and immediately after the intervention, however, their difference was significant 2 months after the intervention. Results also showed that the mean scores of obesity-related behaviors in children were significantly increased in the intervention group immediately after and 2 months after the intervention compared to before the intervention. The mean scores in the control group showed no significant changes at the three time intervals.

Obesity-related behaviors in the mothers of the intervention group 2 months after the intervention was significantly higher than that before the intervention, however, the difference between the intervals after the intervention was not significant; whereas among the mothers of the control group, the differences between the three scores were not significant. Considering the improvement of behaviors in general and in children in the intervention group and no significant difference in mother's behavior immediately after the intervention, it could be said that, although the educational program was designed for mothers, the contents of educational courses were probably transferred by the mothers to their children and the change occurred faster among children than mothers; the reason could be that making lifestyle changes is harder for older people compared to the young, and lifestyle modification requires more time in them as it was observed 2 months after the educational program, that the changes in mothers were also significant.

A study conducted by Cason and Logan in South Carolina, America, indicated that educating fourth grade students about the food pyramid and physical activity would improve their diet-related health behaviors.[15] Azadi *et al*. also reported that executing educational program for teenage students in Tehran city, Iran would improve their nutritional behaviors.[16] Sabet Sarvestani *et al*. in their study indicated that behavior modification programs, including problem solving trainings, yoga, food habits, and appropriate physical activity for teenage girls, would improve their nutritional behaviors.[17]

Results of the present study are in line with the abovementioned studies with one difference; the present study was based on the health belief model and focused on educating mothers. Therefore, it could be said that the present program has helped mothers to become more sensitive about obesity, its complications, and severity, and by increasing their knowledge, they could transfer correct health behaviors to their children. Furthermore, the results showed that, in the intervention group, the mean score of knowledge in mothers,

Table 2: Mean scores of the health belief model element in two groups

Variable	Time	Experimental (*n*=32) Mean (SD)	Control (*n*=32) Mean (SD)	*P* (*t*-test)
Knowledge	Before	19.12 (1.75)	19.47 (1.22)	0.37
(max score=24)	Immediately after	23.28 (1.25)	19.66 (1.26)	<0.001
	Two months after	23.34 (0.94)	20.12 (1.26)	<0.001
P value (repeated-measures ANOVA)		<0.001	0.09	
Perceived threat	Before	18.06 (2.33)	17.50 (1.50)	0.25
(max score=20)	Immediately after	19.22 (1.90)	17.62 (1.36)	<0.001
	Two months after	19.34 (1.80)	17.12 (1.98)	<0.001
P value (repeated-measures ANOVA)		0.03	0.53	
Perceived benefits	Before	11.69 (1.69)	11.84 (2.20)	0.75
(max score=15)	Immediately after	12.97 (2.12)	12.00 (1.65)	0.04
	Two months after	12.97 (2.04)	11.87 (2.20)	0.04
P value (repeated-measures ANOVA)		0.03	0.95	
Perceived barriers	Before	31.03 (5.10)	30.50 (4.40)	0.66
(max score=45)	Immediately after	33.19 (4.03)	30.81 (3.98)	0.02
	Two months after	33.34 (4.29)	30.69 (4.45)	0.02
P value (repeated-measures ANOVA)		0.05	0.95	
Obesity related behaviors (mother and their children)	Before	53.41 (6.78)	54.72 (4.63)	0.37
(max score=85)	Immediately after	58.41 (6.88)	54.81 (4.66)	0.02
	Two months after	62.34 (8.62)	55.84 (7.59)	0.002
P value (repeated-measures ANOVA)		<0.001	0.75	

immediately after the intervention was higher than before the intervention, and this increase continued till 2 months after the intervention. Moreover, the mean score of perceived threat in mothers immediately after and 2 months after the intervention was significantly higher than before the intervention.

Conclusions

In the present study, results showed that the executed educational program for mothers led to control of obesity-related behaviors until 2 months after the intervention. Hence, it appears that understanding the importance of obesity and its complications as a serious health threat for children by mothers could change their behaviors to make efforts for eliminating existing barriers for controlling their child's weight and would also modify obesity-related behaviors in children. We had a limitation of following up the behaviors in participants for more than 2 months because of unwillingness of participants, hence, a further study is required in this field.

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Conflicts of interest

There are no conflicts of interest

References

1. Peyman N, Ezzati Rastegar K, Taghipour A, Esmaily H. Effect of Education on the Weight Self-Efficacy lifestyle among Adolescent Girls with Overweight and Obesity. Armaghane Danesh 2012;17:117-28.
2. Dennison BA, Edmunds LS. The role television in childhood obesity. Prog Pediatr Cardiol 2008;25:191-7.
3. Rahmati M, Kazemi A, Nekoie N, Kerendi H. Sprint interval training effect on leptin, insulin and lipid serum levels and BMI in obese children. Iran J Diabetes Metab 2015;14:265-72.
4. Kang HS, Ryu MH, Park S. The Effects of a Weight Loss Program Focusing on Maternal Education on Childhood Obesity. Asian Nurs Res 2008;3:150-7.
5. Ochoa MC, Moreno MJ, Martinez MA, Martinez JA, Marti A. Predictor factors for childhood obesity in a Spanish case-control study. Nutrition 2007;23:379-84.
6. Danielsen YS, Nordhus IH, Júlíusson BP, Mæhle M, Pallesen S. Effect of a family-based cognitive behavioral intervention on body mass index, self-esteem and symptoms of depression in children with obesity (aged 7–13): A randomised waiting list controlled trial. Obes Res Clin Pract 2013;7:116-28.
7. Meshesha B. Factors influencing voluntary counseling and testing service utilization associated with VCT utilization among youths in Arbaminch town: A Health Belief Model approach. Res Social Adm Pharm 2007;8;48-58.
8. Ghaffari M, Tavassoli E, Esmaillzadeh A, Hasanzadeh A. The Effect of Education based on Health Belief Model on the improvement of osteoporosis Preventive Nutritional Behaviors of Second Grade Middle School Girls in Isfahan. Health Syst Res 2010;4:714-23.
9. Rahmati Njarklayy F, Niknam Sh, Amin shokravi F, Ahmadi F, Jafari M, Rahnema P. Application of health belief model in the field of AIDS prevention programs for students. J Payesh 2009;8:349-59.

10. Sullivan KA, White KM, Young RM, Scott CJ. Predictors of intention to exercise to reduce stroke risk among people at risk of stroke: An application of an extended Health Belief Model. Rehabil Psychol 2008;2:294-8.
11. Pinto SL, Lively BT, Siganga W, Holiday Goodman M, Kamm G. Using the Health Belief Model to test factors affecting patient retention in diabetes related pharmaceutical care services. Res Social Adm Pharm 2006;2:38-58.
12. Ebadiazar F, Solhi M, Pakpour A, Yekaninejad MR. The impact of health education through Health Belief Model (H.B.M) on mother's perceptions about obesity children obese male student in elementary schools (17th district, Tehran City). Journal of Health Administration 2006;8:7-14.
13. Chiocca EM. Appendices. In: Chiocca EM, editor. Advanced pediatric assessment, 3rd ed. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2011. p. 538-9.
14. Golshiri P, Yarmohammadi P, Sarrafzadegan N, Shahrokhi S, Yazdani M, Pourmoghaddas M. Developing and validating questionnaires to assess knowledge, attitude, and performance toward obesity among Iranian adults and adolescents: TABASSOM study. ARYA Atheroscler J 2012;7:119-24.
15. Cason K, Logan BN. Educational intervention improves 4th-grade school children's nutrition and physical activity knowledge and behaviors. Topics Clin Nutr 2006;21:234-40.
16. Azadi A, Anoosheh M, Alhani F, Hajizadeh E. The effect of implementation of health promotion program in school to control risk factors for obesity in adolescents. Iran South Med J 2009;11:153-62.
17. Sabet-Sarvestani R, Kargar M, Kave MH, Tabatabaee H. The effect of dietary behavior modification on anthropometric indices in obese adolescent female students. Iran J Pediatr 2008;18:71-6.