The Effect of Education on Increase Breakfast Consumption Among Female Students Based on Social Cognitive Theory (SCT)

Nooshin Salimi [1], Akram Karimi-Shahanjarini [1, 2, *], Seyed Mohammad Mahdi Hazavehei [1, 3] and Ghodratollah Roshanaei [4, 5]

[1]Department of Public Health, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran
[2]Social Determinants of Health Research Center, Hamadan University of Medical Sciences, Hamadan, Iran
[3]Research Center for Health Sciences, Hamadan University of Medical Sciences, Hamadan, Iran
[4]Modeling of Noncommunicable Diseases Research Center, Hamadan, Iran
[5]Department of Biostatistics, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran

*Corresponding author: Akram Karimi-Shahanjarini, Social Determinants of Health Research Center and Department of Public Health, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran. Tel: +98-8138380398, E-mail: karimi.a@umsha.ac.ir

Abstract

Objectives: Breakfast is the most important meal of the day and plays an important role in the physical and mental health of students. Young people, especially girls, frequently skip breakfast. One of the best theories that have been used successfully in various nutritional behaviors, such as breakfast consumption, is the social cognitive theory (SCT). The purpose of this study was to investigate the effectiveness of training intervention based on (SCT) increase breakfast consumption among female students of Hamadan University of Medical Sciences.

Methods: In this quasi-experimental study, 100 female students living in two dormitories of Hamadan University of Medical Sciences allocated into two groups by using cluster sampling (control = 50 / intervention = 50) in 2014. The intervention group received 3 sessions, booklet, poster, and 3 cell phone SMS reminders. Measures included the constructs of SCT and consumption of breakfast during the past week. All participants completed questionnaires before, 10 days, and 4 months after the last session. Data was analyzed using the 16 SPSS software and based on independent t-test, paired t-test, Chi-square test, and repeated measures analysis. The significance level was considered (0.05).

Results: At first, there were no significant differences between groups for demographic data and outcome variables (i.e.; constructs of SCT and behavior). The results showed that interventions led to increase breakfast consumption and improve scores of social cognitive theory structures in the intervention group. Also, in both follow up assessments, the level of knowledge, outcome expectancies, social support, self-efficacy, and frequency of breakfast consumption in the intervention group significantly increased (P < 0.001) compared with the control group. However, there were no differences between the two groups in terms of outcome expectations (P = 0.750) and observational learning (P = 0.427).

Conclusions: This study supports the assumption that SCT-based interventions create a significant increase in breakfast consumption. Due to the effectiveness and low cost of this intervention, it seems that the extension of this program can lead to the increase in the frequency of breakfast consumption among students.

Keywords: Breakfast, Social Cognitive Theory, Female Students

1. Background

As the first meal of a day, breakfast should provide energy in the range of 20% to 35% of all energy needed for the body during a day (1). There are several consequences in breakfast skipping such as negative effects on cognitive function (2, 3), infirmity of the immunity system (4), and increase the possibility of gastrointestinal disease (1). Skipping breakfast is associated with unhealthy lifestyles, such as low levels of physical activity, risk factors of heart diseases, and high body mass index (5-10). In spite of the widely known importance of regularly eating breakfast, the rate of breakfast skipping in many populations is very high (11). Young people skip breakfast more than other meals (12). The 19 - 24 age groups have the highest rate of breakfast skipping compared to any other age groups (13). In addition, breakfast skipping is more common in girls than boys (5). In a study that is done on medical students, 41.7% of females and 23.7% of males don't eat breakfast (14). Breakfast skipping is common among Iranian students; in the study that was done on the female students of

Isfahan, 52% of students didn't eat breakfast, 25% ate breakfast every day, and 23% of people were irregular in eating eat and would eat it approximately twice or less in a week (15). Furthermore, the study that was recently done on the female student of Hamadan showed that just 24% of them ate breakfast regularly (16).

Evidence shows that only a limited number of interventions were successful in increasing eating breakfast (17). It is believed that this unsuccessfulness is largely due to ignoring the cognitive variables that are related to this behavior (18). In a study, Kothe and Mullan have shown a systematic review, where between 11 studied articles, just three of them that focused on making changes in psychosocial variables were successful in increasing eating breakfast (18). The results of eating breakfast in poor groups approve these findings, so that such studies rarely reported the lack of food as a result of lack of breakfast, as an example in a study that was done among young people that lived in slums, just 3% of people that didn't eat breakfast, said that food was not available for them. Instead, they reported that psychosocial factors such as lack of time and unwillingness to eat breakfast in the early hours a day are the main reason of breakfast skipping (19). Different studies have shown that education plays an important role in breakfast. For example, Khazaei pool et al., by use of different educational methods such as lecture, question-answering, and pamphlet, could increase breakfast consumption (20). To increase breakfast consumption among teenagers and young people in different countries, extensive programs were designed and conducted. Based on the suggestion of Kothe and Mullan, we can categorize interventions of eating breakfast into two general groups: interventions that emphasize availability and accessibility of food, and interventions that emphasize providing persuasive messages for influence on psychosocial variables of individuals (18).

One of the most efficient theories used to predict different health behaviors is the social cognitive theory (SCT) (21). Based on this theory, changes in behavior are affected from the complex interaction that called "reciprocal determinism", which happens between individual, environmental factors and especial characteristics of a behavior. This theory has been successfully employed in various nutritional behaviors such as eating snacks (22, 23), fast food (24, 25), and breakfast (16, 26). For example, studies of Salimi et al., showed that variables of this theory could explain 64% of the variance of eating breakfast among female students. This study also showed that among SCT theory's structure, self-efficacy and social support were the significant predictors of breakfast consumption (16).

According to the limited number of studies based on psychological theory to increase breakfast consumption, also according to the comprehension of social cognitive theory, in this study, (SCT) was used to improve the breakfast consumption.

2. Objectives

The purpose of this study was to investigate the effectiveness of training intervention based on (SCT) on increase breakfast consumption among female students of Hamadan University of Medical Sciences.

In this study, our hypothesis was that strategies used in the educational intervention based on social cognitive theory including modeling, verbal persuasion, and act in small steps leads to improvement of theory's constructs and breakfast consumption.

3. Methods

3.1. Samples and Process

This quasi - experimental intervention was done during 6 months of 2014 among female students in two dormitories of Hamadan University of Medical Sciences. According to the study of Angorani et al., (27), with considering 5% for type I error and power of 80%, the sample size was 50 individuals in each groups. This formula

$$n = \frac{\left(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta}\right)^2 \left(\sigma_1^2 + \sigma_2^2\right)}{d^2} \tag{1}$$

was used for sample size. We used a two level cluster sampling that was randomly conducted. At the first level, we selected two dormitories out of four dormitories (one dormitory for each group), then at the second level, a total of 28 rooms were selected (18 rooms for the intervention group and 20 rooms for the control group). Such that the list of rooms, which had acceptable situations, were prepared. In order to prevent ceiling effect bias (ceiling effect is a type of measurement limitation and occurs when the highest possible score is obtained in a test, thereby the accuracy of the tool is reduced in the measurement of the desired range), rooms were selected where at least two students ate breakfast 4 times or less. Between 29 qualified rooms of intervention group in the dormitory, 18 rooms and among 35 qualified rooms of the control group, 20 rooms were selected randomly. The inclusion criteria included: rooms where at least, two of the students were living, consume breakfast 4 times or less in a week, students have at least one semester time to graduating, and consent to participate in the study. The exclusion criteria included: absence in more than half of the sessions and student transfer to another city.

3.2. Measurements

After obtaining the subscription from students, data were collected by a researcher made questionnaire in part questionnaire. The first part related to student demographic information such as age, marital status and grade point average, structures of social cognitive theory in the second part includes: knowledge, outcome expectancies, Outcome expectations, observational learning, self - efficacy, social support and in part 3, the frequency of eating breakfast was measured.

In this study assessment questions about structures and behavior for both intervention and control group was done 3 times. The first assessment was presented before the intervention, second assessment 10 days after ending intervention, and the third assessment 4 months after ending intervention.

The validity of the questionnaire was evaluated by five health education experts. The content validity ratio (CVR) in this study assessed: knowledge 0.90, outcome expectations 0.80, outcome expectancies 0.85, observational learning 0.83, self - efficacy 0.80, and social support 0.91. In addition, scores of face validity for structures include knowledge 100%, outcome expectations 0.85, outcome expectancies 0.90, observational learning 0.90, self - efficacy 0.85, and social support 100%. Content validity index (CVI) in this study includes: knowledge 100%, outcome expectations 0.90, outcome expectancies 0.85, observational learning 0.83, self - efficacy 0.90, and social support 100%.

For reliability assessment, internal correlation method (Cronbach alpha coefficient) was used. Thus, preparing a questionnaire with mentioned corrections, as a pilot completed by 30 female students in the University of Medical Sciences. Structures had desirable and acceptable reliability: knowledge 0.75, outcome expectations 0.73, outcome expectancies 0.81, observational learning 0.76, self - efficacy 0.85, and social support 0.80. In order to evaluate the questionnaire, all questions were read for students who participated in the reliability study, and perception and difficulty level of questions reviewed and proposed reforms were applied. Student's knowledge regarding eating breakfast was measured by using 6 questions such as: does regularly eating breakfast cause fatness?

In the knowledge part, the possible answer of questions consisted of 3 parts:

Yes, no, and do not know, which correct answer had 1 point, don't know, and false answers were 0 points. Structures of social cognitive theory, measured by Likert scale, with 5 possible answer: outcome expectancies with use of 5 questions (such as, eating breakfast can improve my learning), outcome expectations with use of 5 questions (such as, have better learning...), observational learning with sue of 5 questions (such as, when my friends eat breakfast it

motivates me to eat), self - efficacy with use of 7 questions (such as, how successful are you in eating breakfast when you are in hurry to go to the university?), in addition, social support with the use of 6 questions (such as, my family and friends advise me that: don't forget to eat breakfast). In this study breakfast is defined in this way: it is a complete meal, which can include any kinds of bread, jam, cheese, milk, butter... not small and low amount of eating food.

The frequency of eating breakfast was checked with one question (how many breakfasts have you had in the last week?).

3.3. Educational Intervention

Based on the diagnostic evaluation that was conducted to investigate the factors affecting on breakfast consumption in female students of Hamadan University of Medical Sciences, educational content was developed. The main emphasis of intervention was changing in the effective structures of this theory (self-efficacy and social support) by using effective strategies from each of these structures. In various studies to increase self-efficacy methods of modeling, verbal persuasion, and act in small steps were used. In this study, according to the conditions to increase breakfast consumption, creating successful experiences and encouraging methods have been used. For example, in this study students need to target and convert it to smaller steps that ultimately lead to an increase in the frequency of breakfast consumption.

The study of Salimi et al., showed that social support is an important factor in predicting the frequency of eating breakfast with female students (16). Therefore, in order to facilitate intervention performance and making changes in these factors through friendship, this intervention was done in the dormitory. Survey evidence suggests that to increase social support, mainly used for the creation of social networks, strengthen existing social networks, development and increase connections of social network (21). As students who lived in the dormitory and away from their family, we focused on their roommates as a proper source of social support. In this study, it was tried that existing social networks to be strengthened, so that students benefited from emotional support (assistance from others that makes us feel loved), informational (providing someone with beneficial information) and instrumental support (offering a helping hand) from each other to increase breakfast consumption.

The interventions were conducted within three weeks include 3 sessions group discussion, booklet, poster, and 3 SMS reminders. In intervention for any people in the dormitory room in each sessions group discussion, 35 - 45 minutes time allocated. In training sessions, used from group discussion and question-answering for exchanging

information and experiences. The purpose of training in the form of room-by-room was social support strengthening and respect to the situation of students under study. Training programs in the separation of title and content of meetings and social cognitive structures are presented in Table 1. The pedagogic booklet contained data messages and appropriate strategies in order to increase knowledge of the advantages of regularly eating breakfast and disadvantages of the omission of this main meal, it is also designed with the aims of increase self - efficacy and social support, and in the second session of intervention settled for students.

In addition, posters with the subject of regularly eating breakfast stick in the appropriate place of the dormitory in sufficient numbers. After intervention ending, educational reminder program, are done by phone calls and SMS in 3 times and within one month after the last intervention, the second reminder after 2 months, and third reminder was presented after the latest intervention to students, of the intervention group. The content of reminder messages is based on structures of the social cognitive theory that is used in this study, for example the main meal of the day is breakfast, so do not forget it. Eating breakfast has an important role in human health (effective on knowledge, outcome expectancies, and outcome expectations).

3.4. Ethical Principles

Research ethics committee of the Hamadan University of Medical Sciences confirmed this study and include protection of human dignity, obtaining informed consent from study participants, maintaining the privately of information, and coordination with authorities in Hamadan University of Medical Sciences. After the intervention, the educational materials were also given to the control group.

3.5. Data Analysis

The normality of the data was confirmed by the Kolmogorov-Smirnov test. The data analyzed by statistical tests includes: independent t-test, paired t-test, Chi-square test, and repeated measures analysis used to compare before and after groups, and for data analysis, 16 SPSS software and the significance level of 5% was used.

4. Results

Basic features: The average age of students within the intervention group was 21.78 and in the control group was 21.54. The majority of students in both intervention and control groups were single (92% and 94%, respectively). In

addition, there is no difference between the grade point average of two groups (Average score: C) (Table 2). Furthermore, before the intervention, between both groups (intervention and control) there was no significant difference in the average scores of social-cognitive structures and frequency of breakfast consumption (Table 3). In Table 3, we can see the average scores of structures in base assessment, 10 days and 4 months later. The result of paired t-test for the intervention group was compared with the control group. Result showed the increment in knowledge about eating breakfast (P < 0.001), outcome expectancies (P < 0.001), social support (P < 0.001), and self - efficacy (P < 0.001). In addition, frequencies of breakfast consumption in the intervention group significantly increased (P < 0.001) compared with the control group.

However, in the first post-test there was no significant changing in the average scores of outcome expectations (P = value = 0.750) and observable learning (P value = 0.427). In the second post-test, within 4 months after ending intervention, the impact pattern of intervention remains stable on variables studied. Compared with the control group, the knowledge of eating breakfast (P < 0.001) outcome expectancies (P < 0.001), self - efficacy (P < 0.001), and social support (P < 0.001) between the intervention groups was significantly different 4 months after intervention. In addition, the frequency of eating breakfast among students was significantly different in both groups (P < 0.001).

4.1. GEE Model 10 Days- 4 Months Assessment

Over the period from 10-day to 4-month assessment, in comparison with participants in the control condition, participants of intervention group had more favorable knowledge toward breakfast consumption (adjusted mean difference equal to 0.11, P = 0.015), higher self-efficacy scores (adjusted mean difference equal to 0.12, P = 0.001), higher social support scores (adjusted mean difference equal to 0.14, P = 0.001) and more behavior (adjusted mean difference equal to 0.44, P = 0.001). However, outcome expectancies (adjusted mean difference equal to 0.04, P = 0.185), outcome expectations (adjusted mean difference equal to -0.01, P = 0.65), and observational learning (adjusted mean difference equal to 0.02, P = 0.64) of participants in the intervention group didn't improve between the two post-test assessments (Table 4).

5. Discussion

The findings of our study showed that the SCT - based intervention was useful in increasing the frequency of eating breakfast among female students. In addition, the level of knowledge, outcome expectancies, social support,

Table 1. Training Programs to Increase Breakfast Consumption Among Female Students Based on Social Cognitive Theory

Session	Title	Content / Activities	Intended Social Cognitive Structures
1	Understanding the benefits of breakfast and disadvantages of skipping this important food meal	Discussing consumption advantages of this important meal, and provide a suitable training booklet	Knowledge, Outcome expectancies, Outcome expectations, Self-Efficacy
2	Overcome barriers in consuming breakfast regularly	Identify barriers in consuming breakfast regularly such as lack of time, breakfast repetitive, drowsiness, obesity, etc., and provide solutions to overcome barriers	Self-Efficacy
3	To emphasize and strengthen friendly relations in dormitories and eating breakfast together	Provide appropriate solutions, such as the strengthening of relations in dormitories through the division of labor, encouraging each other to consume breakfast, and help to friend for breakfast consumption during illness, disability and exams	Social Support, Observational learning

Table 2. Of Demographic Variables in the Intervention and Control Groups (N = 50)

Intervention/ Control	Age, Mean ± SD	Marital Status, No. (%)		Grade Point Average (%), No. (%)			
		Single	Married	A: (18 - 20)	B: (16 - 18)	C: (14 - 16)	D: (12 - 14)
Intervention group	21.78 ± 2.06	46 (0.92)	4 (0.08)	4 (0.08)	18 (0.36)	25 (0.50)	3 (0.06)
Control group	21.54 ± 1.58	47 (0.94)	3 (0.06)	2 (0.04)	14 (0.28)	24 (0.48)	10 (0.20)
P value	P value = 0.515	P value = 0.695, x^2 = 0.154		P value = 0.175, x^2 = 0.175			

self-efficacy, and frequency of breakfast consumption in the intervention group, significantly increased compared with the control group (P < 0.001). However, there were no differences between two groups in terms of outcome expectations and observational learning. According to a search of the research team, few interventions based on social cognitive theory implemented in order to increase eating breakfast (28, 29). Kobel et al., in their study reported that, however, following intervention based on social cognitive theory, children in the intervention group omit breakfast in lesser amount compared with the control group, however, this difference was not significant. Although, data analysis with regard to the educational grade of participants determined that students in the intervention group with high level significantly ate breakfast more than the control group (28). Also, interventions by using theories in some structures have a similarity with social cognitive theory such as the theory of planned behavior) for example, perceived behavioral control is conceptually related to self-efficacy). The results of the study done by Mohammadi Zeidi et al., on students in schools with use of the theory of planned behavior showed that after the intervention, eating breakfast among students had significant improvement (30). Also, findings of Eilat - Adar et al., showed that after training, eating breakfast increased 51% - 65% (31). Results of Khazaie Pool et al., in Noshahr, by using the health belief model, represented the findings from this study (20). In the present study knowledge of students in the intervention group showed the significant in-

crease compared with the control group after training intervention, which according to other studies, it can play in important role in increase other structures especially self-efficiency (32). The study of Khalaj et al., in Qazvin schools, showed that health education has an important role in knowledge increment and the reformation of nourishment behavior, especially breakfast (33). Also, the results of the study done by Kaur et al., in India showed that training has a significant effect on the level of student knowledge (34). Outcome expectancies is one of the individual variables in social cognitive theory, which predict possible outcomes from the involvement of intended behavior (21, 35). In the present study, after intervention training, outcome expectancies in the intervention group toward the control group increased significantly. On the contrary of our study, the results of Abbasian et al., and Hashemi et al., didn't observe any changes in the amount of outcome expectancies after intervention (32, 36), which expressed causes of lack of intervention effect on structure were few numbers of meetings and short-term intervention. Although the number of training sessions in the present study was similar to the studies, the present study includes a booklet containing informational and motivational messages and three reminders that can be effective on the significant intervention of this structure. Outcome expectations refer to a value, which a person gives to possible consequences of one behavior (21, 35). In this study, outcome expectations are the value that students give to eating breakfast. Dimensions of consequences related to eat-

Table 3. Comparison of the Mean and Standard Deviation Structures of Social Cognitive Theorybefore and After the Intervention Among Female Students in Both Intervention and Control Groups

Outcome Variables	Baseline		After 10-Day Assessment			After 3-Month Assessment		
	Mean ± SD	P Value[a]	Mean ± SD	P Value[a]	P Value[b]	Mean ± SD	P Value[a]	P Value[b]
Knowledge		0.601		< 0.001			< 0.001	
Control	3.82 ± 1.22		3.98 ± 1.27		0.290	3.76 ± 1.17		0.673
Intervention	3.68 ± 1.43		5.50 ± 0.86		< 0.001	5.56 ± 0.70		< 0.001
Outcome expectancies		0.176		< 0.001			< 0.001	
Control	20.42 ± 2.35		20.44 ± 2.24		0.930	22.54 ± 1.74		0.620
Intervention	19.76 ± 2.48		22.70 ± 1.84		< 0.001	22.54 ± 1.74		<0.001
Outcome expectations		0.169		0.75			0.872	
Control	22.58 ± 2.39		22.38 ± 2.18		0.534	22.14 ± 1.99		0.185
Intervention	21.9 ± 2.50		22.22 ± 2.79		0.294	22.06 ± 2.88		0.630
Observational learning		0.725		0.427			0.248	
Control	11.7 ± 1.95		11.90 ± 1.63		0.185	11.74 ± 1.60		0.881
Intervention	11.48 ± 2.02		12.20 ± 2.10		0.630	12.18 ± 2.14		0.257
Self-efficacy		0.352		< 0.001			< 0.001	
Control	16.58 ± 3.90		16.36 ± 4.25		0.419	16.20 ± 4.14		0.307
Intervention	15.84 ± 4.01		21.82 ± 3.92		< 0.001	21.30 ± 3.46		< 0.001
Social support		0.718		< 0.001			< 0.001	
Control	19.08 ± 5.35		19.12 ± 4.82		0.933	18.56 ± 4.52		0.370
Intervention	19.42 ± 3.89		23.84 ± 3.58		< 0.001	24.02 ± 3.02		< 0.001
Behavior		0.275		< 0.001			< 0.001	
Control	1.84 ± 1.34		2.02 ± 1.36		0.118	1.96 ± 1.10		0.402
Intervention	2.14 ± 1.38		3.70 ± 1.40		< 0.001	3.84 ± 1.09		< 0.001

[a]P value between groups (independent t-test).
[b]P value within groups (Paired t-test).

Table 4. Generalized Estimation Equation (GEE) Model for 10-Day and 4-Month Assessment Adjusted by the Baseline Value

Outcome Variables	Estimate	95% CI	P Value
Knowledge	0.113	0.022 - 0.203	0.015
Outcome expectancies	0.044	-0.021 - 0.11	0.185
Outcome expectations	-0.017	-0.09 - 0.056	0.65
Observational learning	0.023	-0.073 - 0.12	0.64
Self-efficacy	0.128	0.054 - 0.202	0.001
Social support	0.146	0.073 - 0.218	< 0.001
Behavior	0.44	0.23 - 0.65	< 0.001

ing breakfast in this study included: health, better learning, fitness, euphoria, and enjoyment. In the present study, scores of outcome expectations structure in both groups, before and after the intervention, have no significant differences. The Hashemi et al., study, regarding eating fruit and vegetable in teenagers, showed that outcome expectations related to it in both intervention and control group at the end of the study did not have any significant differences, which is similar to our results. As well as the study of Abbasian et al., didn't show the significant differences in outcome expectations scores in both intervention and the control group and explained the causes of lack of intervention effect of structure is due to the low number of training sessions and short-term intervention (32, 36). On the other hand, study of Hindin et al., showed that a media literacy nutrition education curriculum can increase outcome expectations (37). In the present study, this lack of increase may be due to inadequate repeated messages to change this structure.

One of the most important impressive structures on behavior in cognitive-social theory is self-efficacy. Self-efficacy is a fundamental variable in learning and choosing strategies and behaviors. People who have high self-

efficacy can better overcome to constrain and face with problems, therefore, perceived self -efficacy can be the reason to preserve and maintain promotional health behaviors (38). The results of the present study showed that the educational intervention could make a significant change in the student's self-efficacy. In addition, recent researches have been shown long-term effects of the intervention, which focus on self-efficacy (39, 40). In the study of Hashemi et al., which was a family-based intervention, results showed that the intervention had no significant effect on self-efficacy, which was due to the inability of parents to strengthen the self-efficacy of teenagers (36). Mohammadi Zeidi et al., study findings indicated that average of self-efficacy scores in the intervention group than the control group was significantly different that correspond with the present study (30). In this study, self-efficacy belief increased by verbal persuasion. The intervention group was asked to remember and write successful memoirs about their ability in breakfast consumption regularly. Eventually, participants' positive feelings were strengthened by supportive feedback. For example, these events show that if you want to, make sure you can.

Social support in the intervention group increased significantly compared with the control group after the intervention. In this study for increasing student's social support in the dormitory, in addition to informational support, including training sessions, booklet and poster, increased emotional support of students by strengthening relationships among roommate who is an important factor in increasing the score of this structure. In direction of results of this study, Franko et al., could also make changes in student's social support of web-based intervention to creating improvement, healthy nutritional behaviors (41). The Poddar's study was a study among students based on social cognitive theory to increase eating dairy, which could not make a significant change in social support of students. In explaining the lack of impact, researchers of this study said that in the proposed intervention, there is a little focus on changing the structure (42). Observational learning is learning that occurs through observing the behavior of others (21). In this study, the mean score of observational learning did not show significant changes in both intervention and control groups, before and after the intervention, which could be due to living in a dorm, stay away from family and parents, and have less access to TV as an important resource to strengthen observational learning among students living in dormitories. In the study of Abbasian et al., results showed that the intervention had no significant effect on observational learning. They said, it is a possible assessment tool, which used to assess that learning observational is not accurate enough to measure this structure (32). According to the obtained results, group, which received intervention training (intervention group) frequency of eating breakfast regularly, increased, that this reflects an important role of social cognitive theory in improving eating breakfast. The significant change in aforementioned behavior was due to increasing knowledge, outcome expectancies, social support, and self-efficacy; these, provided in the form of training group sessions with strengthening support group and create supportive vice norms. Due to the fact that nutrition is multi factorial behavior and many factors effect on it, in order to make permanent changes in behavior, the involvement of family and society is essential.

Another noteworthy finding of this study was that score of knowledge, self-efficacy, social support, and behavior of intervention group improved between the two post-test assessments. It seems that strategies used in educational intervention used methods of modeling, verbal persuasion, act in small steps, creating and strengthen of social networks, improve breakfast consumption. Moreover, from a 10-day assessment to a 4-month assessment, there was still room for improvement in outcome expectancies, outcome expectations, and observational learning.

Limitations: The first limitation was that we did not conduct test-retest. In addition, other limitations of this study include a self-reporting method regarding the frequency of eating breakfast, which raises the possibility of error in the estimate of these behaviors.

Also, this study was conducted among female students. However, based on previous findings, breakfast skipping is more common among female, thus, it is necessary to study this behavior and determinative factors among male students.

5.1. Conclusion

Intervention based on social cognitive theory, created relatively favorable changes in the breakfast consumption in students. Due to the low cost and effectiveness of nutrition education based on social cognitive theory, the need to extend these training programs seems necessary.

Acknowledgments

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