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The Effectiveness of Social Cognitive Theory-based Educational Intervention on School Children's Breakfast Consumption

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Authors' contributions

This work was carried out in collaboration among all authors. Author AM designed the study, and conducted the literature review and the statistical analysis. Authors AM and ZG wrote the first draft of the manuscript. Author FG supervised the all steps of research. All authors contributed to the writing of the final draft of the manuscript and have approved it.

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ABSTRACT

Introduction: Breakfast consumption has a lot of beneficial effects on nutritional status and cognitive activities of school-aged children's. This study aimed to examine the efficacy of social cognitive theory–based education on schoolchildren breakfast eating behaviors.
Methods: Two schools with similar socio-demographic characteristics were selected from 20 public primary schools of Ilam city (west of Iran) and randomly assigned as intervention or control school. Fifty school children from 3rd, 4th and 5th grades of each school participated in this study. Educational intervention was performed during 6-weeks and was focused on enhancing the self-efficacy, social support and self-regulation mediators to promote the school children's breakfast

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consumption. Data were collected at baseline and 8-weeks after intervention using a 57-item questionnaire and a breakfast food diary and analyzed using Nutritionist IV food processor software and IBM SPSS statistics data editor.

Results: The findings showed that mean scores of all Social Cognitive Theory (SCT) constructs as well as breakfast eating behaviors in intervention group significantly increased at 8-weeks after intervention ($p < 0.05$). Also, there was a significant increase in mean score of knowledge in control group at 8 weeks follow-up ($p < 0.05$). Moreover, the results showed that mean scores of energy and all measured macro and micronutrients intakes significantly increased at follow-up in intervention group ($p < 0.05$). Also, there were significant increases in mean scores of energy, zinc, calcium and vitamin D intakes in control group at 8-weeks follow-up ($p < 0.05$).

Conclusions: The findings of the present study showed that social cognitive theory is an effective framework to planning and implementation of the educational intervention to promotion of male school children's breakfast consumption.

Keywords: Breakfast; schoolchildren; social cognitive theory; educational intervention.

1. INTRODUCTION

Breakfast is often regarded as the most important meal of the day and has many positive effects on human health [1-2]. Breakfast consumption after a period of overnight fasting, to maintain and improve the individual health, especially during the early years of growth is vital [3]. Studies have shown that regularly eating breakfast has a range of physical and psychosocial effects including lower body mass index (BMI), improved appetite control, better nutritional profile, and reduced risk of chronic diseases such as diabetes, cardiovascular disease and obesity [4-6]. Generally, schoolchildren should obtain one fourth of daily dietary needs from breakfast. It provides the major nutrients required by the body; and has important and positive impact on nutritional status, dietary habits and cognitive activities of school children [7,8].

Despite the health benefits and positive effects of eating breakfast, skipping the breakfast is very common among schoolchildren. Studies conducted in Iran showed that missing breakfast is very prevalent in Iranian schoolchildren (from 13.7% in Tehran to 47.5% in Zahedan) [9,10]. Also, results of a study conducted in Ilam showed that 32.2% of schoolchildren (38.5% of boys and 25.3% of girls) skip breakfast and 13.1% of them come to school without eating anything at breakfast [11].

Identifying factors affecting schoolchildren breakfast consumption is the first step for planning and implementation of effective interventions and modifying these behaviors. Based on previous studies, two sets of factors including personal and environmental factors seem to determine the schoolchildren eating breakfast behaviors. The most common environmental determinants of schoolchildren breakfast skipping included having no breakfast foods available at home [2,12,13], having a lack of breakfast food choices at home, and having no one to prepare food for schoolchildren at home [2,12]. Personal determinants given for schoolchildren breakfast skipping included lack of appetite (not being hungry) in the morning, lack of time to eat breakfast (waking up too late) and not having a favorite breakfast (not having the foods available at home) [2,12,13]. Factors mentioned to skip breakfast by schoolchildren show that these factors are mainly related to lifestyle of students and their families. For example, skipping breakfast due to lack of time can be associated with sleep-wake patterns of students [14-16].

Many studies have shown that health behaviors developed in early life continue into adulthood [17,18]. So, childhood should ideally have positive effects on the primary schoolchildren. Recently, several efforts to facilitate change in dietary behaviors have been focused on schoolchildren because of the capacity of school setting to reach the large numbers of schoolchildren all together [19,20]. Furthermore, school setting provides the best opportunity to applying the multicomponent interventions that combine classroom, family and environmental approaches [21].

Educational intervention is an effective commencement to addressing the dietary behaviors of school-aged children. After identifying the factors that influence the students' eating breakfast, health educators (HE) need to determine the theory applied to develop and

deliver educational topics [22]. Albert Bandura's social cognitive theory (SCT) has been extensively used as a theoretical foundation for nutrition related school-based interventions and they were effective in seeking optimistic change among the targeted behaviors. SCT explains how people attain and continue definite behavioral patterns; for example dietary behaviors [23,24]. SCT suggest that behavior, personal and environmental factors interact to describe and predict changes in behavior. Bandura called these interactions "reciprocal determinism," denoting that, as the three components interact, a change in one will create changes in the others [25-27]. Environmental effects, such as social support (the perceived support for healthy behavior from significant others; for example family or friends), make opportunities and provide reinforcement for behavior modification. Personal factors, such as perceived self-efficacy (person's belief in their ability to change a behavior), outcome expectations (the person's perceived costs and benefits of performing the behavior) and outcome expectancies (perceived importance of the potential costs and benefits of the behavior) provide direct pivotal effects on behavior and are used to interpret information from the environment. Also, self-regulatory behavior (particularly goal setting) has been related to healthy behaviors such as eating healthy breakfast [25,26].

Previous studies showed the SCT as an effective framework to promote eating behaviors [28,29], but, there are not studies carried out to promotion of breakfast consumption in school-aged children by using the SCT framework. So, this study sought to test the efficacy of a social cognitive theory–based educational intervention on school aged children breakfast consumption.

2. MATERIALS AND METHODS

This study is an interventional study for promoting primary students' breakfast consumption. Two schools with similar socio-demographic characteristics were selected from 20 public elementary schools in Ilam city; and randomly assigned as intervention and control schools. Fifty male schoolchildren (3rd, 4th and 5th grades) from each school were recruited in this randomized controlled trial. To achieve the required sample size for each intervention and control group, we used the same approach as Rinderknecht K et al. (2004) [30] and calculated the means (μ_2 - μ_1=0.37) and variances (S_1=1.95, S_2=2.32) for self-efficacy construct before and after the intervention on the basis of the formula presented below. Forty students had to be assigned for each group, but with the possibility of sample loss, it was planned the addition of 20% over that amount. As a consequence, fifty students for each group were enrolled. α=0.05;

$$\beta=0.1 \qquad n = \frac{\left[z_{1-\frac{\alpha}{2}}+z_{1-\beta}\right]\left(s_1^2+s_2^2\right)}{\left(\mu_1-\mu_2\right)^2}$$

Inclusion criteria were education in 3rd, 4th & 5th grades of primary school; having the physical and mental readiness and ability to participate in the study; being breakfast skipper (less than 5 days during the school days); having an energy intake at breakfast of less than 500 kcal (the mean of energy obtained at breakfast meal for three days); and student and his parents' satisfaction to participate in the study. A packet containing written parental consent form and a socio-demographic questionnaire was sent to parents and they were guided on how to complete them. Baseline data were collected in January 2013; intervention was conducted during the period of January-March 2013 and the follow-up data were collected in May–June 2014. Research Ethics Committee of Tarbiat Modares University (TMU) approved the present study.

2.1 The Definition of Breakfast

Breakfast definition varied based on target population [1]. Students participating in this study went to school just in the morning. In addition, we tried to promote the schoolchildren breakfast consumption at home. Due to these aspects, definition of breakfast in the present study was "any foods or beverages consumed in a meal at home after waking up and before going to school (in the morning) [1,31].

2.2 Measures

Data were collected using two measures including: 1) a researcher-made questionnaire based on SCT constructs; 2) three days breakfast diary.

The questionnaire included three sections:

i) Socio-demographic characteristics such as students' grade, parents' educational level, age, occupational status and socio-economic situation (SES).

ii) Breakfast Consumption Social Cognitive Scale (BCSCS) including six subscales to assess the knowledge, outcome expectations, outcome expectancies, self-efficacy, social support and self-regulation. The knowledge subscale included six multiple-choice items with one correct answer that measured the necessary knowledge related to the breakfast consumption behavior. Sample item: *What is the most important meal of the day*? Outcome expectations and outcome expectancies subscales included 16 items (8 corresponding items for each construct). These subscales were valued on a five-point Likert scale (from strongly disagree=1 to strongly agree=5). Outcome expectations sample item: *If I eat breakfast, I'm healthier.* Outcome expectancies example item: *It is important for me that I'm not ill.* The self-efficacy subscale was valued on a five-point Likert scale (from strongly disagree=1 to strongly agree=5) and included five items. Self-efficacy sample item: *I am sure that I can eat breakfast before going to school.* Social support subscale included eight items with a range from strongly disagree=1 to strongly agree=5 on a five-point Likert scale. Social support sample item: *My teachers encourage me to eating breakfast.* Self-regulation subscale included 11 items and was valued on a five-point Likert scale from never=1 to always=5. Self-regulation sample item: *I choose the healthy food for breakfast.*

iii) Breakfast Consumption Behavior Scale (BCBS) includes nine items that were valued on an eight-point Likert scale (from never to 7 days); sample item: *During the previous 7 days, how often did you eat breakfast?*

To determine the content validity of the questionnaire, a panel of 13 experts (nine experts on health education and four experts on human nutrition were asked to comment independently on necessity and relevance of the items in order to calculate Content Validity Ratio (CVR) and Content Validity Index (CVI). The results of internal consistency (Kuder Richardson-20 and Cronbach's alpha), CVR and CVI of subscales are showed in Table 1.

Three-day breakfast diary was completed by the study subjects in three school days at classrooms. Schoolchildren were asked to record all the things they ate including drinks. Also, details about the type and form of the consumed food items, kind of preparation, as well as the quantities, were asked. Participants were guided verbally on how to complete the diaries.

The approximate time required to complete the questionnaire and breakfast diaries were 25 and 15 minutes, respectively.

2.3 Description of Intervention

- Social Cognitive Theory was used as the theoretical framework of intervention. Educational content mostly focuses on modifying the main predictors of breakfast behaviors in the study including self-regulation, social support and self-efficacy [32]. It continued for eight weeks with the assistance of school staff. Intervention program included:
- Two lecture-based sessions along with questions and answers (60 minutes for each session) with participation of schoolchildren (moved by the professional health educators) focusing on the benefits and importance of breakfast for schoolchildren, correct and incorrect beliefs related to breakfast, healthy food choices for breakfast, food variety at breakfast, and the use of self-regulation strategies for schoolchildren breakfast consumption.
- Two group discussion sessions (30 minutes for each session) with participation of school staff (conducted by the professional health educators) focusing on the supportive role of teachers and school staff on schoolchildren breakfast consumption, ways to encourage schoolchildren to eating breakfast regularly, and ways to enhance students' self-efficacy for eating breakfast regularly.
- Two lecture-based sessions along with colloquy (45 minutes for each session) with participation of schoolchildren mothers/ caregivers focusing on the benefits and importance of breakfast for schoolchildren, the supportive role of mothers and other family members on how to encourage school aged children to consume breakfast, causes of inadequate nutrition of students and ways to solving the problem, using the self-regulation strategies for eating breakfast by students, and increasing the mothers' capability to conduct preparation of healthy breakfast.

- Educational content combined with the usual curriculum consisted of three 15 minutes sessions as a part of a physical education (PE) lesson (moved by the professional PE teachers) focusing on the importance of breakfast in the growth and development of schoolchildren body, the role of breakfast meal in increasing the vitality and participation of students in sports and athletic success, and the role of breakfast in energy intake, body strength and diseases prevention.
- Educational content combined with the usual curriculum also consisted of four 10 minutes sessions as a part of experimental sciences (ES) lesson (moved by the classroom teachers) focusing on the importance of breakfast in improving cognitive activities of students, the relevance of the variety of food groups and the importance of each in the diet, and the ways for providing the required energy, macronutrients and micronutrients through eating breakfast.

2.4 Data Analysis

The breakfast food diaries were analyzed using Nutritionist IV food processor software and estimates of macronutrient, micronutrient and energy intake were calculated (mean scores of three days). Data were analyzed using IBM SPSS statistics data editor. Descriptive statistics were used to describe subjects' characteristics. Chi-square (χ^2) test was used to assess any association between the subjects' characteristics and groups. Potential mean differences among intervention and control groups were assessed using paired sample T-test and independent sample T-test at baseline and follow up and between baseline and follow-up, respectively. $P<0.05$ was considered to be statistically significant in all tests.

3. RESULTS

A total of 100 persons (50 subjects in intervention group and 50 subjects in control group) participated in this study. Demographic characteristics are presented in Table 1. As shown in Table 2, there are no significant differences between socio-demographic characteristics of schoolchildren in intervention and control groups at baseline.

Findings of this study showed that mean scores of all SCT constructs including knowledge, outcome expectations, outcome expectancies, self-efficacy, social support and self-regulation as well as breakfast eating behavior in intervention group significantly increased at 8 weeks follow-up ($p < 0.05$). Also, there was a significant increase in mean score of knowledge in control group at 8 weeks follow-up ($p < 0.05$), but there were not significant changes in SCT constructs and breakfast eating behavior in control group ($p > 0.05$); (Table 3).

The energy, macronutrient and micronutrient intakes for both groups are reported in Table 4. The results showed that mean scores of energy, carbohydrate, protein, fat, iron, zinc, calcium, vitamins A, D & C intake significantly increased at 8-weeks follow-up in the intervention group ($p < 0.05$). Also, there were significant increases in mean scores of energy, zinc, calcium and vitamin D intakes in the control group at 8-weeks follow-up ($p < 0.05$). However, there were not significant changes in mean scores of carbohydrate, protein, fat, iron, vitamin A & C intakes in control group at 8-weeks follow-up ($p > 0.05$).

4. DISCUSSION

This study aimed to assess the effectiveness of school-based educational intervention based on social cognitive theory on breakfast consumption between elementary schoolchildren grades third, fourth and fifth in the city of Ilam. Several studies have been done on modifying schoolchildren's eating behaviors; however most of them were not theory-based or have not fully used the structure of a theory [33]. There are few studies that investigated the effectiveness of theory-based educational interventions on students' breakfast consumption [1]. In several studies, SCT predicted the dietary behaviors of schoolchildren such as breakfast consumption, [23-25,32] but, to the best of our knowledge, there is no any previous interventional study using the SCT framework to promote the breakfast consumption in schoolchildren.

The results of this study showed that educational intervention modified the SCT constructs and promoted the breakfast consumption behavior of schoolchildren in the intervention group at 8-weeks follow-up. Though, the knowledge of subjects in the control group significantly increased, but any changes in other SCT constructs as well as behavior of the control group were not significant. In other similar studies, various results were acquired. For

example in Hashemi et al. (2012) study, in spite of significant increase in fruits and vegetables consumption behavior of schoolchildren after 3 months follow-up, and knowledge, no significant change was observed in the other SCT constructs such as outcome expectation, self-efficacy and observational learning in the intervention group [28]. Powers et al. (2005) reported that after 8 weeks educational intervention based on SCT, consumption of fruits and vegetables significantly increased in the intervention group as compared to the control group. Also, nutritional knowledge of students in the study significantly improved [22]. Kothe et al. (2011) examined the efficacy of intervention based on theory of planned behavior (TPB) on breakfast consumption behavior of university students [1]. The study results showed that after four weeks the intervention had no effect on the determinants of breakfast consumption. The expected results were not achieved in the above-mentioned studies possibly due to methodological weaknesses or inadequacy of the intervention strategies [1,34].

Table 1. Validity and reliability of SCT constructs and breakfast eating behaviors

Measures	No. of items	Internal consistency	CVI [c]	CVR [d]
Knowledge	6	0.62 [a]	0.87	0.92
Outcome expectations	8	0.90 [b]	0.86	0.84
Outcome expectancies	8	0.89 [b]	0.86	0.90
Self-efficacy	7	0.86 [b]	0.88	0.75
Social support	8	0.65 [b]	0.84	0.96
Self-regulation	11	0.86 [b]	0.93	0.84
Behavior	9	0.90 [b]	0.90	0.80

[a] Kuder Richardson-20 (KR-20), [b] Cronbach's alpha (α), [c] Content Validity Index, [d] Content Validity Ratio

Table 2. Socio-demographic characteristics of study participants in the intervention and control groups

Characteristics	Intervention group† N (%)	Control group† N (%)	p-value††
Students educational grades			
3rd	16 (32)	14 (28)	
4th	19 (38)	19 (38)	0.252
5th	15 (30)	17 (34)	
Father educational level			
Illiterate	2 (4)	2 (4)	
High school and less than	25 (50)	19 (38)	0.807
Diploma or higher	23 (46)	29 (58)	
Mother educational level			
Illiterate	6 (12)	1 (2)	
High school and less than	24 (48)	23 (46)	0.586
Diploma or higher	20 (40)	26 (52)	
Father occupational situation			
Unemployed	4 (8)	0 (0)	
Laborer	13 (26)	3 (6)	
Employee	6 (12)	24 (48)	0.064
Self-employment	26 (52)	20 (40)	
Dead	1 (2)	3 (6)	
Mother occupational situation			
Householder	49 (98)	48 (96)	
Laborer	0 (0)	0 (38)	0.741
Employee	1 (2)	2 (4)	
Self-employment	0 (0)	0 (30)	
Socioeconomic status (SES)			
Low	17 (34)	11 (32)	
Intermediate	28 (56)	33 (66)	0.651
High	5 (10)	6 (12)	

† Intervention group (n=50), Control group (n=50), †† Chi-Square test

Table 3. Means and standard deviations of SCT constructs and breakfast consumption behavior in intervention and control groups at baseline and 8-weeks follow-up

Constructs	Baseline † M±SD	8 Weeks follow-up †† M±SD	Obtainable score range	p-value†††
Knowledge				
Intervention group	4.70±1.15	5.17±0.67	0-6	0.012
Control group	4.27±1.30	4.89±0.81		0.008
Outcome expectations				
Intervention group	34.43±3.93	35.96±3.75	8-40	0.041
Control group	34.66±3.59	35.30±4.95		0.512
Outcome expectancies				
Intervention group	34.50±4.16	37.41±7.25	8-40	0.010
Control group	34.64±3.62	35.14±6.96		0.670
Self-efficacy				
Intervention group	31.26±4.31	32.70±1.80	7-35	0.040
Control group	28.68±3.40	29.66±6.00		0.370
Social support				
Intervention group	32.78±3.84	34.83±3.12	8-40	0.003
Control group	31.73±2.89	30.57±5.86		0.251
Self-regulation				
Intervention group	38.59±7.01	41.52±8.11	11-55	0.046
Control group	37.50±7.42	38.20±10.61		0.739
Behavior				
Intervention group	42.84±7.87	45.98±6.79	9-72	0.001
Control group	42.84±8.97	39.77±8.77		0.122

† Baseline: Intervention group (n=50), Control group (n=50). †† 8 Weeks Follow-Up: Intervention group (n=46), Control group (n=44), ††† Paired t test

The results regarding the effectiveness of the intervention based on the SCT constructs was in line with our expectations. Though, the mean of score knowledge in the control group was statistically enhanced. This could be due to the nature of health education efforts in such audience groups as schoolchildren, since the fulfilling of the questionnaire and of the breakfast food diaries along with great contact of pupils in the control group with study conditions could increase their sensitivity to the study issue and increase their knowledge. Furthermore, justifying the control school officials for performing the study can also cause sensitivity to the study subject and intervene to their attitudes and even behaviors indirectly. So that, in the present study officials of control school tried to provide the health messages relevant to the study subject for schoolchildren during the intervention period. That, of course, was outside of the researchers' control. However, there were no significant changes in other SCT construct in the control group because these constructs needed more complex mechanisms for improvement.

The present study's educational intervention mainly focused on the modification of perceived self-efficacy, perceived social support and self-regulation as major predictors of breakfast consumption behavior in the target population [32]. Moreover, consumption of breakfast at home was the one of the secondary objectives of this study. The educational intervention program tried to promote perceived self-efficacy of pupils for eating healthy breakfast at home through providing the adequate social support (perceived support from important others, for example parents and teachers) and using the self-regulation strategies (specially goal setting).

In this study, the effectiveness of educational interventions on energy, macronutrients and micronutrients intake of breakfast meal was also studied in intervention and control groups. As shown in Table 4, mean scores of energy, carbohydrate, protein, fat, iron, zinc, calcium, vitamins A, D & C intake significantly increased at 8-weeks follow-up in the intervention group ($p < 0.05$). Also, there were significant increases in mean scores of energy, zinc, calcium and vitamin D at 8-weeks follow-up in the control group ($p < 0.05$). However, there were not significant changes in mean scores of carbohydrate, protein, fat, iron, vitamin A and vitamin C intakes

in control group at 8-weeks follow-up ($p > 0.05$). It is recommended that individuals should gain approximately 25% of their daily dietary requirements, including energy, macronutrients and micronutrients from breakfast. Accordingly, children aged 9-13 years must get nearly 500 Kcal of daily energy intake from breakfast meal [7,8]. Based on this study results, mean scores of energy intake of the schoolchildren participating in intervention and control groups at baseline were 161.34 Kcal and 199.04 Kcal, respectively. Mean scores of energy intake in intervention and control groups at 8-weeks follow-up increased to 298.48 Kcal and 219.37 Kcal, respectively. Despite the significance evidenced in both groups, the mean differences between baseline and follow-up were markedly different in intervention group (137.14 Kcal) and in the control group (20.33 Kcal). Similar results were reported in other studies. Reeves et al. (2014) found that the individuals who regularly ate breakfast have better dietary intake than those who did not eat breakfast. So, breakfast eaters had more micronutrients (calcium, zinc, folate, iron, vitamins D & C) intake and got more balanced macronutrients than those who did not eat breakfast [35]. The results of other studies [4,7] confirmed these findings similarly.

Regardless of the fact that the consumption of other meals (snacks, lunch & dinner) had impact on the total daily dietary intake and that the impact on dietary intake status was different between breakfast eaters or skippers, eating breakfast especially for schoolchildren is crucial because of they are in development ages and plenty of physical as well as cognitive activities [36,37].

Table 4. Means and standard deviations of energy, macronutrients and micronutrients intake of intervention and control groups at baseline and 8-weeks follow-up

Variables	Baseline † M±SD	8 Weeks Follow-Up †† M±SD	p-value†††
Energy Intake [a]			
Intervention group	161.34±70.24	298.48±158.21	0.001
Control group	199.04±85.11	219.37±87.14	0.013
Carbohydrate [b]			
Intervention group	27.45±11.53	54.45±22.39	0.001
Control group	35.91±13.67	39.98±16.17	0.076
Protein [b]			
Intervention group	4.16±2.80	7.90±5.20	0.001
Control group	5.01±2.63	6.32±3.23	0.113
Fat [b]			
Intervention group	3.66±2.45	6.16±4.15	0.001
Control group	4.07±2.36	5.04±3.88	0.282
Iron [c]			
Intervention group	0.70±0.45	1.30±0.93	0.001
Control group	1.05±0.57	1.31±0.76	0.093
Zinc [c]			
Intervention group	0.40±0.30	0.73±0.70	0.005
Control group	0.35±0.28	0.60±0.41	0.001
Calcium [c]			
Intervention group	77.02±65.85	131.08±138.59	0.016
Control group	59.19±51.67	107.10±85.38	0.004
Vitamin A [d]			
Intervention group	45.90±47.51	138.25±108.45	0.001
Control group	71.09±59.29	87.60±62.52	0.234
Vitamin D [e]			
Intervention group	0.19±0.49	0.41±0.89	0.048
Control group	0.02±0.19	0.32±0.56	0.002
Vitamin C [c]			
Intervention group	0.46±0.84	2.29±4.93	0.019
Control group	0.65±1.74	0.64±1.92	0.994

[a] Kcal, [b] Gm, [c] mg, [d] RE, [e] µg, † Baseline: Intervention group (n=50), Control group (n=50), †† 8 Weeks Follow-Up: Intervention group (n=46), Control group (n=44), ††† Paired t test

5. STUDY LIMITATIONS

Only male school-aged children were enrolled in the study for two reasons: first, in a pilot study (reference No 11) we found that breakfast skipping is more prevalent in male students (38.5% for male students versus 25.3% for female); second, there were some limitations to study on schools for females students. It is notable that schools in Iran are separated for boys and girls. The present study is likewise trusting on self-reported data that cannot always be accurate; however, there are studies that support the concept that food diaries are practically robust [38,39].

6. CONCLUSIONS

Though, increased amounts of the schoolchildren nutritional needs from breakfast in the present study are still far from standard values. However, the results of this study suggest that modifying the social-cognitive mediators of schoolchildren eating breakfast can help us to promote the breakfast consumption behaviors of pupils and ultimately improve their nutritional status. The present study adds to the developing body of evidence that the educational interventions based on SCT positively affect breakfast consumption behavior of male schoolchildren and improve their dietary intake.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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