

## The effect of mothers education program based on the precede model on the mean weight in children (6-12 months) at health centers in Shiraz, Fars province

Seyed Mansour Kashfi<sup>1</sup>, Ali Khani Jeihooni<sup>2</sup>, Abbas Rezaianzadeh<sup>3</sup>  
Shahnaz Karimi<sup>4</sup>

Received: 2 March 2013

Accepted: 18 January 2014

Published: 15 September 2014

### Abstract

**Background:** Growth retardation in children is a result of nutritional ignorance, inappropriate care, and inadequate monitoring of growth monitoring. This study was performed to assess the effect of mothers education program based on the precede model on the mean weight of children (6-12 months) at health centers in Shiraz, Fars Province.

**Methods:** This quasi experimental study was conducted on 120 mothers (60 in the experimental and 60 in the control group) with single child and exclusively on breast feeding who were cared by health centers in Shiraz, Fars province. The data were gathered through a questionnaire which included demographic characteristics, the components of the precede model (knowledge, attitude, enabling as well as reinforcing factors, and maternal function) and child weight. Educational intervention was performed during 6 sessions each of which lasted for 55 to 60 minutes. The questionnaire was completed by the experiment a land control group before and 4 months after the training program.

**Results:** The results showed that the educational intervention program in the experimental group caused significant increase in the means of knowledge ( $p < 0.001$ ) and attitude scores ( $p < 0.001$ ). This study showed that enabling and reinforcing factors (and training sessions), performance score of mothers as well as weight of children among experimental group were significantly higher than control group ( $p = 0.01$ ).

**Conclusion:** The results of this study can be used as a guideline prevents growth retardation in health centers and other related organizations.

**Keywords:** Health education, Precede model, Growth retardation, Children.

*Cite this article as:* Kashfi S.M, Khani Jeihooni A, Rezaianzadeh A, Karimi Sh. The effect of mothers education program based on the precede model on the mean weight in children (6-12 months) at health centers in Shiraz, Fars Province. *Med J Islam Repub Iran* 2014 (15 September). Vol. 28:95.

### Introduction

Today's children are valuable human resources for future; and how they are raised today guarantees the quality of human resources in future (1). In April 2005, the World Health Organization (WHO) chose the motto "Let's care for all mothers' and children's health", which implies the vast interest of nations as well as governments toward children (2). Children and mothers

are actually the vulnerable groups of the society and include almost 70% of the population in developing countries. Growth retardation is usually manifesting the malnutrition in the first years of life. Studies reveal that nearly 25% of children under 5 years old in our country suffer from different degrees of underweight condition (3). The easiest way to understand growth pattern children and evaluate their health is to

1. Instructor, Department of Public Health Research Center for Health Sciences, Shiraz University of Medical Science (SUMS), Iran. smkashfi@yahoo.com

2. (Corresponding author) Instructor, Department of Public Health, Fasa University of Medical Science (FUMS), Iran. khani\_1512@yahoo.com

3. Associate Professor, Research Center for Health Sciences, Department of Epidemiology, Shiraz University of Medical Science (SUMS), Iran. Rezaiana@gmail.com

4. Instructor, Department of Nursing, Fasa University of Medical Science (FUMS), Iran. shahkar20022002@yahoo.com

monitor growth pattern – as the first step – the malnutrition for both mothers and children should be investigated at the same time, enables them to timely (4) What follows includes the steps which should be taken toward the growth monitoring:

1. Engaging mothers in weighing their children.
2. Identifying the children with growth retardation.
3. Questioning the mothers about the affordable food as well as the quality food they consume.
4. Making the mothers aware of the nutrition provided for their children (5).

Therefore, mothers are highly important since they are considered as the target group to be trained in order to monitor their children's growth regularly and prevent growth retardation, and they must be aware of the issues (6).

Health education is defined as the knowledge and the art of directing people's attention toward learning process to develop the desirable behavior to reach health; therefore, it is considered as a helpful method in creating motivation and modifies the incorrect functions (7). The first step in designing an educational program is selecting a health education model which starts the program on the right way and guides it to the evaluation phase. In the present study, the Precede model was used. Possible outcomes of an educational program are projected by this model, so planning is from a whole to the details.

Nonetheless, before selecting a model for the health education program, its objectives as well as components must be studied. The precede model emphasizes the process of designing the program (8). The Precede model was unique since it starts by the active involvement of the target community in order to identify its final results and then goes back to identify the factors which were prior to those results (9,10). Salehi et al showed that nutritional behaviors could be improved using education based on Precede model (11). Improvement in breast feeding behavior using education based on

Precede model was reported by Baghiani Moghadam (12). Other study also reported that this method could increase nutritional knowledge of preschool children (13).

Based on what was mentioned above, the Precede model was used in the present study in order to achieve more effective results.. The present study, therefore, aims to determine the effect of mothers training program on growth adjusting and monitoring – based on some components of the precede model – on the mean weight in children(6-12 months) at health centers in Shiraz, Fars Province.

### Methods

Mothers and 6-12 months old children who had referred to health centers in Shiraz participated in this interventional study in 2011. The inclusion criteria were the children's being single, benefiting exclusively from breast feeding, and not having any specific diseases such as: congenital and genetic diseases. In addition, the exclusion criteria were the mothers' not being interested in taking part in training classes, the children's being fed by formula, having chronic diseases, being hospitalized, and having accidents. The population under study included 120 mothers who had 6-12 months old children.

Four health centers were randomly selected from all health centers located in Shiraz, Iran. Then, 30 eligible mothers were chosen from each health center. The samples were chosen by referring to the lists provided by the office of child care. Of the four selected health centers, two were considered as the control and two as the experimental group.

In order to gather the data, a questionnaire, was designed based on the precede model. This model provided a framework which clarifies the factors affecting the behavior, such as the predisposing factors (knowledge, attitude, etc.), enabling factors (availability of resources, and skills), and reinforcing factors (the effect of others, family members, peers, etc.), in identifying a training program. The questionnaire consisted of 6 sections including demographic

characteristics, questions on knowledge, attitude, enabling factors, and reinforcing factors, questions on maternal function, and measuring the children's weight.

The questionnaire was designed after studying a great number of books and articles. Also, it was checked by the specialists in health education, and then their opinions on the validity of the questionnaire were applied (evaluated by two dietitians, an epidemiologist and two health education specialist for the assessment of face and content validity). Moreover, in order to measure the reliability index the questionnaire was completed by 20 mothers and alpha Cronbach's coefficient of 84% obtained (a pilot study was also performed on 30 subjects).

Twenty six Questions regarding knowledge were scored from the lowest to the highest level from 1 to 5. There were also 14 questions about attitude with responses ranged from completely disagree to completely agree which scored from 1 to 5, respectively. Responses to questions regarding capability and reinforcing factor and maternal functions were also scored from 1 to 4.

The questionnaire was given to the participants of both groups. Data was collected by trained interviewers. Then, based on the gathered data, the selected mothers in the experimental group underwent the educational intervention. This intervention was conducted in 6 sessions each of which lasted for 55-60 minutes. Each session included giving speeches, question and answer, showing movies as well as slides, and prac-

tical teaching for preparing supplementary food. Mothers were also trained on the nutrition by food additives, appropriate pattern of nutrition, gradual variation in food, and growth monitoring. The children in both groups were weighed before and four months after the educational intervention.

### Statistical Analysis

The data were analyzed by the SPSS statistical software version 18. Descriptive statistics was used to describe the characteristics of the subjects and distribution of variables involved in the study. Based on the type of explanatory and outcome variables chi-squared test, independent and matched t-tests were used for data analysis in this study.

### Results

Both groups under study were not significantly different regarding age and household size (Table 1). Patients' education level was categorized as secondary and high school and patients' job was housewife or employee. Education and job were not also different between the two groups under study (Table 2).

The results of the present study revealed that, before the intervention, no statistically significant difference was found between the two groups regarding the means obtained for knowledge, attitude, enabling factors, reinforcing factors, and maternal functions to prevent the growth retardation, and to evaluate the mean of the children's weight.

Table 1. Demographics characteristics of the participants in experimental and control groups (Age and Household size)

Variables	Experimental group (Mean±SD)	Control group (Mean±SD)	p
Age	24.8±4.22	29.6±1.10	0.17
Household size	3.78±1.01	3.67±.97	0.09

Table 2. Demographics characteristics of the participants in experimental and control groups (Education and Job)

Variables	Experimental group (N %)		Control group (N %)	p
Education	Secondary school	37(61/66)	35(58/33)	0.12
	High school	23(38/33)	25(41/66)	
Job	Housewives	58(96/6)	56(93/3)	0.80
	employees	2(3/33)	4(6/66)	

Table 3. Comparison of the means obtained for knowledge, attitude, enabling factors, reinforcing factors, and maternal function

Variables	Before the intervention			Four months after the intervention		
	Control group	Experimental group	p	Control group	Experimental group	p
Knowledge	65.2±11.8	66.8±11.3	0.06	67.1±17.6	170.2±2.25	<0.001
Attitude	22.4±2.01	25.2±1.9	0.20	23.2±3.03	36.1±2.2	<0.001
Enabling factors	9.2±0.85	8.95±0.92	0.62	9.02±0.90	12.02±0.6	<0.001
Reinforcing factors	33.26±10.62	33.26±10.62	0.54	33.26±10.62	60±10.64	<0.001
Maternal function	6.74±1.12	6.42±1.73	0.40	6.1±1.79	8.19±1.19	<0.001

Table 4. Comparison of the mean of weight (grams) in the children under study

Variable	Before the intervention			Four months after the intervention		
	Control group	Experimental group	p	Control group	Experimental group	p
Weight	6830	6950	0.42	9160	10096	<0.001

Four months after the educational intervention, however, the results of the matched t-test revealed both a great increase and significance difference in the mean of knowledge scores obtained by the experimental group ( $p<0.05$ ). Moreover, the mean of the mothers' attitude to monitor growth and preventing the growth retardation revealed a significant difference four months after the educational intervention ( $p<0.001$ ). This shows the great impact of education on mothers' attitude. Regarding the enabling and reinforcing factors, also, a significant difference was found between the two groups after the intervention ( $p<0.05$ ). The results of the t-test also depicted that the maternal function on growth monitoring and preventing the children's growth retardation four months after the educational intervention was significantly different in comparison to the period before the intervention ( $p<0.05$ ). (Table 3) In addition, four months after the educational intervention, the mean of the children's weight increased in both groups; however, the increase revealed to be more significant in the experimental group compared to the control group ( $p<0.05$ ) (Table 4).

### Discussion

In general, a significant increase in the mean of the overall knowledge was observed in the experimental group, which shows the great impact of the educational intervention. The results of the present study are in line with the results obtained by Hazavehei on the relationship between

increasing the mothers' knowledge and IDA in 1-5 year-old children (14), Soltani on preventing the growth retardation among children in Tabriz (15), SharifiRaad on increasing the students' knowledge of intestinal parasitic diseases (16), and Shakouri on controlling IDA in high school girl students (17).

Shojaeizadeh et al. conducted a study about IDA conclusion that a qualified educational program which is accompanied by group discussions leads to the increase in the knowledge score. Moreover, sufficient amount of knowledge about an issue can result in the importance as well as the belief toward that issue and, consequently, develop a positive attitude (18).

In general, after the educational intervention, the mean of attitude scores has increased in the experimental group, which reveals the effect of the precede model on increasing the positive attitude. The results are in line with the results obtained in the studies conducted by Hazavehei (14), Sabzmadan on the increase of the patients' attitude scores after the coronary heart bypass surgery (19), and Shakouri (17).

In the precede model, predisposing factors such as attitude are prior in behavior and, at the same time, are considered as behavior's stimulating factors. In the present study, also, the positive attitude has resulted in appropriate maternal function for health monitoring and preventing the growth retardation.

The results of the present study depicted a significant difference between the two

groups regarding the enabling factors. Similar results were obtained in the studies conducted by SharifiRaad on the relationship between increasing the enabling factors and decrease in the intestinal parasitic diseases (16) and Zigheimat on the effect of educating the epileptic patients (20).

The results of the present study, also, revealed a significant difference between the two groups regarding the reinforcing factors, which shows the effect of utilizing the precede model on increasing the reinforcing factors. This is in line with the studies conducted by Zigheimat on Epilepsy (20), Shakouri on controlling IDA in high school girl students (17), and Hazavehei on controlling IDA in 1-5 year old children (14).

Regarding the maternal function in monitoring health and preventing the growth retardation, the present study revealed a significant difference between the two groups, which proves the effect of knowledge, attitude, and reinforcing as well as predisposing factors on the rate of maternal function. The study conducted by Baghiani-Moghadam et al. in Yazd province (12) as well as a study in Chile (21), also, revealed that education based on the precede model increases the mothers' breast feeding behavior. Therefore, growth monitoring can encourage the mothers to perform positive activities. In order to achieve this aim, sufficient amount of time must be taken into account for monitoring. Cooperation of the mother and the family has a major role in the child's growth. It is also quite important to strengthen the mothers, increase their motivation, discuss the child's growth with them, and receive their opinions (22).

In a study which was conducted by Emami and Aref on the rate of maternal function in using iron as well as supplementary vitamins for infants, it was shown that the mothers had a moderate function regarding this issue (23). The mean of the scores obtained for the maternal function significantly increased after the educational intervention in Hazavehei's study on controlling IDA in 1-5 year-old children using the precede model (14). Also, James et al.

as well as Booth et al. performed studies in England and reached similar results; i.e. conducting the Iron supplementation program by mothers leads to success in IDA control strategy. His aim can be achieved by developing an effective relationship between the mothers and the health staff (24, 25). Dabagh and Green, also, conducted a study on the application of the precede and the proceed models – as the framework of designing the programs as well as policies in preventing diarrhea in children – in Arab countries. In line with the objective of the study, the precede model was utilized as a diagnostic instrument for identifying and emphasizing the factors which affect the causes as well as controlling diarrhea in children in rural areas (26).

The results of the present study revealed a significant difference between the control and the experimental group regarding the increase of weight. Although the increase in weight was observed in both groups, the experimental group revealed more increase in weight in comparison to the control group.

Kilaru conducted an interventional study – which included growth monitoring consultation accompanied by teaching nutrition to mothers – and came to the conclusion that the children in the experimental group gained more weight after the intervention (5).

In his study, Kumar considers starting the breast feeding 6 hours after birth and inappropriate supplementary food as the risk factors for underweight (27). This might be due to the fact that the mothers had not been educated in this respect.

In a study which was conducted on children in India, 60% of the children had underweight, which had happened because of the mothers' lack of knowledge about nutrition, their unhealthy habits, and undesirable cultural functions (28).

The effectiveness of the precede model was also confirmed in a study which was conducted in Vietnam in order to evaluate the need for educational interventions with respect to children's nutrition, breast feed-

ing, and growth monitoring (29).

These results, all, prove the effectiveness of the precede model in educating the mothers on the children's gain of weight.

One limitation of this study is that we did not have control over the study subjects regarding their contacts. Any contact between individuals in intervention and control group can affect their behaviour and the final outcome of the study.

### Conclusion

Educational programming based on the Precede model positively affects different aspects of mothers' behavior in children's growth monitoring. The results of this study indicated that mothers training program based on the Precede model was highly effective on the prevention of growth retardation in the study population.

### References

1. Mohamad Por Asl A, Sahebi Hagh MH, Rostami F. Factors related to undesirable growth of 6 month- 2 years in Tabriz, Iran. *GOUMS* 2010; 12(3): 45 – 50. (Persian)
2. WHO. Global strategy for infant and young child feeding. 2002 Report. Accessed Sept. 16, 2011. Available from: [http://www.who.int/nutrition/topics/global\\_strategy/en/index.html](http://www.who.int/nutrition/topics/global_strategy/en/index.html).
3. ManouchehriNaeini A. Distribution of malnutrition in children under 6 years old who are cared by health center in Isfahan province. Abstracts 9<sup>th</sup>Iranian Nutrition congress Tabriz; 2006 September 13-16; Tabriz, Iran; 2006.P. 382. (Persian)
4. Heydari ST, Emamghoreishi F, Amini M. A comparative study on growth state of children less than two-years old in Jahrom, Southeastern Iran with NCHS Measurements. *Ofogh-e-Danesh, Journal of Gonabad University of Medical Sciences and Health Services* 2005; 3(11):42-8. (Persian)
5. Kilaru A, Griffiths P.L, Ganapathy S, Ghosh Shanti. Community-based Nutrition Education for Improving Infant Growth in Rural Karnataka. *Indian pediatrics*. 2005, 42(17): 425-32.
6. Eshrati B, HolakooeiNaeini K, Hassan Zadeh J, Borhani M, Pour Malek F. Relationships of the number of health cares during the 1st year of life and head circumference and risk of failure to thrive. *Arak Medical University Journal* 2004; 6(25):32-9. (Persian)
7. Hosseini M, Shojaeizadeh D, Chaleshgar M, Pishva H. A study of educational intervention on knowledge, attitude, practice about iron deficiency anemia in female adolescent students. *Journal Gorgan University of Medical Science*. 2006; 8 (3) :37-42. (Persian)
8. Bao Y, He Y, Zhang J, Mo ZB, Li XH. Design of working programming of health education and health promotion in China city community. *Chinese General Practice* 2004; 7(3):146-8.
9. Glanz K, Lewis FM, Rimer B K. *Health behavior and health Education: theory research and practice*. 4<sup>th</sup> ed. San Francisco: Jossey-Bass; 2008. pp.407-29.
10. Butler JT. *Principles of Health education and Health promotion*. 3<sup>th</sup> ed. Belmont: Wadsworth; 2001. pp: 250-5.
11. Salehi L, Haidari F. Efficacy of PRECEDE Model in Promoting Nutritional Behaviors in a Rural Society. *Iranian Journal of Epidemiology* 2011; 6(4): 21-7. (Persian)
12. Baghianimoghadam M H, Nadrian H, Rahaei Z. The Effects of Education on Formula and Bottle-Feeding Behaviors of Nursing Mothers Based on PRECEDE Model. *Iran J Pediatr*. 2009; 19(4):359-66. (Persian)
13. Min Oh Su, Lee Yu Ye, In Choi Hye, Won Kim Kyung. Implementation and Evaluation of Nutrition Education Programs Focusing on Increasing Vegetables, Fruits and Dairy Foods Consumption for Preschool Children. *Korean J Community Nutr* 2012; 17(5):517-29.
14. Hazavehei SMM, Jalili Z, Hydarnia AR. Application of the precede model for controlling iron-deficiency anemia among children aged 1-5 kerman, Iran. *Advancing, Knowledge* 2006; 3 (13): 173-7. (Persian)
15. Soltani R. The effect of mothers training on growth monitoring based on the precede model on preventing the growth retardation in children cared for by the health centers in Tabriz. M.S. thesis of health education [dissertation]. Faculty of Health, Isfahan University of Medical sciences; 2007. (Persian)
16. Sharifirad G. survey effect precede model in decreased intestinal parasitological infection at Ilam students [dissertation]. PhD Thesis. Tarbiat Modares University; 2000. (Persian).
17. Shakouri S, Sharifi Rad GR, Hassanzade A, Golshiri P, Shakouri MS. The effect of health education programming based on the precede model on controlling IDA in high school girl students in Talesh. *Journal of Arak University of Medical Sciences* 2009; 12 (3): 47-56. (Persian)
18. Shojaeizadeh D. Survey effect of health education program on knowledge, attitude and practice of girls students about iron deficiency anemia. *Journal of Yazd University of Medical Science* 2005; 4(4):51-7. (Persian)
19. Hazavehei SM, Sabzmakan L, Hassanzadeh A, Rabiei K. The effect of PRECEDE Model-based educational program on depression level in patients with coronary artery bypass grafting. *Journal of Qazvin University of Medical Sciences* 2008; 12(2): 32-40. (Persian)

20. Zigheimat F, Naderi Z, Ebadi A, Kachuei H, Mehdizade S, Ameli J. and et al. Effect of education based on "precede-proceed" model on knowledge, attitude and behavior of epilepsy patients. *Journal of Behavioral Sciences*. 2009; 3(3): 223-29. (Persian)
21. Valdez V, Perez A, Labbok M P. The impact of a hospital and clinic-based breastfeeding promotion program in a middle class urban environment. *J Trop pediatr*. 1993;39(3):142-51.
22. Golshiri P, Sharifirad G, Baghernezhad F. Comparison of two methods of education (lecture and self-learning) on knowledge and practice of mothers with under 3 year old children about growth monitoring and nutritional development stages. *Iranian Journal of Medical Education* 2011;10(5): 927-36. (Persian)
23. Emami P, Aref Sh. The rate of mothers' knowledge, attitude, and function in using Iron and supplementary vitamins for infants in four health centers covered by Islamic Azad University. *Journal of Islamic Azad University*. 2008; 17(3):165-69. (Persian)
24. James J, Mal P, Oalhill A, Lawson P. Preventing iron deficiency preschool children by Educational and screening programme innercity. *BMJ* 1989; 299: 838-40.
25. Booth IW, Aukett MA. Iran deficiency anemia in infancy and early childhood. *Archives of Disease in childhood* 1997; 76: 549-54.
26. Dabagh L, Green LW, Walker GM. Application of precede and proceed a frame work for designing culturally sensitive diarrhea prevention program and policy in Arab countries. *A Quarterly of community Health Education*. 1922; 12 (4): 293-315.
27. Kumar D, Goel NK, Mittal PC, Misra P. Influence of infant-feeding practices on nutritional status of under-five children. *Indian J Pediatr* 2006; 73(5):417-21.
28. Rao VG, Uadav R, Dolla Ck. Undernutrition & childhood morbidities among tribal preschool children. *Indian J Med R*. 2005; 122 (1): 43-7.
29. Karppinen T, Kettunen T. Promotion of Child Growth in Vietnam. An Application of the PRECEDE –PROCEED –Model to Assess Needs for an Intervention. Master s Thesis on Health Education [dissertation]. University of Jyväskylä. Department of Health Sciences. Spring 2002.