

Mother's Behavior Regarding Preparation of Healthy Breakfast and Snacks for Children: A School-based Intervention Research

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ABSTRACT

Healthy breakfast and snacks play an important role in students' physical and mental health and education is one of the most effective strategies for improving the nutritional status of children. The aim of this study was to survey the effect of school-based educational intervention on mothers' behavior with respect to healthy breakfast and snacks for children.

In this experimental study, random sampling was conducted and 120 students were selected and divided into two experimental and control groups and their mothers were invited to participate in the study. Samples were examined in two stages through pre-test, and a delayed post-test with a questionnaire that consists of demographic information questions related to knowledge, attitude, perceived benefits, perceived barriers and behavior. Training, lectures and group discussion methods and question and answer with educational aids such as pamphlets were used. Data were analyzed by using SPSS16 and paired t-test, t-test and chi-square analyses were employed.

The mean scores of knowledge (6.20 ± 88.30), attitude (1.65 ± 25.95) and perceived benefits (0.29 ± 17.95), perceived barriers (2.71 ± 34.70), and behavior of mothers (8.38 ± 115) in the experimental group significantly increased after intervention ($P < 0.001$). There were significant differences between the two groups in terms of the mean knowledge, perceived benefits, perceived barriers and behavior scores 2 months after the program, except for attitude, and mean scores ($P < 0.001$).

Design, implementation and evaluation of interventions for mothers regarding nutritional issues for children to enhance their health are recommended.

Keywords: Healthy Breakfast, Healthy Snack, Education, Mothers.

INTRODUCTION

Nutrition plays an important role in human health [1]. Students are vulnerable because of their physical and mental characteristics so food shortage can adversely affect their abilities in using limited educational opportunities [2]. Children should enjoy three balanced meals besides some snacks per day [3]. Breakfast is the most important meal [4]. Eating breakfast can lead to improved math scores and increased focus and memory. Children who eat breakfast regularly are less likely to suffer from obesity and obtain more nutrients, vitamins and mineral materials compared to children who refuse to eat breakfast. In addition to breakfast, eating daily small snacks would lead to increased performance and empowered memory among children [5]. Junk food is increasingly being used and breakfast, which is the most valuable meal for children, is ignored [3]. Skipping breakfast and snacks causes some hunger symptoms such as drowsiness [4], decreased learning, fatigue, restlessness, and obesity and this might lead to increased chronic health issues in the long term [6]. Chronic diseases related to diet are responsible for

seven out of 10 deaths in the U.S., killing more than 1.7 million Americans each year [7]. One in every five children in the developing world is malnourished, and poor nutrition is associated with half of all child deaths worldwide. Malnutrition in children causes an increase in morbidity and mortality and has an adverse effect on intellectual ability and 35.8% of preschool children in developing countries are underweight, 42.7% are stunted, and 9.2% are waste [8]. Also, worldwide, 47.4% of children under 5 years of age are anaemic, with the burden being greatest in low- and middle-income countries [9]. In 2010, 171 million children (167 million from developing countries) were short [10]. In Eastern Mediterranean Region, 63% of children below 5 suffer from iron deficiency anaemia [11], 13.2 million preschool children have a serum retinol status $< 0.70 \mu\text{mol/L}$, with 0.8 million afflicted by night blindness. About one-third of the population is at risk of iodine deficiency disorders, including cognitive and functional development in early childhood [12] and in 2015, the prevalence of obesity increased for children from 4.1% (95% UI 2.9–5.5) to 4.9% (95% UI 3.6–6.4) in this region [13]. A study was conducted on preschool students in Zarandiyah,

Iran and it was found that the prevalence of overweight and obesity in children was 15.5 and 9.9%, respectively [14]. In the study of Shafie and his colleagues it was found that the pediatrics of subjects classified as "regular", "often" and "seldom" breakfast eaters were 2,653(47.3%), 1,327(23.7%) and 1,624(29.0%), respectively [15]. Global strategy for prevention from implications caused by unhealthy nutrition among students is holding workshops for parents and teachers as well as providing free breakfast in schools [16]. The other strategy is training parents and encouraging them to have a healthy lifestyle in relation to children's diet because children's behavior is affected by their parents' behavior [17]. Mohammadhossini and colleagues conducted a study emphasizing the importance of increased nutritional knowledge of families, particularly mothers [18]. It is required to increase the nutritional knowledge and education levels of parents, in particular, mothers teaching them to consider children's needs when buying foodstuffs and consider household food plan in order to change inappropriate diets [19]. The major targets of nutrition training are women, because they decide on foodstuffs and are concerned about family health. Accordingly, it is necessary to increase knowledge and change attitude and performance of women and their families to achieve a proper nutritional plan in society [20]. A study was conducted entitled "Analyzing the level of knowledge and attitude of the mothers referring to the urban health centers of Birjand about nutritional behaviors" and it was found that such training could positively affect attitude among mothers [21]. There are some other factors affecting children's nutrition including family income [22], household size [23], age and mother's education, time, and job. Children whose mothers have full-time or part-time jobs have lower scores, less iron and fiber use, higher use of cola and fried potato in comparison with children who have unemployed mothers [24]. In other words, people in this area are faced with obstacles that, if unsolved, consumption of breakfast and healthy snacks will decrease in students.

Mothers have a vital and effective role in the area of preparing healthy breakfast and snacks. Training nutritional patterns to mothers is an effective method to reduce malnutrition among children and it is required to hold training sessions for mothers in the field of nutrition.

MATERIALS AND METHODS

This is an experimental study. The target population consisted of students' mothers in selected schools of Islamshahr, a city south of Tehran, Iran. The sample size was calculated according to the formula $n =$

$$\frac{2 \left[Z_{(1-\frac{\alpha}{2})} + Z_{(1-\beta)} \right]^2}{\Delta^2}, n=54 \text{ people and considering } 10$$

percent of the loss calculated 60 people in each group (experimental and control group) [25]. Inclusion criteria to the study were the tendency of mothers to participate in the study, mothers who have 6-12 years old children, having minimum education level and exclusion criteria were lack of consent to continue participation, lack of responding to at least 20% of the questions in the pretest. The sampling method was a cluster random one. In this regard, the list of elementary schools in Islamshahr was taken from Education Organization, and then 2 schools were randomly selected and assigned to two experimental and control groups. Ten students were chosen from each grade of school and then their mothers received invitations to participate. A researcher-made questionnaire was used as a data collection method that included two parts: part one was related to demographic characteristics of the population such as age, education level, job, family size, family structure, employment status, and economic situation and part two consisted of questions related to awareness (9 items), attitude (10 items), perceived benefits (6 items), perceived obstacles (12 items), and behavior (8 items). In questions related to awareness scores of 2, 1, and 0 were considered for "true", "I do not know", and "false" responses, respectively. In the attitude section, perceived benefits and perceived barriers were scored based on 3-point Likert Scale in which, the option "agree" obtained a score 3, "no idea" score 2, and "disagree" score 1. The score domain was variable from 0 to 4 for behavior questions. The questionnaire was designed based on valid books and references, related questionnaires and an expert panel. The validity of the questionnaire was evaluated using two face and content validity methods (by 3 nutritionists and 4 health education and health promotion experts) and their opinions were applied; finally, the validity of the questionnaire was approved after resolving ambiguities and bugs. The reliability of the questionnaire was tested using test-retest and internal consistency (Cronbach's alpha) methods. To determine reliability, 15 mothers from selected schools filled out the questionnaire twice within 15 days. It should be mentioned that these members were not included in the studied sample. For internal consistency, Cronbach's alpha coefficient was calculated. The collected data was inserted into SPSS 16 software at this step and analyzed statistically and then the measures (ICC=0.84) ($\alpha=0.83$) were obtained which are acceptable values. Pretest was implemented in order to determine training need assessment for training content development. In this regard, questionnaires were distributed among members of

experimental and control groups. Data was inserted into SPSS 16 software, and training content for intervention in the experimental group was prepared based on the results obtained from statistical analysis. The educational intervention was implemented in the experimental group during the month as 250-minutes of training sessions for mothers using lectures (focused on knowledge and benefits) for two 30-members groups and group discussion (mainly focused on attitudes and perceived barriers) among 10-members groups distributing pamphlets in classes of selected schools and asking teachers and schools' principals to be involved in the study. The variables including awareness, attitude, perceived benefits and obstacles were discussed in the training sessions and 2 months later, questionnaires were distributed among experimental and control groups and data was collected. To examine the effect of education, data was analyzed using statistical tests of independent t-test, paired t-test and Chi-square two months after the intervention. To follow the ethical principles,

participants received some explanations about the research objectives. Informed consent, voluntary participation, the confidentiality of information, their choice for inclusion or exclusion, and giving enough time for responding were the ethical considerations in the present research.

RESULTS

Participants of this study included 60 members in the intervention group and 60 members in the control group and their demographic characteristics are described in Table 1. Both groups were equal among variables of age, economic situation, job, education level, and family size before training. According to the findings, most of the participants were 30-40 years old (64.2%) and were at a moderate level in the economic situation (65%) and most of them were housewives (90%). Also, most of the members, either in the experimental or control group, had diploma and higher education levels and most of the families had four members (Table 1).

Table 1: Demographic characteristics of mothers in both groups

Demographic variables		Experimental group	Control group	P-value
		Percent(Number)	Percent(Number)	
Age	20-30 Years old	16.7(10)	13.3(8)	0.871
	30-40 Years old	63.3(38)	65(39)	
	40-50 Years old	20(12)	21.7(13)	
Level of education	Lower of diploma	23.3(14)	26.7(16)	0.637
	Diploma & higher	76.7(46)	73.3(44)	
Job-status	Housekeeping	95(57)	85(51)	0.125
	Employee	5(3)	15(9)	
Economic situation	Poor	6.7(4)	6.7(4)	0.919
	Moderate	63.3(38)	66.7(40)	
	Good	30(18)	26.7(16)	
Family size	3 People	36.7(22)	18.3(11)	0.06
	4 People	48.3(29)	66.7(40)	
	5 People & more	15(9)	15(9)	

According to the results obtained from the independent T-test, there was not any significant difference between mean scores of knowledge, attitude, perceived benefits, perceived barriers, and behavior among the two experimental and control groups before the intervention (P -value >0.05). Mean scores of knowledges among mothers were 77.40 with a standard deviation of 6.89 before educational intervention and these values reached 88.30 with a standard deviation of 6.20 two months after educational intervention and paired t-test showed a significant difference between scores of this variable during two steps (P - <0.001) (Table 2).

Also, the mean scores of attitude among mothers were 25.27 with a standard deviation of 2.45 before the educational intervention and these values increased to 25.95 with a standard deviation of 1.65 two months after educational intervention and paired t-test showed a significant difference between scores of this variable during the two phases (P - <0.001). However, there was

not any significant difference between the scores of the control group after and before the educational intervention in two phases ($P=0.563$) (Table 2). The results obtained from the independent T-test between two experimental and control groups indicated no significant difference between mean scores of attitude in the two groups before educational intervention ($P=0.362$) and two months after educational intervention ($P=0.267$) (Table 2).

The mean score of perceived benefits among the members was 17.47 with a standard deviation of 0.96 before the educational intervention but increased to 17.95 with a standard deviation of 0.29 two months after the intervention, which was significant at $P<0.001$. Results obtained from independent t-test among two experimental and control groups showed no significant difference between scores of perceived benefits before the educational intervention in these groups ($P=0.928$) while there was a significant

relationship between the groups two months after the educational intervention ($P < 0.001$). Results imply the effectiveness of educational intervention in increased perceived benefits of preparing healthy breakfast and snacks for children among members (Table 2). Means scores of perceived barriers were 33.30 with standard deviation before intervention and this value increased to 34.70 with a standard deviation of 2.71 two months after intervention and paired t-test indicated a significant difference between scores of this variable at two phases ($P < 0.001$). The Independent t-test indicated no significant difference between mean scores of perceived barriers before educational intervention in both groups ($P = 0.491$), while this difference was significant after educational intervention ($P = 0.007$) (Table 2). The mean score of

behavior of members was 104.93 with a standard deviation of 9.65 before the educational intervention but increased to 115 with a standard deviation of 8.3 two months after the intervention this difference was significantly based on paired t-test. Results obtained from the independent t-test among two experimental and control groups showed no significant difference between scores of behavior before educational intervention in these groups ($P = 0.834$) while there was a significant relationship between groups two months after educational intervention ($P < 0.001$). Results highlight the effectiveness of educational intervention in the promotion of behavior of preparing healthy breakfast and snacks for children among participants (Table 2).

Table 2: Mean and standard deviation scores of knowledges, attitude, perceived benefits, perceived barriers and behavior in the

Variables	Groups	two groups		P-value
		Before intervention	2 months after the intervention	
		Mean \pm SD	Mean \pm SD	
Knowledge	Experimental	6.89 \pm 77.40	6.20 \pm 88.30	0.001* $<$
	Control	6.78 \pm 76.07	5.76 \pm 80.70	0.001* $<$
	P-value	0.288	0.001* $<$	
Attitude	Experimental	2.45 \pm 25.27	1.65 \pm 25.95	0.001* $<$
	Control	2.33 \pm 25.67	1.94 \pm 25.58	0.563
	P-value	0.362	0.267	
Perceived benefits	Experimental	0.96 \pm 17.47	0.29 \pm 17.95	0.001* $<$
	Control	1.50 \pm 17.48	1.19 \pm 17.35	0.280
	P-value	0.928	0.001* $<$	
Perceived barriers	Experimental	3.92 \pm 33.30	2.71 \pm 34.70	0.001* $<$
	Control	4 \pm 33.80	3.84 \pm 33.03	0.001* $<$
	P-value	0.491	0.007*	
Behavior	Experimental	9.65 \pm 104.93	8.38 \pm 115	0.001* $<$
	Control	10.35 \pm 105.32	10.21 \pm 105.63	0.001*
	P-value	0.834	0.001* $<$	

DISCUSSION

According to the findings of this study, knowledge of preparing healthy breakfast and snacks for children significantly increased among mothers in the experimental group after the educational sessions compared to mothers in the control group and this underscores the effect of education on increased mothers' knowledge of preparing healthy breakfast and snack. Results of the study conducted by Ziaee *et al.* to examine the effect of health belief model-based training nutrition during pregnancy on knowledge and attitude of women indicated a significant increase in these variables in the intervention group compared to the experimental group after awareness educational intervention [26]. Accordingly, these results are matched with the findings of the present study. Motamedzade *et al.* conducted a study to examine the

effect of nutrition and training on nutritional stuff hygiene on awareness among female teachers of elementary schools in Ferdos, Iran and concluded that such interventions led to an increased awareness of teachers [27]. Also, the results of the study conducted by Akar Sahingoz entitled "training the importance of breakfast among children and mothers in Turkey" indicated a significant difference between the awareness level of trained and non-trained children and mothers in terms of breakfast and its importance [28]. The results of this study are also consistent with the results obtained from the present study. However, Rahimi *et al.* conducted a study entitled "effect of nutritional training on awareness, attitude, and nutritional performance of women employed in Tabriz University Medical of Science" and concluded that scores of awareness of women increased after

intervention but this increase was not statistically significant [29]. This result is not compatible with the result of the present study. Despite the lack of training sessions for the control group, awareness of members in these groups increased after intervention and this increase was statistically significant that the case can be attributed to the testing effect, time effect, social networks effect and exposure to media. However, the considerable point is that increased awareness of experimental groups was more significant and prominent than in the control group.

The effect of training on the attitude of mothers in the experimental group can be seen and this intervention has improved the attitude of mothers in terms of preparing healthy breakfast and snacks to some extent. Attitude is defined as a mental process determinant of potential and actual activities that predict behavior. It means that people would make decisions and think of the concept of decisions before showing a behavior [30]. Hanafi and colleagues conducted a study entitled "Impact of health education on knowledge of, attitude to and practice of breastfeeding among women attending primary health care centres in Almadinah Almunawwarah, Kingdom of Saudi Arabia: Controlled pre-post-study" and found a significant difference between mean scores of attitude before and after the intervention [31]. Also, the study conducted by Nimbalkar *et al.* on pregnant women about nutrition during pregnancy indicated that scores of awareness and attitude increased significantly in the experimental group after the training intervention [32]. The obtained results approved the results of the present study. However, what was found in the study conducted by Hankey *et al.* was that nutritional training had no effect on the attitude of employed women this result is in conflict with the result of the present study [29]. The probable reason for such contradictions might be related to implementation method and time duration of intervention and test after the training intervention step. In this study, the perceived benefits consist of a mental understanding of positive implications and effects of recommended health behaviours related to healthy breakfast and snacks. Health and hygiene trainers should determine accurate behavior and highlight obstacles or benefits obtained from such actions in order to ease the use of the structure of the perceived benefits. Perceived benefits increased among mothers after the training intervention in the present study. Increased perceived benefits play a vital role in the prevention of harmful hygiene and health behaviors. Ziaee *et al.* conducted a study and showed that training intervention can positively affect all variables such as perceived benefits and this result is in agreement with the results obtained from the present study [26]. Also, the study by Wang *et al.* entitled "A model of health education

and management for osteoporosis prevention" indicated a significant increase in scores of perceived benefit [33]. Perceived obstacles in this study consist of mental understanding of mental and financial costs of recommended health behaviors related to nutrition. It is required that health trainers try to remove some obstacles that prevent recommended actions by individuals and this can be done through reassuring, removing misunderstanding or providing stimulus. In relation to this variable, we observed an increase in perceived obstacles among mothers two months after training intervention that this result is matched with the results obtained from the study of Ahmadpour *et al.* This study showed an increase in scores of perceived obstacles by mothers besides the increased score of perceived benefits; hence, training had a positive effect [2]. Also, the results obtained from the study conducted by Wang *et al.* showed an increase in score of perceived obstacles among postmenopausal women [33]. Scores from mothers' behavior in the experimental group considerably increased and this indicates the effect of a training program on change in behavior and the creation of positive behavior. Horodyski *et al.* conducted a study to examine the effect of training nutritional behaviors pattern to mothers of toddlers on the nutritional quality of children and performance of mothers in which, mothers' performances in case of child nutritional behavior improved significantly compared to pre-intervention. Also, there was a significant difference between nutritional patterns of toddlers after the intervention [34]. The study conducted by Yabancı *et al.* indicated that many of the mothers who have higher nutritional knowledge level and their children have normal weight. The mothers who have higher level of nutritional knowledge feed their children more with vegetables, fruit, legumes, and less sugared drinks such as pops, juice and fast foods than the mothers who have a lower level of nutritional knowledge. Also, higher nutritional knowledge-level mothers avoid giving food which contains non-organic ingredients to their children and believe in the knowledge about nutrition-health more. Mothers' nutrition knowledge level affects children's eating habits [35]. These results are consistent with the results obtained from the present study.

Limitations

This study is limited to primary schools in southern Iran, which may limit its generalizability. Therefore, there is a need for further studies in different regions of the country and other educational levels.

CONCLUSION

Results obtained from this study indicated that educational intervention could have an effect on awareness, attitude, perceived benefits, perceived

obstacles and behaviors of mothers toward preparing healthy breakfast and snacks. In addition, behavior of mothers improved through the increasing level of awareness and attitude, perceived benefits and perceived obstacles. It is recommended to conduct a similar study among students' mothers in other educational grades and other regions of Iran.

IMPLICATIONS FOR SCHOOL HEALTH

The results of this study showed that this educational method can be easily used in the field of healthy nutrition for children. also, This experimental study can be a basis for planning research in other groups and in other areas.

ETHICAL ISSUES

Ethical issues have been completely observed by the authors. Participants were allowed to leave the study at any stage. Also, researchers explained all procedures and requirements for participants.

CONFLICTS OF INTERESTS

There is no conflict of interest to be declared.

AUTHORS' CONTRIBUTIONS

All authors equally contributed to writing this manuscript.

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