

Investigation of educational intervention based on Theory of Planned Behavior on breakfast consumption among middle school students of Qom City in 2012

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ABSTRACT

Background: Eating breakfast is crucial for adolescents to be healthy. It also improves students' capacity of learning and doing school homework. Although healthy habits such as eating breakfast, weight control, and regular sleep increase the lifespan in adults, the effects of healthy habits on school-age children have not been studied much. The present study aimed at investigating the impact of an educational program based on Theory of Planned Behavior (TPB) on eating breakfast among middle school students. **Materials and Methods:** This interventional study was conducted on sixth-grade students in Qom City during the academic year 2012–2013. First, 97 students were randomly assigned to the experimental group and 97 other students were assigned to the control group. Then, a questionnaire was developed on eating breakfast by the researchers according to the TPB. A pilot study was conducted to assess the reliability of the questionnaire. To assess the validity of the questionnaire, advice by a panel of experts was sought. To carry out a pre-test, both groups answered the questions. After analyzing the pre-test results, the required content was developed for the experimental group. Educational methods included delivering speech, discussion groups, pamphlets, and posters. The required educational content was provided for students during five sessions and for parents in one session. To determine the effect of educational intervention, a post-test study was carried out 2 months after the intervention. Collected data were analyzed using independent *t*-test, χ^2 ,^[2] and repeated measures. **Results:** In the experimental group, 36.7% of students were eating breakfast at least in a day of a week, before educational intervention. After implementation of the educational program, only 32.7% of them were continuing their past habit. There was a significant difference between the mean scores of attitudes, perceived behavioral control, intention, and practice of eating breakfast in the experimental and control groups ($P < 0.05$), while there was no significant difference between

the mean scores of subjective norms after implementing the educational program in both groups ($P < 0.26$). **Conclusion:** Using the TPB improved students' intentions and behavior of eating breakfast. Thus, it seems necessary to consider all effective environmental factors on the subjective norms in the education of healthy eating behaviors or improving breakfast-eating practice among students.

Key words: Eating breakfast, students, Theory of Planned Behavior

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INTRODUCTION

The importance of nutrition has been noticed in man's different periods of life on the planet.^[1] Proper nutrition during school years is extremely important.^[2] Breakfast is the first meal during the day and it is related to receiving enough nutritional value by children and adolescents.^[3] Eating breakfast is important to their health and growth^[4] and plays a great role in improvement of their nutrition.^[5] Elementary and middle school years bring about new and relatively lasting eating habits. During these years, child becomes more accustomed to the new environment and peer groups and is being influenced by them. Eating breakfast is a desirable habit which positively yields positive impact on nutritional balance, physical growth, and school and learning performance in these years.^[6,7] Despite the fact that breakfast is considered the most important daily meal, since it is eaten after the longest period of fasting during 24 h and its deletion would lead to decrease in nutrients accessed by brain and ultimately poor mental performance,^[8] evidence shows that skipping breakfast has increasingly become a habit among children.^[8,9] While it may be well clear for many that skipping breakfast may lead to undesirable impact on children's mental abilities, the scientific validity of this statement is still questioned.^[10]

Eating breakfast increases students' presence in school and decreases their absence. It also improves their nutritional diet quality.^[11] Survey studies on the effect of eating breakfast on learning ability in schools indicated that children going to school without eating breakfast displayed lower leaning abilities than children who ate breakfast.^[12] Skipping breakfast as a daily meal is found to be more common among students than skipping other meals.^[13] The rate of skipping breakfast is different among different communities and varies between 7.4% and 34%.^[14]

A study by Murata in Japan indicated that the majority of students did not eat breakfast in school years.^[9] Nutritional needs in children who go to schools without eating breakfast, or whose breakfast lacks high nutritional value, are not supplied. In these children, poor physical growth, behavioral disorders such as decreased learning ability, irritability, and irascibility, and poor mental performance are observed.^[15] Karimi *et al.*'s reported in their study aimed at determination of conditions of receiving breakfast in students that 53.4% of students stated that they ate breakfast always, with the rest of students stating their eating breakfast conditions as "often," "sometimes," or "rarely," with 4.6% of them mentioning "never" as their eating breakfast condition.^[16] In a research by Vahedi *et al.*, 62% of the city elementary school children and 49% of the village elementary school children were observed to consume only a unit of milk daily. The milk consumption in 59% of boys and 55% of girls has been less than the recommended amounts.^[17]

Access to healthy and enough nutritional sources is an effective factor on children's and adolescents' growth and education.

Nutritional deficiencies in growth ages lead to children's lack of enough energy necessary for hours of education and reduce defensive power of their bodies against epidemics in the school environment. It is clear that frail students with retarded growth would show no progress in the school curriculum.^[18] Thus, one of the main causes of the poor quality of items consumed as breakfast or not eating breakfast at all is the absence of targeted education.^[19] School's particular position as the center of students, the role of teachers and parents in providing knowledge and favorable attitudes, and ultimately, bringing about change in students' and their parents' behavior could be crucial in health development in the society. During school years, there is little resistance against learning; thus, behavioral models and concepts learned remain permanent and wield an impact on children's future lifestyle. In addition, students act as transmitters of health messages from school to home.^[20] The implementation of nutritional education has had significant impact on students' breakfast-eating habits in some regions.^[21,22] So, in any planning for children, it is important to consider that children, due to high amount of activity in these ages, need proper nutritional education proportionate to their ages.^[18] Theory of Planned Behavior (TPB) is one of the common theories for behavior change and educational interventions on various topics.^[23,24] Most nutrition education efforts have been made on studying the health benefits of eating breakfast to increase nutrition knowledge and awareness. But the TPB examines the influences of peers and family on predicting and explaining intention and behavior to eat breakfast.^[25] One component of the TPB allows examination of personal, family, and peer-related factors on the effectiveness of the intervention.^[25] Studies have investigated the impact of the different components of the TPB in predicting breakfast consumption, and have suggested that the TPB can be meaningfully applied to breakfast consumption.^[26,27] Findings of the study conducted by Berg *et al.* on choosing milk and bread for children's breakfast according to TPB indicated that attitude, subjective norm, and perceived behavioral control predicted an individual's intention to eat this type of foods.^[28] Also, in Bogers *et al.*'s study, perceived behavioral control was the strongest predicting factor of intention and behavior in choosing the type of food, and to explain the nutritional behaviors, the design of educational interventions in health education has been recommended based on TPB.^[29] Given these details, the present study evaluated the breakfast-eating behavior among students and its related factors. Then, it developed, implemented, and evaluated the theory-based educational program on students' breakfast-eating practice.

MATERIALS AND METHODS

This interventional study was conducted on sixth-grade students of Qom City in the academic year 2012–2013. Previous studies reported the mean of variance before and after intervention to be 0.870.^[26] Therefore, we calculated the sample size with 0.05 significance level and withdrawal rate of about 10%. According to the sample size formula, we randomly selected 97 students for the experimental group

and 97 students for the control group. We used stratified cluster random sampling method. For this purpose, each region (totally four regions) of the city was considered as a stratum. Accordingly, schools were divided into two subgroups based on the students' gender within each region. Then, one school was randomly selected from each subgroup using random number table from each region. Finally, from each school, one class was randomly selected. Then, a questionnaire was developed by the researchers according to TPB on eating breakfast. The questionnaire consisted of the following components: "attitude" with 15 questions and the measuring scale ranging from 0 to 3 with the descriptors of "completely agree" to "completely disagree"; subjective norm with 12 questions and the measuring scale ranging from 1 to 3 in two sections of normative beliefs with 6 questions with descriptors of "definitely consume," "does not care," and "never consume" and the other section with 6 questions with descriptors of "agree," "do not care their opinion," and "disagree"; behavioral control with 10 questions and the measuring scale ranging from 1 to 3 in two sections of control beliefs with 5 questions with descriptors of "always," "sometimes," and "never" and perceived ability section with 5 questions with descriptors of "with high probability," "with low probability," and "never"; and the component of intention with 3 questions with the measuring scale ranging from 1 to 5 and descriptors of "completely false" to "completely true."

For assessing breakfast-eating behavior, 16 questions were asked to the participants about the possible food types eaten for breakfast in the last week, and was calculated according to the food unit for each day of the week. To assess the reliability of the questionnaire, a pilot study gave us Cronbach's alpha for attitude (0.82), subjective norm (0.73), perceived behavioral control (0.71), and intention (0.75). To assess the validity of the questionnaire, advice from an expert panel was sought. To conduct pre-test study, the questionnaire was filled in by both groups. The inclusion criteria for participation in the study are as follows: The student must have been enrolled in the sixth grade, should attend all the sessions of educational intervention, and should complete the pre-intervention and post-intervention questionnaires. The exclusion criterion was student being absent for more than two sessions during training. The required educational content was developed using educational methods such as delivering speech, group discussion, pamphlets, peer groups, and posters in schools. Then, it was provided for the experimental group. In case of subjective norm, keeping in mind the impact by the family, parents, and teachers on breakfast-eating behavior of the students, an educational session was held for parents, and peer groups and teachers were used for an active learning by the students. The educational program content was presented for the experimental group through speech and group discussion during five sessions, each lasting 40 min. All sessions were held in the conference halls of the respective schools. The educational sessions' topics are as follows. *First session:* Having a discussion about the importance of healthy eating and breakfast. *Second session:* To debate about the type of healthy foods for breakfast and the benefits of

eating breakfast. *Third session:* Talk over about the ability to choose healthy foods for breakfast by students and the ability to abstain from the consumption of worthless junk foods. *Fourth session:* Perception and belief about the pressures of friends, peers, and teachers on breakfast eating and belief in the importance of opinion of parents and family about eating breakfast. *Fifth session:* Identifying and understanding the factors that affect eating breakfast at the appropriate time, and cognition and encouragement to follow the proper pattern of eating breakfast.

A session was held for parents that included discussion on parents' knowledge and beliefs about the importance and benefits of eating breakfast in students, understanding about accompanying and guiding the students for eating breakfast, and identifying the factors that had an effect on eating or not eating breakfast in students. Finally, the discussion groups were held for each session. Then, 2 months after the intervention, through questionnaire, the data from both groups were collected as self-reports by the students, and fed into SPSS₁₆ and analyzed using independent *t*-test, χ^2 , and repeated measures. All participants were enrolled voluntarily and anonymously into the study. Written informed consent was obtained from all the participants. Local Human Subject Review Board of Qom University of Medical Sciences approved this study.

RESULTS

The participant students in the present study averaged 12.45 ± 0.53 years in age, and there were 99 (50.8%) males and 96 (49.2%) females. In terms of weight, the students averaged 45.65 ± 9.76 kg, and in terms of length, they averaged 149.77 ± 13.68 cm. The number of brothers and sisters of the participants averaged 1.78 ± 1.15 , and the order of siblings in the family averaged 1.87 ± 1.16 . The night sleep hours averaged 10.17 ± 3.19 h. There was no significant statistical difference in the demographic characteristics and the mean scores of attitude, subjective norm, perceived behavioral control, intention, and breakfast-eating behavior between the two groups before intervention ($P > 0.05$). Findings indicated that in the control group, two participants (2.1%) before educational intervention and two participants (2.1%) after educational intervention did not eat breakfast. Also, 40 participants (41.2%) before educational intervention and 55 participants (56.7%) after less than a unit of educational intervention ate at least a breakfast in week days.

Table 1 shows that in the experimental group, one participant (1%) before educational program and three participants (3.1%) after educational program did not eat breakfast. In addition, 36 participants (36.7%) before educational program and 32 participants (32.7%) after a unit of educational program ate at least one breakfast in a week.

The findings presented in Table 2 indicate that there was a significant difference between the mean scores of attitude, perceived behavioral control, intention, and breakfast-eating

Table 1: The frequency of eating breakfast before and after educational program in the experimental group

Variable	Class	Before educational program		After educational program	
		Frequency	Percentage	Frequency	Percentage
Eating breakfast	Not eating	1	1	3	3.1
	Less than a unit	36	36.7	32	32.7
	A unit	54	55.1	57	58.2
	More than a unit	7	7.1	6	6.1
Total		98	100	98	100

Table 2: The difference of means of scores for attitude, subjective norm, perceived behavioral control, intention, and breakfast-eating behavior after educational program in both groups

Components	Group	No	Mean	SD	P value
Attitude	Experimental	98	83.43	13.51	0.045
	Control	97	78.48	10.80	
Subjective norm	Experimental	98	91.69	9.69	0.26
	Control	97	90.09	10.26	
Perceived behavioral control	Experimental	98	83.02	13.91	0.038
	Control	97	79.31	17.05	
Intention	Experimental	98	74.66	19.65	0.000
	Control	97	55.90	23.18	
Behavior	Experimental	98	41.72	18.43	0.013
	Control	97	34.88	19.52	

behavior after educational intervention in both groups ($P < 0.05$), while there was no significant difference between the two groups in the mean score of subjective norm after educational intervention ($P = 0.26$).

According to Table 3, there was a significant difference between the mean scores of attitude, perceived behavioral control, intention, and breakfast-eating behavior in both groups before and after educational intervention ($P < 0.05$), while there was no significant difference between the two groups in subjective norm before and after educational intervention ($P = 0.91$).

DISCUSSION

The results of this study show that educational interventions based on the TPB can increase breakfast consumption among students. Eating breakfast is one of seven healthy habits, with an effect on individuals' health and mortality rate. However, research has indicated that the frequency of eating breakfast has reduced over time,^[30] and skipping breakfast in the daily meal, especially among children and adolescents has become common.^[31] In the present study, 1.5% of the students were not eating breakfast before educational intervention and 39% of them consumed at least a breakfast in a week. Different findings have been reported in this regard. A report indicated that a fourth of Australian adolescent students went to school hungry.^[32] In Britain, the situation was worse. As research by Lattimore and Halford indicated, 19% of students in the age range of 11–16 years did not eat breakfast regularly.^[33] Sandercock *et al.* indicated that in British schools, 39% of

females and 27% of males in the age group 10–16 years refrained from eating breakfast always or sometimes.^[34] In a study by Soheili Azad *et al.* conducted with the objective of nutritional gains among elementary school students in the city of Tehran, 6.9% of children were found to go to school without eating breakfast.^[18] Also, in a research by Nemati *et al.* conducted to investigate the breakfast-eating practice among female students in Ardebil, 16.85% of students were found to attend school without eating breakfast.^[35] According to a research conducted globally, the rate of refraining from eating breakfast was reported to range from 1.7% for Croatia to up to 30% for Brazil.^[36] Karimi *et al.* carried out a research on students in Semnan and indicated that 4.6% of students were never eating breakfast.^[16] Kaheni *et al.* conducted a study of school-age children in Birjand and showed that consumption of milk and its by-products among these children was less than the recommended amount.^[37] In Vahedi *et al.*'s study, the milk consumption of 62% of city children and 49% of village children was found to be only a unit per day.^[17] It seems that the wide variations observed in eating or not eating breakfast depend on the socioeconomic status, culture, different eating habits, physical factors including accessibility of breakfast items, political factors of rules and regulations on eating breakfast, and other factors such as food palatability and taste, herbalist beliefs, the impact of the media, parents, peer groups, and different tastes. In DeJong *et al.*'s study, modeling by friends and parents, political factors, economic and cultural factors, eating breakfast with one of the parents, and access to food items were related to eating breakfast among adolescents of 12–15 years of age.^[38]

Several studies have emphasized on the implementation of interventional educational programs in order to improve and change the breakfast-eating behavior or bring about better nutritional behavior among students.^[16,29,39] TPB is a good model for investigation of eating breakfast in a period of more than 1 month.^[26] In the present study, after educational intervention, all scores of the components of attitude, perceived behavioral control, intention, and behavior in the experimental group displayed significant difference compared to those in the control group, except for the component of subjective norm. Inconsistent findings have been reported in this issue. Study by Côté *et al.* entitled "Randomized clinical experiment in a theory-oriented short-term intervention (4 weeks) to increase breakfast eating" indicated that intervention had not had any impact on the desired increase in breakfast-eating behavior or in change of attitude, subjective norm, and perceived behavioral control.^[26]

Table 3: Difference of means within and between groups for attitude, subjective norm, perceived behavioral control, intention, and behavior before and after educational intervention in both groups

Components	Group	Mean			P value
		Before education	After education	Difference	
Attitude	Experimental	75.20	83.43	8.23	0.039
	Control	78.40	78.48	0.08	
Subjective norm	Experimental	90.89	91.69	0.79	0.91
	Control	89.35	90.09	0.73	
Perceived behavioral control	Experimental	78.58	83.02	4.44	0.042
	Control	79.78	79.31	-0.47	
Intention	Experimental	64.75	74.66	9.91	0.001
	Control	70.94	55.90	-15.04	
Behavior	Experimental	40.98	41.72	0.73	0.048
	Control	39.50	34.88	-4.61	

However, attitude, subjective norm, and perceived behavioral control were able to predict the intention for eating breakfast, and the predictive score on subjective norm was not significant.^[26] Also, the findings by Wong and Mullan (2009) indicated that TPB could be applied significantly to breakfast eating, such that it predicted 46% of variance of breakfast eating.^[27] In Bogers *et al.*'s study entitled "Explaining fruit and vegetable consumption: The theory of planned behaviour and misconception of personal levels," it was reported that perceived behavioral control was the strongest predicting factor of intention and behavior in consuming fruit and vegetable.^[29] Berg *et al.* conducted a study to understand the choice of milk and bread based on TPB. It was indicated that intention predicted the behavior on consumption of bread and milk, and that perceived behavioral control and attitudes and subjective norm predicted the intention for consuming bread and milk.^[28] Pawlak *et al.* observed that attitude, subjective norm, and perceived behavioral control were responsible for 72% of variance in intention behavior to have a healthy eating diet, with the attitude wielding the greatest impact upon the intention to consume.^[40] Mullan *et al.* conducted a study on British and Australian adolescents and reported that the components of TPB predicted 42.2% of variance of intention to eat breakfast, with perceived behavioral control being the strongest component.^[41]

With regard to subjective norm, for which in the present study there was no significant increase in the score in the experimental group after educational intervention, findings of different studies are consistent with our findings. For example, Armitage and Conner (2001) cited subjective norm as the weakest component of TPB.^[42] In Wang and Mullan's study, subjective norm was not cited as a strong and significant predicting factor.^[27] In the present study, breakfast-eating behavior displayed significant difference in the experimental group after educational intervention. Several studies reported similar results. In Sadrzadeh-Yeganeh *et al.*'s study, nutritional performance scores of the students in the experimental group after educational intervention increased significantly compared to those in the control group.^[21] Findings of Faghih *et al.* showed that consumption of milk and its by-products was less than its recommended levels in

more than half of the school children.^[43] Kellar and Abraham found significant increase in the consumption of fruits and vegetables in the experimental group compared to that in the control group.^[22] Findings of other studies, however, show results different from our findings. For example, Vakili *et al.* conducted a study to determine the impact of education on knowledge, attitude, and behavior of female students on the consumption of milk and its by-products and revealed that although the scores of knowledge and attitude in the experimental group increased significantly after educational intervention, this increase in behavior score was not significant.^[39] Lautenschlager and Smith reported high score of intention in males before intervention and some behavior changes in fruit and vegetable consumption after intervention, while in females, they did not observe higher intention score before intervention and positive behavior change in fruit and vegetable consumption after intervention.^[44] It seems likely that the different results that were obtained could be due to different educational programs, study period, different individual, social, cultural, and economic characteristics of the groups under study, educational program content, etc. There were a few limitations in this study. First, the sample size was small. Second, a longer follow-up was not possible. Furthermore, incorrect responses were likely due to self-reporting of students.

CONCLUSION

Despite its limitations, the current study investigated the intervention based on TPB about breakfast consumption. Therefore, high social and health risks associated with not eating breakfast reveal the importance of research to understand the individual and motivational factors effective on regular breakfast consumption among school children. TPB is a model which could highlight the factors of individual insight. In the present study, educational intervention on breakfast consumption based on TPB improved all the components of attitude, perceived behavioral control, intention, and behavior (with the exception of subjective norm) after educational intervention. In addition to the impact of family and its atmosphere, other factors such as the effect of friends and peer groups, teachers, habits, traditions,

and cultures ruling the family, and media propaganda would wield impact on the subjective norms associated with breakfast consumption among students. Thus, to increase the subjective norm of breakfast consumption and healthy-eating behavior among students, it is necessary to consider and to educate students about all the effective factors on this component.

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