

Relationship between Breakfast Consumption and Self-Efficacy, outcome Expectations, Evaluation and Knowledge in Elementary Students

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Abstract

Background: The breakfast is the most important meal of the day that its regular consumption is effective on individuals' physical, psychological and social health. Given the high prevalence of irregular consumption of breakfast among students, this study aimed to investigate breakfast consumption behavior and self-efficacy, outcome expectations, evaluation and knowledge in elementary students.

Materials and Methods: This cross-sectional study was carried out on 360 (52.3%) female primary school students and 154 (47.7%) male students of Isfahan- Iran using cluster-random sampling. The data were collected in a self-reporting form by researcher made questionnaire. The data were analyzed using SPSS 18.0 with independent t-test, ANOVA, Pearson correlation coefficient, and multiple regression.

Results: The mean breakfast consumption (in a week) score of 2.4 with a standard deviation of 1.7. 10.5% of students were eating breakfast daily. There was a significant relationship between breakfast consumption and self-efficacy, outcome expectation and outcome evaluation ($P < 0.001$). There was an inverse relationship between students' age, economic situation and breakfast consumption ($P = 0.01$ and $r = -0.143$). Multiple regression analysis showed there was a significant relationship between self-efficacy (Beta [standardized regression coefficients] = 0.145), type of school (Beta = 0.631), and student age (Beta = 0.402) and having breakfast and it predicted 24.3% of breakfast consumption variance.

Conclusion: Results showed that eating breakfast is not desirable in students. Self-efficacy is a predictor of breakfast consumption. Therefore, some interventions such as regular psychological counseling to increase the self-efficacy of students and educational programs to increase the knowledge of students are necessary to increase breakfast consumption rate.

Key Words: Breakfast consumption, Iran, Self-efficacy, Students.

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1- INTRODUCTION

Breakfast consumption is one of the indicators of a healthy lifestyle (1) and is the most important meal. Breakfast in terms of quantity and quality must supply about 600-700 calories of energy required daily by boys and 500-600 calories of energy required daily by girls (2) that is totally 20 to 30 percent of energy daily needed by an individual (3). It is better to include all food groups at breakfast; but only about 36 percent of children consume all food groups at breakfast (4). The results show that a significant proportion of our country's students skips breakfast entirely or partially (4). Breakfast, based on scientific definitions, is the first daily meal that should be eaten during the first 2 hours of waking up, before 10 A.M (3). The breakfast, at the beginning of the day, due to stave off hunger, increase of metabolism (5-7), learning (7), and blood sugar regulation has a direct effect on the balance of body weight (8, 9) and improves cognitive functions, memory and attention concentration (10). Children who go to school without having breakfast or a breakfast without high nutritional value causes malnutrition, physical growth reduction, irascibility, irritability and difficulty is cognitive functions (11).

Skipping breakfast contrary to many people's minds, increases overeating during the day and reduces nutritional quality and increases body mass index (BMI) (12), poor concentration (4, 13), academic failure (14), iron deficiency anemia (15) obesity (10, 13, 15-18), gastrointestinal disorders (15,18), tooth decay (in short-term), chronic and dangerous diseases like cancer and heart disease and diabetes (in long term) (10, 15, 16, 18). Skipping breakfast also causes lack of energy, vitamins (such as calcium, phosphorus, magnesium and vitamins B12, C, A and riboflavin), and minerals that could not be compensated with other meals (4). Nutrition plays a vital role in

providing public health, especially children (11). A focus on natural growth of children through good nutrition and continuous sanitary support represents effective investment of hygiene and children's future health (10). But given the importance of breakfast consumption, unfortunately it has been neglected more than other meals among children and teenagers (1, 19). Omitting the breakfast is common and continues to increase among children (13, 20). The rate of breakfast skipping has been reported differently in different populations (20). The studies show that 80 percent of children in United States (21), 89.5% of Qatari female students and 90% of male students consume breakfast regularly (22). The rate of breakfast skipping has been reported from 1.7% up to 30% in Croatia and Brazil respectively (23).

A study carried out by Vegari and colleagues showed that one out of every 11 children go to school without having breakfast (24). Another study showed that 6-18 years old students in 23 cities of country have a poor nutritional behaviors (25). The breakfast consumption and food choice get under influence of different environmental, individual and biological factors. But fewer studies have been carried out on the impact of these factors on the selection of healthy nourishment (19). The environmental factors are influence of parents, friends and media (10). Parents play an important role in shaping nutritional behaviors and breakfast consumption patterns in their children (26). The individual factors are parental educational level, age, gender, etc. (24). The behavioral factors are anorexia, dinner time, bed time at night and waking time in the morning (27). The cognitive factors such as knowledge, self-efficacy, perceived benefits have the greatest impact on children's nutritional behavior (28). In Reynolds's study, self-efficacy has been also introduced as the main construct in

promoting consumption of fruits and vegetables (29). The study by Hall et al. (30) on fifth grade elementary students regarding their knowledge, behavior, and self-efficacy showed that self-efficacy is associated with improvement in students' consumption of fruits and vegetables. This study was carried aiming to investigate breakfast consumption behavior and some related factors based on social cognitive theory (self-efficacy, outcome expectations, outcome evaluation, and knowledge) among elementary students of schools in district 4 of Isfahan, Iran.

2- MATERIALS AND METHODS

2-1. Study Design and population

This cross-sectional study was carried out on 360 third, fourth and fifth grade primary school students who were selected out of district 4 schools of Isfahan city (the capital of Isfahan province), using cluster-random sampling method. Initially, a list of Isfahan elementary schools in district 4 was provided from the relevant department that were selected randomly and proportionally differentiated by gender (male and female) based on type of school, number of students per school and proportionate to the required volume. The third, fourth and fifth grade students (240 third, fourth and fifth grade students from public schools and 120 third, fourth and fifth grade students from non-public schools), were selected randomly out of four schools.

2-2. Methods

The researcher made questionnaire was used as an instrument for data collection. The content validity of the questionnaire was measured using experts' opinions. They were 6 health education and health promotion experts, 2 nutrition experts and 3 school educators. Their opinions and recommendations were applied. Reliability of the questionnaire was measured using internal correlation method as

questionnaires were completed by 30 students. Cronbach's alpha coefficient for each of the constructs were as follows: self-efficacy (0.79), outcome expectations (0.70), outcome evaluation (0.75) and knowledge (0.48). The Cronbach's alpha of total constructs was 0.89.

The questionnaires were completed as self-reporting by students. The check list of breakfast consumption in previous 7 days was completed by parents at home. The questionnaire response time was 30 minutes. The data collection time was conducted from February to March 2016. Based on previous studies and considering the p (30%) estimated from relative frequency of breakfast consumption among students (23) and Z confidence level (0.59) that is 1.96 and d accuracy rate (0.05), sample size was calculated according to the following formula namely formula 323 and it was obtained equal to 360 people taking into account the number of exclusions that was calculated as follows:

$$n = \frac{Z^2 P (1 - P)}{D^2} = 3.84 * 0.3(0.7) / 0.0025 = 323$$

The initial sample size 323 + number of exclusions 37 = 360 persons total sample size.

2-3. Measuring Tests

The data were gathered using a researcher made questionnaire. The questionnaire included specifications of field factors (10 questions), breakfast consumption behavior (4 questions), self-efficacy (6 questions), outcome expectations (5 questions), outcome evaluation (5 questions), and knowledge (5 questions). The measurement of breakfast consumption behavior with 4 questions (example: How many days have you had breakfast during 7 days?) 4-option (7 days a week 5-6 days, 3-4 days 2 days and fewer), measurement of knowledge with five questions (example: is breakfast necessary for? 4-option (teeth, bones -

for body growth - preventing obesity _ all options) and measurement of self-efficacy with 6 questions (example: if I get bored I will have breakfast again. Measurement of outcome expectations with 5 questions (example: if I eat breakfast every day I will get sick less). Measurement of outcome evaluation with 5 questions (example: is important to me to get less sick by eating breakfast. 4-option never, sometimes, most often, always was measured. Students' breakfast consumption was measured by a check list including record of 7-day breakfast consumption. The students recorded their breakfast consumption at home during 7 days and the questionnaire was taken from them after one week.

2-4. Inclusion Criteria

Inclusion criteria included satisfaction to participate and cooperation of parents and instructors in study and Satisfaction of students to participate in study.

2-5. Exclusion Criteria

Exclusion criteria included failure to fulfill the questionnaire correctly and completely.

2-6. Ethical Considerations

This study was carried out supported by the Faculty of Public Health of University of Isfahan Medical Sciences (No.394, 941) and the objectives of the study were explained to all participants and all of them accepted to participate and were assured of the confidentiality of their individual information as well as the voluntary nature of participating in the study.

2-7. Data Analyses

The data were analyzed using SPSS software version 18.0 and using descriptive statistics and independent t-test, ANOVA and regression. For all tests, the significance level was considered to be $\alpha = 0.05$. Dependent variables were described as mean \pm standard deviation (SD) and independent variables were

expressed as number of individuals and percentages.

3-RESULTS

The study population consisted of 323 third, fourth and fifth grade students (male and female) in elementary schools of Isfahan city, Iran. The participation rate in this study was 89.7 percent. 37 students were Afghans who emigrated and were excluded out of 360 students participated in the study.

Mean age of students were 10.01 ± 0.976 years old and its range was obtained to be 8-14 years old. 53.3% of persons were female students, and 47.7% were male students. 35, 32.5, and 32.5 percent of students were third, fourth and fifth grade students, respectively. 48.9% of students were from public schools and 51.1% from non-public schools. The mean score of students' breakfast consumption were 10.8% with a standard deviation of 2.2 (minimum 4, maximum 16).

There was an inverse correlation between students' age, and school grade and the breakfast consumption score ($r = -0.238$, $P < 0.001$), that means that breakfast consumption pattern score has become low with the increase of students' age. In the present study, the mean score of breakfast consumption behavior in female students was 10.7 with a standard deviation of 2.3 and the mean score of breakfast consumption behavior in male students was 10.9 with a standard deviation of 2.2. It means that gender has no significant impact on breakfast consumption behavior.

According to the results of the study, 10.5 percent of students were consuming breakfast 7 days a week, and 10.8 percent have had breakfast between 5 and 6 days and 11.1 percent of them have eaten breakfast 3 to 4 days, and most of the students (67.5%) have eaten breakfast 2 days or less. The mean frequency of breakfast consumption per week was

obtained to be 2.4 with a standard deviation of 1.7 (**Table.1**).

In addition, consumption ration of jam and honey was 30 units and consumption ration of milk has been 10 units (maximum and minimum) per week regarding breakfast consumption (**Table.2**).

Mean score of self-efficacy (SD) and the mean score of knowledge (SD) were 16.9 (5.03) and 3.1 (1.2), respectively. Additionally, Pearson correlation test showed that there was a direct relationship between student's breakfast consumption score and scores of self-efficacy ($r=0.423$, $P<0.001$), outcome expectations, ($r=0.327$, $P<0.001$) and outcome evaluation ($r=0.341$, $P<0.001$). There was no significant relationship between students' knowledge score and their breakfast consumption pattern (**Table.3**).

Simple regression analysis for each construct was done. According to findings, three variables of outcome expectations, outcome assessments and outcome self-

efficacy are important predictors which were entered for statistical modeling in regression analysis. In fact multiple regression was a kind of modeling for predicting the relationship between four predictive factors and breakfast consumption; while the fourth (knowledge) was not a predictor of eating breakfast (**Table.4**).

The multiple regression analysis was used to evaluate the prediction pattern of breakfast consumption behavior. Given the results obtained from final regression model, at the presence of field factors, there was a significant relationship between breakfast consumption and an mean score of students' self-efficacy ($P<0.001$, $r= 0.512$), so this means that for every one unit increase in self-efficacy, the mean pattern of breakfast consumption increases by 0.145. In fact, it shows positive relationship between breakfast consumption and self-efficacy factor (**Table.5**).

Table-1: The field factors and their relationship with the mean of students' breakfast consumption

Variables		Number	Percentage	P- value
Gender	Female	169	52.3	.25
	Male	154	47.7	
Type of school	Public	158	48.9	.013
	Non-governmental	165	51.1	
Father's education	Elementary	19	5.9	.134
	Middle School	56	17.3	
	Diploma	153	47.4	
	Collegiate	95	29.4	
Mother's education	Elementary	22	6.8	.255
	Middle School	29	9.0	
	Diploma	171	52.9	
	Collegiate	101	31.3	
Economic status (based on income)	Weak	84	26	.013
	Medium	171	52.9	
	Good	68	21.5	
School grade	Third	113	35	.000
	Fourth	105	32.5	
	Fifth	105	32.5	

Table-2: The score range of the ration received by each of the food groups at students' breakfast (in a week)

Food group	Mean	Standard Deviation
Carbohydrate	4.8	3.01
Vegetables	0.7	1.5
Milk	2.4	2.4
Meat	1.8	1.5
Cheese	3.2	2.3
Tea	2.3	2.4
Fruit	0.6	1.2
Fats	3.4	4.9
Honey and jam	4.3	4.7
Nuts	2.3	2.7
Sugars (sugar, biscuits, cakes)	1.8	2.2

Table-3: Results of Pearson correlation and score average of social cognitive variables constructs studied on students (Means, standard deviations, and inter-correlations for breakfast consumption behaviors and social cognitive)

Variables	Behavior	Knowledge	Outcome Expectation	Outcome Assessment	Self-Efficacy	Mean	SD
Behavior	1	0.094	0.327	0.341	0.423	10	2.2
Knowledge		1	0.228	0.193	0.181	3.1	1.2
Outcome expectation			1	0.742	0.483	17.5	2.9
Outcome Assessment				1	0.502	17.4	3.3
Self-Efficacy					1	16.9	5.03

SD: Standard deviation.

Table-4: Simple regression analysis for each construct

Model	Predictive factors	Beta	SE (Beta)	Adjusted R square	P-value
1	Outcome Expectation	0.252	0.041	0.104	0.001
2	Outcome Assessment	0.233	0.036	0.114	0.001
3	Outcome Self-Efficacy	0.188	0.022	0.177	0.001
4	Student's Knowledge	0.170	0.100	0.006	0.092

Beta: Constant Coefficient; SE: Standard Error; Adjusted R square: a modified version of R-squared, adjusted for the number of predictors in the model.

Table-5: Multiple regression analysis for Self-Efficacy (dependent) and its predicting factors (n=323)

Predictive factors	Beta	SE (Beta)	P-value	Adjusted R square
Outcome expectation	0.032	0.058	0.580	0.243
Outcome assessment	0.082	0.051	.111	
Self-efficacy	0.145	0.026	<0.001	
Student's knowledge	0.070	0.093	0.451	
Type of school	-0.631	0.236	0.008	
Gender	-0.063	0.228	0.783	
economic rank	-0.299	0.175	0.088	
Father education	0.148	0.160	0.356	
Mother education	-0.243	0.155	0.120	
Student age	-0.402	0.109	<0.001	

Beta: Constant Coefficient; SE: Standard Error; Adjusted R square: a modified version of R-squared, adjusted for the number of predictors in the model.

4- DISCUSSION

This study was conducted on 323 elementary students (male and female) (third, fourth, fifth grade) out of district 4 schools of Isfahan city during February and March 2016. The findings of the study showed that 10.5 percent of students 7 days a week, 10.8 percent (5 to 6 days a week), 11.1 percent (3 to 4 days) and 67.5 percent (2 days or less per week), have had breakfast and the mean frequency of breakfast consumption per week was obtained to be 2.4 with a standard deviation of 1.7 which represents dire situation of breakfast consumption behavior. The current findings confirm previous studies carried out by Rahimi et al. (16), and Namakin et al. (31) (5.5% of students under study did not have breakfast consumption) Karimi et al. (13), and Mortazavi et al. (32). Another study conducted by Gross et al. (17), also showed that 20 percent of American students were going to school without breakfast.

The statistical indicators of received ration mean of each one of the food groups (the receiving unit) in students' breakfast during a week, milk (with a mean of 2.4 (2.4), 10 units), honey and jam (mean 4.3(4.7), 30 units), were students' breakfast from the lowest to the highest consumed unit. The previous studies showed that in the study of Karimi et al. (13), consumption ratio of bread and cheese and tea is higher than other foods, and other foods such as milk, walnut, honey, egg, fruit and fruit juice were in next ranks. Another study (33), showed that 81.25 percent of students eat bread and cheese, 41.6 percent consume milk, butter and jam and 21.9 percent of them have egg at their breakfast. In a study by Soheyliazad et al. (34), majority of students have consumed bread and cheese (61.3%), and 4.30 percent have had milk and yogurt at their breakfast. In a study by Vaghari et al. (24), lowest consumption group were nuts

(3.8%). The healthy, balanced and varied nutrition is one of the important factors in human being' health and studies indicate lack of a desirable variety and balance. This study showed that there is an inverse relationship between breakfast consumption and school grade. The higher the grade, the less breakfast consumption. It is in line with surveys conducted by Wilson et al. (26) in New Zealand and Vaghari et al. (24). The findings of this study showed that there is an inverse relationship between breakfast consumption score and students' age ($r = -0.238$, $P < 0.001$), that suggests breakfast consumption rate has become low with the increase of students' age.

The findings of the present study indicated that there was a significant relationship between students' gender and consumption pattern score ($P = 0.26$). In the findings of present study, the mean score of breakfast consumption behavior in female students was 10.7 with a standard deviation of 2.3. The mean score for males was 10.9 with a standard deviation of 2.2 that showed that gender had no significant effect on breakfast consumption behavior. The studies conducted by Vaghari et al. (24), show that (the breakfast consumption rate relatively decreases with aging and breakfast consumption rate in male students is 2.2 percent more than female students). The results of study carried out by Karimi et al. (13), and findings of Rampersaud et al. (1), Vereecken et al. (23), Pearson et al. (35) and Cairo et al. (36), also showed that breakfast consumption in male students were significantly higher than female students that is different with findings of the present study.

With the increase of the students' age, regular and high quality consumption of nutrition drops sharply. In this study, 48.9% of students were from public schools with a mean of 11.13, SD of 2.15 and 51.1% of them were from non-public

schools with a mean of 10.52 and standard deviation of 2.26. The breakfast consumption rate was higher in public schools. It is in line with the study by Vaghari et al. (24) in which breakfast consumption in public schools is 7.8 percent more than non-public schools.

In this study, Spearman correlation coefficient showed that there was no significant relationship between students' breakfast consumption behavior score and father's education ($r = -0.066$, $P = 0.24$) as well as mother's education ($r = -0.090$, $P = 0.10$). The results of previous findings are different from the present study. Vaghari et al. (24) study showed that parents' education is inversely associated with students' breakfast consumption rate and father's education was more effective than mother's education. Additionally, breakfast consumption rate of children whose mothers were illiterate was 14% more than children whose mothers had college education. The study Alimoradi et al. (27), also showed that there is relationship between parents' education level and breakfast consumption in adolescents. Moreover, breakfast consumption in children of fathers with higher education level was more compare to children of parents with lower education level. Additionally, breakfast consumption rate in one week was also higher in adolescents whose mothers had higher education. In a study by Soheyliazad et al. (35) carried out on 7-11 years old elementary students in Urmia- Iran, it become clear that there is a significant relationship between parents' education and consumption of breakfast and snacks.

The study by Lazari et al. (37) showed that there has been a relationship between frequency of eating breakfast by children and mothers' education. The study showed that highly educated parents had no impact on creating or increasing breakfast consumption and these findings were inconsistent with all the studies have

conducted. (Even students having parents with highly educated (Physician), had not breakfast consumption behavior). In the present study, it was shown that there was an inverse relationship between economic situation and breakfast consumption behavior of students ($r = -0.143$, $P = 0.01$). Vaghari et al. study (24), showed that poor households had poor nutrition status and had many reports of poor appetite and lack of breakfast consumption compare to households with good income and high education level. Karimi et al. (38), believed that there is a significant relationship between the frequency of feed intake at breakfast and economic status. In the study of Ghasemi et al. (39), results showed that breakfast consumption rate slightly increases with improvement in economic conditions, because of close relationship with educational level of fathers from poor level to a moderate level. The study showed that students with higher levels of income did not use regular and quality foods instead of breakfast and tend to buy a non-beneficial nutrition (junk foods). The results of the study on students with wealthy family showed that the behavior of breakfast consumption was less and bad nutrition was more.

Based on the present results, multiple regression analysis showed that self-efficacy has a direct relationship with breakfast consumption behavior and is the strongest predictor of breakfast consumption behavior. This finding is in line with the study by Mirzaee et al. (40), and Dehdari et al. (41), that have pointed out to the role of self-efficacy as an important predictor of breakfast consumption. In the study by Berg et al. (42), breakfast skipping is also related to the lack of self-efficacy. Anderson et al. (43) reported the self-efficacy as the most important factors of nutritional behavior. In the study of Lubans et al. (44), self-efficacy is the major determinant of behavioral intention and has a strong

correlation with students' nutritional intake. Solomon and colleagues (18), also believe that among social cognitive theory constructs, self-efficacy is the predictor of breakfast consumption among students. In a study by Najimi et al. (45), the role of self-efficacy has been as the most important predictor in other nutritional behaviors such as fruits and vegetables consumption behavior. The results showed that the students who had higher self-efficacy, had a regular breakfast consumption behavior, but students who did not have breakfast or irregular breakfast consumption, had low self-efficacy than others. The findings of the present study showed that there was no relationship between outcome expectations, and outcome evaluation and breakfast consumption behavior. At the presence of the rest of factors, outcome expectations and outcome evaluation are impressive and powerful predictor that are in line with results of the other studies (40, 45). Students replied the questions about the importance and consequences of breakfast consumption (less sick, better learning, well-being, less obesity), but they did not have breakfast. The results of regression analysis showed that outcome and evaluation expectation were not strong and effective predictor for behavior of eating breakfast in students.

Based on the findings of the present study, there was no significant relationship between students' knowledge and breakfast consumption behavior. In a similar study by Mirzaee et al. (40), knowledge has not been as a significant predictor for breakfast consumption in students. According to previous studies by Lin and Yang study (46), there has been a huge gap between students' knowledge and attitude and their nutritional behaviors. Powers et al. (47), in a study point out to a strong relationship between nutritional behaviors and students' knowledge as one of the important constructs of social cognitive theory.

Given that some constructs was not shown as a strong predictor, all constructs are effective to make regular and effective consumption behavior at breakfast. There was awareness about the breakfast, but they did not have breakfast and these findings was not consistent with previous studies, other studies point to a strong correlation between awareness and behavior breakfast (46, 47).

4-1. Limitations of the study

One of limitations in this study was that the students were entered in study only in grades 3, 4, 5 and first and second grade students were not included in the study due to their inability to read and respond to questions. Another limitations of the current study, were low of the same study in this field in Iran.

5- CONCLUSION

According to the results of this study, self-efficacy was one of the predictor of breakfast consumption. The breakfast consumption has not an appropriate quality and quantity and is not desirable. It seems that health education interventions can be helpful in increase of students' knowledge through planning and necessary supervision interventions in order to have a healthy, regular and high quality breakfast. Self-efficacy is a predictor of breakfast consumption in students. Therefore, some interventions such as regular psychological counseling in order to increase the self-efficacy of students is necessary to increase breakfast consumption rate.

The meal program of schools is one of the important factors that can be effective on solving the problems concerned with school age students' nutrition and health. Despite the necessary trainings by school health teachers to students, the importance of breakfast as the most important meal as well as eating snack food and avoiding all unallowable foods should be explained to children, parents and teachers by oral or

written sheets even with simple pamphlet. A proper solution as well as regular and high quality eating habits has to be designed and created to improve the nutrition and attention to the importance of breakfast at lower levels (childhood, adolescence). The self-efficacy is necessary to be considered in students' breakfast consumption behavior so that we could have a healthy and industrious generation for excellence and honor of our beloved Iran by encouraging students with the help of parents, authorities of schools and education department in order to insert more texts about breakfast' importance in elementary books and media to establish healthy, organized and high quality nutritional habits.

6-AUTHORS CONTRIBUTIONS

- Study design: FSH, AAE, RV, FY.
- Data Collection and Analysis: FSH, RS, AH.
- Manuscript Writing: FSH, AAE.

7- CONFLICT OF INTEREST: None.

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