

*Original Article*

**The effect of education on behavioral intention model of mothers' attitude towards over weight preschool children's nutritional patterns**

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**Abstract**

**BACKGROUND:** Obesity and over weight is one of the causes of threatening children's present and future life. One of the factors that cause this problem is parents' attitude toward preschool children's nutritional patterns. Education can improve the parents' attitude and prevents from this big issue. This study aimed to assess changes in mother's attitude and behavioral intention using intention model.

**METHODS:** This was a semi-experimental study with pre-test, post test design. Forty-five mothers with overweight preschool children attended this study. Sampling was based on cluster randomize sampling method. The researcher-made questionnaire which was used in this study was standardized through content validity and test, re-test.

**RESULTS:** Comparing the pretest and posttest scores indicated a statistically significant difference in the attitude mean score. The findings of this study suggest that attitude and behavioral intention about nutritional patterns can be improved through parents' education based on behavioral intention model such as attitude, subjective norm and behavioral intention.

**CONCLUSIONS:** In order to have healthy children, parents should improve their knowledge about how they promote their attitude towards children's nutritional pattern. Therefore, new model of education can optimize correct healthy behavior.

**KEY WORDS:** Behavioral intention model, overweight, education.

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Iran's population which has a fast-growing rate indicates that the majority of the population is at the young age groups. Considering the ratio of the children to the total population and the importance of this age group as the future generation of the society, some accurate planning should be done to preserve the health of this vulnerable people of the society. Besides, despite the fact that children have a strong intrinsic background for growth, many factors can undermine the power and impair their field of activity and growth. One of the factors that can threaten child's life currently and in future

is the risk of obesity and overweight. According to the reports, 35% of the adults, 31% of youth aged 6 to 19 years and 22% of the children aged 2 to 5 years are overweight.<sup>1</sup> Reviewing the history of overweight and obesity in children, it would be shown that overweight and obesity have been increasing rapidly among the children in the past three decades throughout the world.<sup>2,3</sup> Currently, obesity is considered as a common problem<sup>4-7</sup> which is not limited to the industrialized and developed countries but it is also common in the third world countries. The majority of overweight children under five are

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related to Asia so that 60 percent (10.6 million people) of the overweight pre-school aged children live in Asia.<sup>8</sup> Furthermore, World Health Organization has reported that Iran is one of the first seven countries in the world in terms of high prevalence of obesity in childhood and adolescence.<sup>5,9</sup> In addition, study results of Kelishadi, on 6 to 18 years old children in Isfahan showed that half of the girls at the puberty age and 6% of the boys at the same age had body mass index (BMI) higher than 25, and this is a warning sign for girls so that certain measures must be done to prevent obesity before entering the puberty age.<sup>8</sup> Body mass index is an appropriate indicator to measure obesity and overweight in children.<sup>10-12</sup> Children who have BMI higher than 95<sup>th</sup> in their own specific age and gender are obese, and the people who have BMI between 85<sup>th</sup> to 95<sup>th</sup> percentiles are considered as children with overweight and are at the increasing risk of diseases associated with obesity.<sup>13</sup> Obesity and overweight causes problems such as atherosclerosis, hyperlipidemia, precocious puberty, obstructive apnea, pancreatitis, gallbladder diseases, type II diabetes, impaired glucose tolerance, hyperinsulinemia, serum lipid disorder, hypertension, polycystic ovary, infertility, cardiovascular diseases, endothelial dysfunction, poor immune function, orthopedic disorders, emotional problems, reduce in self confidence, reduce in self-esteem, depression, renal disease, metabolic syndrome, dermal problems, motor dysfunction, sleep disturbance, quality of life, cancer and low back pain.<sup>5,14,12,3,9,15,16,17</sup> Increasing the prevalence of obesity and overweight in children in recent years not only has been due to genetic changes but also environmental and behavioral factors such as changing nutritional patterns and using foods with high level of energy and fat which have less been used before, caused this increased rate.<sup>18</sup> Thomas in a study showed that nutritional transmission is associated with increase in consumption of energy dense foods, sugar, sweet drinks and foods with low fiber along with low physical activity and sedentary lifestyle that have caused increase in weight gain and obesity is

children.<sup>3</sup> Unhealthy and bad nutritional habits among Iranian children reflect the nutritional habits among Iranian family.<sup>19</sup> The study results on reviewing nutritional status of students in Tehran showed that 88% of them had an average nutritional status and 1.3% of them had a proper nutritional status. Moreover, a study in Tehran on students showed that 87% of them had relatively good nutritional behaviors and their average daily intake included bread and cereals, vegetables, fruits and fats which was out of recommended range and most of them had a improper situation in terms of consumption of the major food groups i.e. the largest percentage of unhealthy food consumed (88.9%) was associated with fat, and most of them ate fatty and salty snacks daily.<sup>9</sup> In respect to the fact that family is the first social institution that individual may experience and in many cases parents are the main health behaviors' patterns, and there are many factors affecting the lifestyle and individual's health behaviors,<sup>20</sup> therefore, the environmental factors affecting children's weight is their nutritional methods by parents which is thought to be an important factor on children's weight status.<sup>12</sup> On the other hand, there is a relationship between nutritional behaviors and physical activity of children and adolescents with their perceptions from their parents' lifestyle.<sup>21</sup> Therefore, in order to decrease risk of overweight and obesity, it is necessary to change the attitude of mothers (i.e. obesity of the child is not the sign of his/her health) toward the diet through teaching the lifestyle and health behaviors and healthy and proper nutrition; because attitudes and beliefs of the parents towards the status of their children are of high importance.<sup>22</sup> Besides, considering that risk factors in childhood continues until the early next ages and the best time to prevent from childhood obesity to adult obesity is at pre-school and early childhood, consequently the necessity of controlling and prevention of overweight and obesity is obvious which requires extensive training and education.<sup>15</sup> Educating the parents can have an effective role on prevention and controlling children's over-

weight and obesity and its subsequent outcomes.<sup>23</sup> Thus educational models should be used in the educational interventions so that they can influence parents' attitudes (particularly mothers). According to the studied researches, probably one of the best models in connection with the attitude and nutritional patterns are "behavioral intention model". In this model, the ultimate objective is predicting the behavior and the main factor determining the behavior, is the intention of the individual. On the other hand, subjective norms can affect their behavioral intention.<sup>24,25</sup> Therefore, in health education, not only should we consider the education of the individual himself and change their attitudes, but also we must consider the beneficiary people around him/her whom are recognized as patterns and norms for him and they should also get involved in the training programs. During some studies, the effect of education on behavioral intention model has been illustrated on individuals' attitude.<sup>24,26</sup> In a study, Chao et al showed the effect of education based on behavioral intention model on elementary school students' attitude in association with physical activity related to the physical health.<sup>27</sup> Since children are our nation's major investment and their upbringing is the main objective of the social and economic development programs, in order to achieve the development, providing the highest level of physical, mental and social health should be considered as the necessity and priorities of development programs. Hence, this study aimed to determine the frequency distribution of mothers' subjective norms regarding nutritional patterns associated with overweight preschool children before and after the educational intervention and comparing frequency distribution of mothers' behavioral intention regarding nutritional patterns associated with overweight preschool children before and after the educational intervention.

## Methods

45 participants enrolled in this one-group, three-step semi-experimental and multivariate study with post-test, pre-test design. The study

environment was public elementary schools in Isfahan province, Iran in 2009. Study population in this study included all the mothers with one of their boys or girls in a public elementary school of Isfahan at the pre-school level. The inclusion criteria included the mothers who had an overweight pre-school boy or girl and their children had no special diet and had not used any specific medication, mothers who had tendency to participate in the study and had the primary literacy to read and write and mothers who had not any physical and mental illness which was identified by asking some questions from the individual. The exclusion criteria included unwillingness of the study subjects and their subjective norms to participate in the study and absence from the educational sessions. The sampling method was randomized cluster method from five educational districts of Isfahan province. Simple random sampling was used for choosing the schools and then overweight students of each pre-school and also measuring BMI percentile. And by raising a question in the questionnaire, mothers' subjective norms were identified. Data collection method in this study was completing a researcher-made questionnaire by the study subjects. Data collection tools included scale, meter and body mass index percentile. The first part of the questionnaire consisted of questions about demographic characteristics which were designed in association with underlying variables of the study (maternal age, maternal occupation, maternal education, child gender, socioeconomic status). The second part of the questionnaire consisted from attitude survey questions with 32 questions which was categorized using five-degree Likert scale from "total agree" (scored 5) and "total disagree" (score 1). The criteria for scoring the mentioned questionnaire was as the following: the minimum score was 32 and the maximum score was 160 i.e. score 32-74 was for the positive attitude, score 75-117 was for the neutral attitude and 118-160 was for the negative attitude. The questions were associated with fruit and vegetables, milk and fast foods, sandwiches and sweet and fatty snacks and fried foods. The third part of the questionnaire

consisted of subjective norms which was discussed in two parts: the first part, what people are effective on choosing your child's nutritional pattern? And the second part, which of these people are more important to you? The fourth part of the questionnaire included questions about behavioral intention about the behaviors related to children overweight titled as "According to the situation of your child, what is your intention to adjust your child's nutritional pattern? and according to the responses of the study subjects about each food groups, they were studied as "has" and "has not" options. The method was done thus: after receiving written permission from the Deputy Research of the University and Education Department officials, out of the districts of the education areas (5 districts), 1 branch and from each branch 2 schools were selected randomly and since each school had two active morning and evening shifts (girls and boys), totally 10 schools were selected and according to the ratio of each school, overweight pre-school students entered the study in simple sampling method (body mass index for the girls aged 5-6 years = 16.8-19.2 and for the boys aged 5-6 years = 16.9-18.9). Totally 45 students were selected and after coordination with the relevant authorities, the mothers of the students were phone called and asked to complete the questionnaire; finally they entered the study in addition to obtaining the consent form to attend into the study and also evaluating the inclusion criteria of the mothers and their subjective norms through the identified questions in the questionnaire. Of course, completing the questionnaire determined that the study samples had a neutral attitude. One of the assembly halls was used for training courses coordinating with the school officials. Before holding the educational course, in order to create an appropriate training environment, lighting, installation of seats and temperature of the place was reviewed. Considering that 99 subjects and norms were collected, in order to have a better and more affective training, mothers and the norms were totally divided into three groups (consisting of 33 people) and the mothers and norms participated in 3 sessions for 60 minutes

during a week. Education method was performed through posters, educational pamphlet,<sup>28</sup> lectures and questions and answers appropriate to educational objectives. In order to avoid subjects to get tired, new teaching methods were used such as group discussion and snowball and also they were forced to have an active discussion and participation in the meeting. After finishing the educational course, the educational pamphlet also was provided for the mothers and after one month (*this time had been considered due to similarity of this study with other studies which was 1 month*) after finishing the educational classes, attitude survey and behavioral intention questionnaire was given to the mothers again and necessary and required explanations about completing the questionnaire was done by the researcher. Scientific validity of the questionnaire was done using content validity. The reliability of the questionnaire was also obtained through test, re-test method; the questionnaire was completed by 10 mothers other than the study participants and after a week, it was again filled by the same people and its reliability was obtained as  $r = 0.98$ . In order to measure reliability, the following tools were used: a scale and a meter; the scale was placed on a flat and even surface in a fixed location e.g. a mosaic and weight of the children was measured with minimal clothing and without shoes and the meter was placed next to the wall in a fixed and flat location and height of the pre-school children was measured without shoes. In this study descriptive and inferential statistical methods were used. Analyzing the data was done using SPSS Software.

## Results

Mean and standard deviation of age of the study subjects was  $33.8 \pm 4.98$  years. Mean and SD of BMI of the children was 17.5 and 0.61, respectively (BMI index of higher than 17.5 indicated overweight). Furthermore, 44.4% of the children of the study subjects were 5 years old and 55.6% of them were 6 years old. Moreover, 44.4% of them were females and 55.6% of them were males. In addition, 84.4% of the study subjects were housewives and 15.6% of them were



employed. The majority of the subjects (60%) were high school graduates, 6.7% of them had elementary education level, 15.5% were secondary school graduates and 17.8% also had academic educational level. In this study, 73.3% of the study subjects had an appropriate socio-economic status and 26.7% of them had an inappropriate socio-economic status. The findings showed that husbands (53.3%) allocated the highest frequency of mothers' subjective norms and health staff (0%) the lowest frequency of mothers' subjective norms. Other subjective norms also were 13.3 percent mother, 8.9 percent sister, 4.4 percent sister in law, 2.4 percent mother in law, 4.4 percent brother, 2.4 percent father, 6.7 percent friend and 4.4 percent the physician. Comparing the mean scores of mothers' attitude towards nutritional patterns associated with overweight pre-school children before and after the educational intervention showed that mean and SD of the attitude scores before the education were associated with inadequate consumption of milk and dairy products respectively as  $X = 6.6$  and  $S_D = 0.96$ , inadequate consumption of fruits and vegetables respectively as  $X = 4.6$  and  $S_D = 1.28$ , consumption of sandwiches and fast foods respectively as  $X = 1.8$  and  $S_D = 0.5$ , consumption of sweets and fatty snacks respectively as  $X = 5.8$  and  $S_D = 1.4$  and consumption of fried foods respectively as  $X = 3.46$  and  $S_D = 0.967$ . Mean total score of attitude after the education was  $X = 44.49$  with standard deviation of  $S_D = 5.08$ , and mean and SD of the attitude scores after the education were associated with inadequate consumption of milk and dairy products respectively as

$X = 3.3$  and  $S_D = 1.2$ , inadequate consumption of fruits and vegetables respectively as  $X = 2.82$  and  $S_D = 0.8$ , consumption of sandwiches and fast foods respectively as  $X = 1.08$  and  $S_D = 2.8$ , consumption of sweets and fatty snacks respectively as  $X = 3.8$  and  $S_D = 1.2$  and consumption of fried foods respectively as  $X = 2.15$  and  $S_D = 0.366$ . Paired t-test in each food group showed a significant difference between the attitude scores before and after the educational intervention ( $p < 0.05$ ) and this significant difference indicated reduction and changing the negative attitudes of the study subject. (Considering that in this study, the minimum score was 32 and the maximum score was 160, with scores 32-74 as positive attitude, scores 75-117 as neutral attitude and 118-160 as negative attitude, the mother before the study had a neutral attitude and after the study changed their attitude to positive attitude) (Table2). Comparison of behavioral intention frequency distribution of mothers with overweight preschool children before and after the intervention, indicated that before the educational intervention, the lowest frequency distribution, "does not intent" was associated with consumption of the fried foods (24.5%) and the highest frequency distribution, "does not intent" was associated with consumption of the sandwiches and fast foods (71%). In addition, findings showed that after the educational intervention, the lowest frequency distribution, "does not intent" was associated with consumption of the fried foods (68.9%) and the highest frequency distribution, "does not intent" was associated with consumption of the sandwiches and fast foods (95.5%) which indicated

**Table 2.** Comparison of the mean attitude scores toward each food group before and after the educational intervention

Variable	Before the intervention	After the intervention	p	t
Inadequate consumption of milk and diary	6.62	3.33		14.40
Inadequate consumption of fruit and vegetables	4.6	2.82		12.87
Consumption of fast foods and sandwiches	1.8	1.08	$P < 0.05$	9.43
Consumption of sweet and fatty snacks	5.77	3.8		9.66
Consumption of fried foods	3.46	2.15		8.45

**Table 3.** Comparison and determination of the frequency distribution of behavioral intention of the study subjects before and after the educational intervention

Behavioral intention	Before the intervention				After the intervention				p	Chi-square
	Intent		No intent		Intent		No intent			
	No.	%	No.	%	No.	%	No.	%		
Inadequate consumption of milk and dairy	21	47	24	53	8	18	37	82	0.003	8.598
Inadequate consumption of fruit and vegetables	16	35.5	29	64.5	4	9	41	91	0.002	9.257
Consumption of fast foods and sandwiches	13	29	32	71	2	4.5	43	95.5	0.002	9.680
Consumption of sweet and fatty snacks	28	62	17	38	7	15.5	38	84.5	0.001	20.618
Consumption of fried foods	34	75.5	11	24.5	14	31.1	31	68.9	0.001	17.857

reduction of behavioral intention of the mothers about false nutritional behaviors. Chi-square test showed that difference in behavioral intention frequency distribution before and after the educational intervention was significant as the following: inadequate consumption of milk and dairy ( $p < 0.003$ ), inadequate consumption of fruits and vegetables ( $p < 0.002$ ), consumption of the sandwiches and fast foods ( $p < 0.002$ ), consumption of sweets and fatty snacks ( $p < 0.001$ ) and consumption of the fried foods ( $p < 0.001$ ).

## Discussion

The findings indicated that husbands allocated the highest frequency of mothers' subjective norms (53.3%) and health staff were the lowest frequency of mothers' subjective norms (0%). Tavakol et al showed that the highest subjective norm of mothers in association with behavior of the child were their husbands (37.8%) and the lowest were the health staff (2.2%).<sup>24</sup> In another study by Fathian et al she also showed that in regarding to the type of delivery, after the physicians, the highest mothers' subjective norm were their husbands.<sup>26</sup> In addition, in reviewing the subjective norms in the study of Miri et al which was done aimed to determine women's fertility view of Birjand University employees based on behavioral intention model; findings indicated that the most important effective people on choosing methods of contraception

respectively were health staff and husbands of the study subjects. In this study, it seems that this was due to close relation of the husbands in the families of the society and that women are influenced by their spouses in comments and opinions. Consequently, husbands can be considered as effective social factors in education. Studies have shown that in third world countries, husband play an influential and important role.<sup>29</sup>

The other finding of the study in association with comparing mean attitude scores before and after the educational intervention indicated that in regarding to each food group, mean attitude scores had reduced after the educational intervention towards false nutritional behaviors. so that in association with inadequate consumption of milk and dairy, inadequate consumption of fruit and vegetables, consumption of fast foods and sandwiches and sweet and fatty snacks and consumption of fried foods, the reduction of the mean attitude scores after the educational intervention was significant. Furthermore, findings indicated that mean total attitude score before the educational intervention had been ( $X = 80.6$ ) which is considered a neutral attitude and after the educational intervention, mean total attitude score was ( $X = 44.49$ ) which is a positive attitude score and the mean total attitude score have reduced in comparison with before the educational intervention and statistically this reduction was signifi-

cant. In the study of McGarvey et al which was done aimed to determine feasibility and benefits of a parent-focused preschool child obesity intervention, there was a significant change in mean score after the intervention.<sup>30</sup> Moreover, in the study of Aein et al it was indicated that education could effectively influence mothers' attitude on dealing with their children and it could significantly change the attitude score.<sup>31</sup> In the study of Fathian et al which was done aimed to review the effect of education based on behavioral intention model on attitude of mothers towards the labor method, there was a significant difference in attitude between the control and case groups after the educational intervention ( $p < 0.001$ ).<sup>26</sup>

In the study of Ansari, titled as "evaluating the effect of education on nutritional snack to the mothers on behavioral changes of the students", one month after conducting educational program, mean attitude score in the case group had a significant difference in comparison with control group using statistical t-test ( $p < 0.05$ ).<sup>32</sup>

Findings, in association with comparison of frequency distribution of mothers' behavioral intention regarding nutritional patterns associated with overweight preschool children before and after the educational intervention showed that frequency distribution of mothers' behavioral intention after the educational intervention had reduced towards false nutritional behaviors and this reduction was statistically significant. In the study of Fathian et al mother's intention after the educational intervention showed a statistically significant difference ( $p < 0.001$ ).<sup>26</sup> Furthermore, in the study of Chao et al which was conducted to determine physical activity of the students based on behavioral intention model, their behavioral intention statistically a significant difference.<sup>27</sup> In the study of Salehi et al which was carried out to assess the impact of nutrition education to the nomadic mothers on growth indices of Iranian nomadic children under 5 years old based on BASNEF model, there was a significant difference between behavioral intention of the mother before and after the education.<sup>33</sup> In the other study by Johnson & Hall which has been done on the

prediction of safe lifting behavior ways based on behavioral intention model, findings indicated that behavioral intention of the study subjects statistically had a significant difference after the education.<sup>34</sup>

In the study of Hazavehei et al titled as "assessing the impact of educational program based on BASNEF model on nutritional function of the second guided school girl students", mean behavioral intention score statistically showed a significant difference between the case and control group after the educational intervention.<sup>35</sup>

### Conclusion

Since in this study, attitude and behavioral intention of the mothers changed towards nutritional patterns of overweight children after the educational intervention, this probably can confirm the effect of educational efforts of this study. In researcher's view and findings of other studies, undoubtedly in order to have a healthy and developed life and also to have children who are physically and mentally healthy, parents need to have necessary knowledge, and having knowledge and awareness is the determined right of the parents to know how to adjust nutritional pattern of their children and to have correct attitudes towards it and more importantly, attention to the children at this age as the country's future investment is of high importance and would cause their health particularly during the puberty and eventually it will cause health of a generation. Education relying on educational models especially models influencing attitude and behavioral intention can have a significant role on changing the attitude of the parents and also behavioral intention can change to promote correct health behaviors. Since, today the appropriate and timely education is emphasized and health education should be the primary duty of every person in the health system, the results of this study can be applied in health systems including monitoring child growth centers, clinics, infirmaries and education systems such as schools and kindergartens to help prevent from this problem through education which is one of the primary ways of prevention. However,

this significant issue requires training the health staff and workers and health care providers of the schools so that they can use more effective educations by having knowledge from the importance and quality of the educational models. Also, according to the increasing reports of these disorders, the necessity of establishing some centers in the health care system for counseling and education, using the related professional specialists,

identifying risk factors and people at risk, its prevention in three levels of prevention and treatment is felt and considering that application of the models can eliminate learning obstacles and improve the effect of education, appropriate use of educational models in the problem domains can provide the most effective education.

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