

# The effect of problem solving education on food behavior self-efficacy in overweight or obese women

Maryam Mataji Amirrood<sup>1</sup>, Mohammad Hosein Taghdisi<sup>2</sup>, Farzad Shidfar<sup>3</sup>, Mahmood Reza Gohari<sup>4</sup>

*Journal of Research & Health*  
Social Development & Health Promotion  
Research Center  
Vol. 3, No.3, 2013  
Pages: 422-428  
Original Article

1. MSc of Health Education, Tehran University of Medical Sciences, Tehran, Iran

2. **Correspondence to:** Associate Professor of Health Education and Health Promotion, Tehran University of Medical Sciences, Tehran, Iran  
Email: taghdisi.mh@gmail.com  
Tel/Fax: +98 21 81454980

3. Professor of Nutrition Department, Tehran University of Medical Sciences, Tehran, Iran

4. Associate Professor of Mathematics and Statistics, Faculty of Management and Medical Information, Hospital Management Research Center, Tehran University of Medical Sciences, Tehran, Iran

Received: 21 Oct 2012  
Accepted: 18 Feb 2013

How to cite this article: Mataji Amirrood M, Taghdisi MH, Shidfar F, Gohari MR, The effect of problem solving education on food behavior self-efficacy in overweight or obese women. *J Research Health* 2013; 3(3): 422-428.

## Abstract

Women have an important role in shaping healthy food behaviors in the family, and the belief to their ability in this field is a sign of their self-efficacy. Problem-solving by making different solutions could be effective in creating this ability. This study was carried out in order to determine the effect of problem solving education on food behavior self-efficacy in overweight or obese women in Urmia. The study is a semi-experimental one with a pre-test and post-test design carried out on 90 women with overweight or obese supervised by health centers in Urmia. The samples were selected with disposability method and randomly divided into experimental and control groups. Educational intervention in the experimental group was done via the problem solving sessions in the form of six training sessions. The post-test was conducted after 2 months with completing demographic information and food behaviors self-efficacy questionnaire again. Data analysis was done with descriptive and analytical test (Paired t-test, Independent t-test, and Chi-square). Self-efficacy score mean improved from  $11.52 \pm 4.03$  to  $15.90 \pm 3.85$  in the experimental group. There was an increase in the good food behavior self-efficacy in the experimental group from %3.14 to %8.54, but the change wasn't significant in the control group. The problem solving approach can promote self-efficacy food behaviors in overweight or obese women via involving them in the process of thinking and problem solving through expressing thoughts and exchanging experiences.

**Keywords:** Behavior, Obesity, Problem Solving, Self-efficacy, Women

## Introduction

Obesity, an abnormal medical condition, is becoming one of the most serious public health problems worldwide and its prevalence has dramatically increased in the last few decades [1].

In spite of great efforts, we still lack effective strategies to fight this epidemic [2].

According to the World Health Organization, by 2015 there will be approximately 2.3 billion of overweight adults, more than 700 million will be fat and 2.4% of the world population will be obese [3] and also obesity is one of

the 10 most preventable health risks [4].

Recent expansion of urbanization, economic growth, changes to life styles, per capita energy intake, and changes in social and cultural habits in addition to less physical activity have contributed to the prevalence of obesity throughout the world [5]. The importance of such a matter is due to the association of this problem with the increase in morbidity and mortality as a direct result of chronic diseases caused by this problem, such as heart diseases, high blood pressure, diabetes

type 2, dislimpedima, and cancers [6]. These would all readily be prevented if such actions as an improvement in food and regular physical activity [7], both as healthy behaviors, were more widely practiced [8]. Poupkin attracted attention to the transition of food in developing countries, that is, the substitution of an old diet and life styles with a Western diet (which means more consumption of saturated fat, sugar and refined food) along with less physical activity and more stress especially in the communities undergoing urbanization. This change has a terrible outcome for these countries including an increase in overweight population, and as a result chronic and non-communicable diseases [9].

There have been some researchers conducted in Iran showing a higher prevalence of obesity in the recent years. It is estimated that rising trend of urbanization in recent years aggravates this problem [10]. Also, these studies have emphasized the higher prevalence of improper food behaviors among Iranians including a lack of diversity in food [11]. Moshki and Bahrami conducted a research showing that the consumption of the main groups of food like proteins, dairy products, fruits and vegetables among children were lower than the recommended level; this food pattern was also formed in their families [12].

Changing lifestyle is the key to preventing obesity, which includes effective corrections toward a better food intake and encouraging physical activity [13]. The goal of such interferences is to correct food behaviors with the help of the individuals themselves to reach healthy weight, and also to prevent and manage chronic diseases [14]. In order to achieve this goal, besides food knowledge, stimulant and voluntary factors which lead self-management process are required [15]. Certain cognitive and behavioral factors like self-efficacy should be considered [16]. Of health-related behaviors, diets and weight control can be managed by self-efficacy beliefs [17].

Self-efficacy is one of the constructs of Bandura social and cognitive theory [18], which he claimed as the most significant precondition of behavioral changes [19].

Bandura's principles for enhancing self-efficacy include: 1) encountering people with successful experiences, 2) vicarious experience, 3) verbal persuasion, and 4) modification of physiological arousal via suitable nutrition behaviors and etc [20].

Donmez and Bas found a meaningful relationship between high self-efficacy and successful weight loss and that self-efficacy had an important role in treating obesity through behavioral control of weight [21]. Debra et al. and Franco et al. pointed to the important role that education can play in elevating self-efficacy to alter food habits [22].

Self-efficacy probably drives people to commit themselves to promote health behaviors like going on a diet and being more physically active [23]. In terms of interfering with one's diet, self-efficacy tends to make the participant believe that they are able to eat in compliance with the right diet with the help of their knowledge about healthy food and the skills to prepare healthy ingredients [24].

Behavioral theory and cognitive behavioral theory are based on this assumption that behaviors are learned and environment and internal factors are related to one's behaviors [25]. This confirms that strategies like self-surveillance and problem solving will help people gain knowledge about the internal and external factors that stimulate their reactions [26]. Behavioral control of weight includes learning about food and physical activity, embracing advice on key behavioral techniques (self-protection and problem solving), and choosing an elective treatment by the obese themselves to lose an average amount of weight [27]. Problem solving is a cognitive procedure through which one seeks proper solutions [28]. Now that the researches have had already counted self-efficacy and timely diagnosis of problematic situations toward health criteria [29], this research aimed to assess the effects of problem solving training on obese or overweigh women's food behavior self-efficacy. With the evaluation of such effects, more appropriate measures could be suggested for educational interferences to empower families and thereafter the community to alter and correct their risky food behaviors to promote health.

## Method

A quasi-experimental interventional study was conducted in 2012 on 90 overweight and obese women. Given  $\alpha$  error of 5% and a power of 80%, the sample size was calculated 66, which increased to 90 to compensate possible loss of 35%. Each one of the experimental and control groups was composed of 45 cases. Two health centers were randomly selected from middle class districts in Urmia. Women who went to the Family Health Center were selected by convenience method and then the samples were randomly divided into two groups of experimental and control. The inclusion criteria were as follows: being 18 years old to 60, married, a body mass index of 25 or over, not being pregnant, ability to write and read, and interested in participating in the study. Moreover, the exclusion criteria were unwillingness to participate in research, or unwillingness to complete research tools, and/or husband's reluctance or refusal to support the participant.

Research tools that were employed in this study included demographics questionnaire and food behavior self-efficacy questionnaire by Hossein-Nejad *et al* [30]. In the present study, the questionnaire was handed out to 15 overweight or obese women, and was found reliable with Cronbach' alpha of 0.78. The food behavior self-efficacy questionnaires were composed of six five-option items ranging from zero to four, respectively for very low to very high. Self-efficacy score was calculated based on 100, so women with 0-33 were weak, 33.1-66 were average and 66.1-100 were good in terms of self-efficacy. This classification was derived from the work of Safavie *et al* [31].

At the pre-test stage, both groups completed the research tools. At the intervention stage, the participants were divided into groups of 15 to take part in six group discussion meetings, each 45 minutes long. These training sessions were held for two and a half months using five-stage problem solving model. The first stage was about collecting data/seeking information, during which the problem to be solved is defined. The next stage was seeking possible solutions for the previously mentioned problem through

brainstorming, that is, logical and available solutions that the participants suggested during the training session were written on the board. Then they were revised at the next stage and their practicality was assessed and changes were applied. Then, the outcomes of each case were evaluated. Finally, the participants discussed the advantages of the suggested solutions, the weakest were deleted and the best one was flagged. The participants prioritized the best solutions based on their importance and practicality. Also during the first and the third meetings, learning materials were presented in forms of pamphlets and notebooks. These meetings aimed at gaining knowledge about these women's problems and suggesting solutions in perspective of improving their food behavior self-efficacy.

Two months after the end of the last session, a post-test was taken which required re-completion of the questionnaires. To meet ethical measures, training materials were handed to the women in the control group in a package. The data were put into SPSS (18) for analysis. The data were analyzed at the significance level of 0.05 through descriptive statistics (the mean and standard deviation) and inferential (paired t-test, independent t-test, and Kolmogorov-Smirnov test).

## Results

In this study, 12 out of 90 samples that had completed the questionnaires were excluded due to having the exclusion criteria or their refusal to participate in the post-test. Finally, 78 samples (42 from the experimental group and 36 from the control group) underwent analysis. They were 19 to 57 years old with the mean age of  $33.63 \pm 8.75$ , the mean weight of  $76.32 \pm 10.6$ , and mean BMI of  $29.28 \pm 3.6$ . Most of them (92.3%) were housewives and 7.7% were employed. Everyone could write and read and the majority (43.6%) had finished elementary and/or middle school. The highest level of education of their husbands was elementary or middle school (39.7%). Almost half of their husbands were self-employed (46.2%) and half of them (50%) had average income. According to the findings of Table 1, the t-tests (both paired and independent) demonstrated meaningful differences in terms

of the level of food behavior self-efficacy two months after intervention in the experimental

group ( $P < 0.001$ ), however, the changes in the control group were not meaningful.

**Table 1** Comparing the means of food behavior self-efficacy

		Before intervention	After intervention	Mean difference before and after intervention	P-value (Paired t-test)
Food Behavior Self-efficacy	Experimental Group	11.52±4.03	15.9±3.85	4.38±3.86	0.001
	Control Group	11.5±5.35	11.72±5.27	1.75±0.22	0.45
P-value (Independent t-test)		0.98	0.001		

The information displayed in Table 2 is based on the results of the Chi-square test. These findings show that good food behavior self-efficacy in the experimental group increased from 14.3% to 54.8% after the intervention.

The changes in food behavior self-efficacy of the experimental group were meaningful, but the control group did not experience meaningful changes.

**Table 2** The distribution frequency of food behavior self-efficacy in both groups before and after intervention

	Experimental Group				P-value	Control Group				P-value
	Before intervention		After intervention			Before intervention		After intervention		
	N	%	N	%		N	%	N	%	
Low	6	14.3	1	2.4	0.001	10	27.8	8	22.2	0.99
Average	30	71.4	18	42.9		16	44.4	17	47.2	
High	6	14.3	23	54.8		10	27.8	11	30.6	

**Discussion**

Bandura recognized self-efficacy as the most important precondition for behavioral changes [19] meaning that self-efficacy beliefs can help change diet and weight control behaviors, which are both related to health behaviors [17].

The data analysis showed that the mean score for diet behavior self-efficacy of the women who were members of the experimental group improved and an increase was observed in the number of the people with high self-efficacy. The findings confirmed the efficiency of training problem solving on improving self-efficacy. The findings of the present study will be compared to those of similar studies.

The results of the study by Safavi et al. confirm that learning diet behaviors and physical activity have a positive effect on students' self-efficacy, which complies with ours [31]. Noushin Peiman et al. in 2012 launched a research on obese and overweight female teenagers and showed that education, encouragement, and support could increase the mean of self-efficacy [32]. This study complies with ours in that it paralleled encouragement and supports with education to improve self-efficacy mean. Verbal and non-verbal encouraging and supporting are

attributed as the significant elements of self-efficacy [33]. Constructive ideas of the participants at our learning sessions were welcomed by the researcher and others resulting in a higher diet behavior self-efficacy mean.

Francis launched a research on female elderly and showed that education was effective toward self-efficacy and development of healthy diet by empowering these women [34]. Education is as one of the factors that play an important role in development of self-efficacy [35]; this was proved right in this study.

Rott et al. conducted a research aimed to design and perform an 8-week program to teach how to lose weight through healthy food and improvement of self-efficacy. They concluded that if an educational program was successfully performed, and included enhancing food knowledge, controlling food consumption, and focusing on moving toward choosing healthier food, self-efficacy and weight loss could culminate [36]. In the present study, right dietary behaviors, and the importance of correcting and implementing them were taught to the participants to enhance their self-efficacy. Our results are in line with those of that study, which

recognized correct education as the, they were at the learning sessions taught how to correct their food behaviors, how important these corrections could be, and how they should put them into effect. The findings were analogous with the above-mentioned studies that proved correct and proper education effectual in heightening self-efficacy.

Richardson et al. launched a research to present an educational program that required consumption of dairy products three times a day for girl scouts to enhance their knowledge and self-efficacy and also to incline them toward consumption of more dairy products and physical activity. They concluded that the educational program significantly increased their knowledge and self-efficacy [37]. Also the results of the study by Donmez and Bas showed that after the intervention, there was an improvement in self-efficacy; there was a meaningful relationship between higher self-efficacy and more weight loss. This study highlighted the significant role of self-efficacy in treating obesity in terms of behavioral controlling of weight [21]. The results of these studies confirmed our findings that proved education effective for higher levels of food behavior self-efficacy.

Zahra Kar et al. conducted a research on female high school students in the city of Rasht confirming the positive effects of interventional programs for problem solving on enhancing self-efficacy of the students [38]. The present study also employed problem solving, which is a rational and regular procedure that helps the individual to search for a variety of solutions to tackle the problem, and choose the best one. Many researchers have employed this method and proved its effectiveness in enhancing self-efficacy. We also used it and confirmed that problem solving was meaningfully effective on food behavior self-efficacy of the women in the experimental group.

Also, Graves et al. studied obese children and assessed the efficacy of learning problem solving for treating obesity. They showed that this method helped these children lose weight and helped them and their parents gain helpful skills to solve their problems [39]. The process of problem solving is managed by each person and they seek effective or adjusted solutions to

their problems. In this study, the problem solving skill contributed to treating obesity and overweight, which is in line with the above-mentioned research findings.

### **Conclusion**

Self-efficacy is an important indicative of one's intention for health behaviors and its absence or weakness could make one envision oneself incapable. Employing problem solving makes one believe in their own capabilities and thus reach a higher level of self-efficacy through learning skills and measures to counter problems. Given the aforementioned, and that overweight and obesity have been spreading in Iran along with a multitude of complications like chronic diseases, it is necessary to empower people with self-efficacy to overcome the obstacles on their way to live healthy and conduct correct food behaviors. The educational method of problem solving could be used as a proper method toward enhancing food behavior self-efficacy for the obese and overweight through engaging the individuals and their capabilities in alleviating problems. Hence, we recommend that this educational method could be used as a part of the procedure of correcting food behavior and controlling weight.

Like all other researches, this one also faced some restrictions. The most important one was the time shortage, which meant shorter time for educational interventions and follow-ups. Furthermore, this research was merely focused on two health centers at two districts of the city of Urmia, and excluding other areas; thus the results cannot be easily generalized. Hence, we recommend that future studies in this field consider these limitations and appropriate longer time for educational interventions and follow-ups. Also, we recommend a greater population be studied to overcome the above-mentioned problems and limitations to be able to generalize the findings to a greater population.

### **Acknowledgements**

This article holding the ethics code of 16975 was extracted from the research thesis confirmed by Tehran University of Medical Sciences in 2011. This research was supported by the Center for Community Based Research. Hereby, we thank the personnel of both the

university and the health center of the city of Urmia, especially Mr.Dr. Javad Eshaghi our statistics consultant, Miss Saeide Mataji Amirrood, and all the other friends who made this research possible.

### Contributions

Study design: MT, FSH, MM

Data collection and analysis: MM, MG

Manuscript preparation: MM, MT

### Conflict of interest

"The authors declare that they have no competing interest".

### References

- Rocchini AP. Childhood obesity and a diabetes epidemic. *N Engl J Med*2002; 346:854–855.
- Hare-Bruun H, M Nielsen B, L Kristensen P, C Moller N, Togo P, L Heitmann B. Television viewing, food preferences, and food habits among children: A prospective epidemiological study. *BMC Public Health*2011; 11:311.
- Bowman TS, Kurth T, Sesso HD, Manson JE, Gaziano JM:Eight-year change in body mass index and subsequent risk of cardiovascular disease among healthy non-smoking men. *Prev Med*2007; 45:436-41.
- World Health Organization. Global health risks: mortality and burden of disease attributable to selected major risks, Geneva, Switzerland. 2009; [62 screens] Available at URL: [http://www.who.int/healthinfo/global\\_burden\\_disease/GlobalHealthRisks\\_report\\_full.pdf](http://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf). Accessed on: 2011
- Gill TP, Antipatis VJ, James W. The global epidemic of obesity. *Asia Pacific J Clin Nutr*1999; 8(1):75-81.
- Khodapanah M, Moradi A. R, Vosough S, Khodapanah M. Executive Function of Performance (inhibition) in Obesity Patients. *Journal of Clinical Psychology*2010; 2(1 (5)): 51-58. [In Persian]
- LT Lee R, JT Yuen Loke A. Health – promoting behaviors and psychosocial well-being of university students in Hong Kong. *Public Health Nurs*2005; 22(3): 209-220.
- Brunner LS, Sudarth DS, eds. Textbook of medical surgical nursing, 11th ed. Philadelphia: Lippincott Williams and Wilkins Company; 2008. PP: 134-60.
- Solomon CG, Manson JE. Obesity and mortality: a review of the epidemiologic data. *Am J Clin Nutr*1997; 66(4):1044-1050.
- Pishdad GR. Overweight and Obesity in adults aged 20-74 in southern Iran. *Int J Obes Relat Metab Disord*1996; 20(10): 963-5. [In Persian]
- Rezaiepour A, Yousephi F, Mahmoodi M, Shakeri M. Relationship between foodal behaviors and physical activities in adolescent girls with their perception of parental lifestyle. *Journal of Faculty of Nursing and Midwifery (Hayat)*2007; 13(3): 17-25. [In Persian]
- Moshki M, Bahrami M. Food consumption behavior among elementary students of Gonabad. *Zahedan J Res Med Sci (ZJRMS)*2013; 15(3):65-67.
- Ottevaere CH, Huybrechts I, Benser J, et al. Clustering patterns of physical activity, sedentary and dietary behavior among European adolescents: The HELENA Study. *BMC Public Health*2011; 11:328.
- Chobanian AV, Bakris GL, Black HR et al. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of Hight Blood Pressure: the JNC 7 report. *JAMA*2003; 289(19): 2560-72.
- Lippke S, P Ziegelmann J. Theory-based health behavior change: Developing, testing and applying theories for evidence-based interventions. *Applied Psychology*2008; 57(4): 698-716.
- Taymoori P, Lubans RD. Mediators of behavior change in two tailored physical activity interventions for adolescent girls. *Psychol Sport Exerc*2008; 9(5): 605-619.
- Shannon B, Bagby R, Wang MQ, Trenkner L. Self-efficacy: A contributor to the explanation of eating behavior. *Health Ed Res*1990; 5:395-407.
- Bandura A. Social learning Theory. Englewood Cliffs, New Jersey: Prentice-Hall, Inc, 1977: 203.
- Bandura A. Health pro,otion from the perspective of social cognitive theory. *Psychology Health*1998; 13(4):623-649.
- Scultze D, Scultze SE. Theory of personality. In: Mohammadi YS, translate. Tehran: Edition Press Institute; 2002. [In Persian]
- Bas M, Donmez S. Self-efficacy and restrained eating to weight loss among overweight men and women in Turkey.

- Appetite*2009; 52(1):209-216.
22. Franko D.L, Cousineau T.M, Trant M et al. Motivation, self-efficacy, physical activity and nutrition in college students: Randomized controlled trial of an internet-based education program. *Prev Med*2008; 47(4):369-377.
23. Bandura A. Self-efficacy: Toward a unifying theory of behavioral change. *Psychology Rev*1977; 84(2):191-215.
24. Steptoe A, Perkins-Porras L, Rink E, Hilton S, Cappuccio FP. Psychological and social predictors of changes in fruit and vegetable consumption over 12 months following behavioral and nutrition education consulting. *Health Psychology*2004; 23(6): 574–581.
25. Ellis A. Overcoming Destructive Beliefs, Feeling, and Behaviors: New Directions for Rational Emotive Behavior Therapy. Amherst, NY: Prometheus Books; 2001.
26. Spahn J M, Reeves R S, Keim K S, Laquatra I, Kellogg M, Jortberg B. State of the Evidence Regarding Behavior Change Theories and Strategies in Nutrition Counseling to Facilitate Health and Eating Behavior Change. *J Am Diet Assoc*2010; 110:879-891.
27. Wing RR. Behavioral weight control. In: Wadden TA, Stunkard AJ, editors. Handbook of obesity treatment. New York: Guilford Press, 2002; 301-316.
28. Perla F, O' Donnel B. Encouraging problem solving in orientation and mobility. *J Visu Impo & Blind*2004; 98:47-52.
29. Bornstein MH, Davidson L, Keyes Corry L.M, Moore KA. Well-Being: Positive Development across the Life Course. New Jersey, Mahawah, NJ: Lawrence Erlbaum Associates; 2003.
30. Hossein Nejad M, Azizzadeh foroozi M, Mohammad Alizadeh S, Haghdoost A. Role of Self Efficacy in the Prediction of Foodal Behaviors of High School Female Students in Kerman in the year 2007. *Journal of Medical Sciences and health Services, Yazd*2008; 16(3):56-49. [In Persian]
31. Safavi M, Yahyavi S, Pourrahimi M. Impact of dietary behaviors and exercise activities education on the self- efficacy of middle school students. *Medical Sciences Journal of Islamic Azad University of Tehran* 2012; 22 (2):143-151. [In Persian]
32. Peyman N, Ezzati Rastegar KH, Taghipour A, Esmaily H. Effect of Education on the Weight Self-Efficacy lifestyle among Adolescent Girls with Overweight and Obesity. *Journal of Armaghan-e-danesh*2012; 17(2):117-128. [In Persian]
33. Tulle A, Alhani F, Shojaei Zadeh D, Sharifi-Rad G. Empowerment approach in improving quality of life and management of patients with type 2 diabetes mellitus. *Health System Research*2011; 7 (2):157-168. [In Persian]
34. Francis SL, Taylor ML, Haldeman LM. Nutrition Education Improves Morale and Self-Efficacy in Elder Women. *J Nutrition Education and Behavior*2007; 39(4S):S114.
35. Morowatisharifabad M, Rouhani Tonekaboni N. Perceived self-efficacy in self-care behaviors among diabetic patients referring to Yazd Diabetes Research Center. *Journal of Birjand University of Medical Science*2009; 15(4): 91-99. [In Persian]
36. Rott C.A, Seaborn C, Schmidt C, Tafalla R, Pejsa J, Evers N. An Eight Week mindful Eating Education Program Increases Self-Efficacy and Weight Loss. *J Am Diet Assn*2008; 108(9): A37-A37.
37. Nickols-Richardson S.M, Parra D.E, Serrano E. Knowledge and Self-Efficacy Increase In Young Girl Scouts After Participation in 3-A-Day<sup>TM</sup> Of Dairy Peer Education Program. *J Am Diet Assn*2007; 107(8):A112-A112.
38. Zahrakar K, Rezazadeh A, Ahghar Gh. The effectiveness of training problem-solving skills on female high school students' self-efficacy of Rasht city. *Journal of Andishehayeh Tazeh* 2011; 53(19): 133-150. [In Persian]
39. Graves T, Meyers AW, Clark L. An evaluation of Parental Problem Solving Training in the Behavioral Treatment of Childhood Obesity. *J Consult Clin Psychol*1988; 56(2):246-2.