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Original article

Predictors of breakfast consumption among Iranian students: applying social cognitive theory

Shadi Askari [1], Nooshin Salimi [1], Ehsan Bakhshi [2]

[1] Kermanshah Branch, Islamic Azad University, Kermanshah, Iran
[2] Kermanshah University of Medical Science, Kermanshah, Iran

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Abstract: *Background* — Despite the known significance of regular breakfast consumption, skipping or inadequate consumption of breakfast is common among students. Social cognitive theory (SCT) is one of the most effective theories in predicting nutritional behaviors, especially breakfast-related behaviors

Objective — This study aimed to determine the factors related to breakfast consumption based on SCT among students of Islamic Azad University Kermanshah Branch.

Methods — In this cross-sectional study, 206 students of Islamic Azad University Kermanshah Branch were selected based on availability sampling. An online questionnaire consisting of demographic information scales, SCT variables and breakfast consumption behavior was sent to student groups. Data were analyzed using descriptive statistical tests, chi-square test, linear regression and correlation analysis in SPSS software version 16.

Results — On average, students consume breakfast 4.39 times a week. Overall, 17.6% of students had completely ignored breakfast and 42.4% of them ate breakfast irregularly between one and six times a week. Among the components of social cognitive theory, self-efficacy and observational learning predicted 55.7% of changes in breakfast consumption among students (P<0.001).

Conclusions — It seems that social cognitive theory is a useful framework for predicting breakfast consumption behavior among young people, and it is possible to improve breakfast consumption behavior by designing and implementing appropriate educational interventions based on this theory.

Keywords: breakfast, self-efficacy, students.

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Correspondence to Nooshin Salimi. Phone: +989186212848. E-mail: nooshin.salimi@yahoo.com.

Introduction

Breakfast is defined as the first meal of the day. This meal is usually taken before the start of daily activities up to 2 hours after waking up [1]. Breakfast is considered as a good source of energy that should provide about 20-25% of daily energy [2, 3]. Obtaining enough energy in the morning can have significant benefits [4]. Various studies have shown substantial evidence regarding the direct relationship between breakfast consumption and physical and mental condition [5, 6]. Eating breakfast at the beginning of the day can prevent the consumption of snacks and other harmful and extra meals during the day; moreover, it can be associated with a decrease in body mass index (BMI) and a reduced risk of obesity [7-9]. The risk of obesity in children and adolescents who do not eat breakfast is43 percent more than those who eat breakfast regularly [10]. The countless benefits of regular breakfast can lead to better mental health [11], academic achievement [12], better physical function [13], and reduction in stress and depression [14]. There is a significant relationship between skipping breakfast and the prevalence of various diseases and people who do not eat breakfast are faced with an increased risk of non-communicable diseases such as cardiovascular disease [15, 16], diabetes [17], some cancers [18] and mental illnesses [19]. Despite the known significance regular breakfast consumption, this meal is more often ignored by young people [20]. Reportedly, skipping or inadequate consumption of breakfast are common among students [21, 22]. The results of a study conducted in 10 European countries with the highest rate of skipping breakfast showed that 44% of girls and 36% of boys refused to eat breakfast [6]. The rate of skipping breakfast varies among different populations [23]. The study conducted among university students aged 18-27 in Santiago showed that only 53% of them eat breakfast regularly between 5 and 7 times a week [24]. In a similar study of medical students in Iran, only 24% of students consumed breakfast regularly, 10% never ate breakfast, and 66% ate breakfast irregularly and between 1 and 6 times a week [23]. In the present study, social cognitive theory was used as a theoretical framework. This theory, while stating the predictors and effective basics in the formation of behavior, offers solutions to changing behavior. According to the Social Cognitive Theory (SCT), nutritional behaviors are explained by individual factors (e.g., awareness, attitudes and beliefs, self-efficacy and body satisfaction), behavioral factors (e.g., meal patterns, participation in breakfast preparation, and participation in shopping for breakfast ingredients), and socio-environmental

factors or interpersonal factors (e.g., access to healthy food at home, parental behavior, and support of family and friends for consuming regular breakfast) [25]. This is one of the most effective theories in predicting nutritional behaviors, especially breakfast-related behaviors [23, 25, 26]. Kermanshah is located in the west of Iran and is bordered by Iraq. In terms of health indicators, Kermanshah with a population of about two million people in 2016 is one of the most deprived provinces of Iran [27, 28]. Based on researches, food insecurity was highly prevalent in Kermanshah families [29, 30], and due to such situation, breakfast plays a major role. Nevertheless, no study has been conducted with the aim of measuring the effective factors in regular breakfast consumption among students in Kermanshah. Therefore, the present study was performed to investigate the predictors of regular breakfast consumption based on SCT in students of Islamic Azad University Kermanshah Branch.

Material and Methods

Study participants and setting

This research is a descriptive cross-sectional analytical study using availability sampling. Also, an online questionnaire was sent for collecting data in 2020 with participation of 206 students of Islamic Azad University, Kermanshah Branch (Kermanshah being a province in western Iran).

Measurements

To collect data in this study, a researcher-made questionnaire of Salimi et al [23] was used, and its reliability was measured in the study population via Cronbach's alpha coefficient. This questionnaire consisted of three parts. The first part was the personal information questions including seven questions (such as age, gender, and marital status). The second part was SCT structures which consisted of awareness (6 questions with a maximum score of 6), observational learning (3 questions with a maximum score of 15), outcome expectations and outcome expectancies (5 questions each with a maximum score of 25), social support (6 questions with a maximum score of 30), and self-efficacy (7 questions with a maximum score of 35). In addition, the third part of questionnaire measured breakfast consumption in the past week (never to 7 time in week). To assess the reliability of the questionnaire, the internal correlation method was used. To this end, 25 students who were not present in the main sample first completed the questionnaire as a pilot effort, and then Cronbach's alpha coefficient was calculated. Thus, Cronbach's alpha coefficient for observational learning was 90%, outcome expectations 84%, outcome expectancies 86%, awareness 75%, social support 87%, and self-efficacy 95%. Due to the coronavirus pandemic and need to observe social distancing, as well as the absence of students in universities to break the chain of disease transmission, questionnaires were designed online using Google Docs and a link to the questionnaires was sent to all WhatsApp Classmate Groups in Islamic Azad University Kermanshah Branch.

Table 1. Demographic variables and their relationship with breakfast consumption behavior

Demographic variables		*Number*	*Percentage*	*Average score of breakfast consumption behavior*	*P-value*
Age	18-20	53	25.9	4.64	0.797
	21-23	121	59	4.21	
	24-26	26	12.7	4.54	
	27-29	3	1.5	4	
	30-32	2	1	7	
Marital status	Married	31	15.1	3.68	0.112
	Single	174	84.9	4.52	
Sex	Man	130	63.4	4.27	0.402
	woman	75	36.6	4.60	
Type of accommodation	With family	163	79.5	4.47	0.394
	In a dormitory	42	20.5	4.07	
Birth rank	First	95	46.3	4.12	0.543
	Second	58	28.3	4.48	
	Third	28	13.7	4.79	
	Fourth or greater	24	11.7	4.79	
Average point	<12	0	0	0	< 0.001
	12-14	8	3.9	3.88	
	14-16	42	20.6	2.95	
	16-18	87	42.6	4.39	
	18-20	67	32.8	5.33	

Table 2. Correlation between the structures of social cognitive theory and breakfast consumption behavior in the studied students

	Knowledge	*Outcome expectations*	*Outcome expectancies*	*Observational learning*	*Self-efficacy*	*Social support*
Breakfast consumption behavior	0.371**	0.580**	0.583**	0.599**	0.698**	0.541**
Knowledge	1	0.646**	0.497**	0.530**	0.456**	0.463**
Outcome expectations		1	0.744**	0.659**	0.664**	0.577**
Outcome expectancies			1	0.636**	0.569**	0.501**
Observational learning				1	0.595**	0.555**
Self-efficacy					1	0.611**
Social support						1

** – Correlation is significant at the 0.01 level (2-tailed).

Table 3. Regression analysis to predict breakfast consumption behavior based on social cognitive theory components in students

Determinants	*Mean*	*Std. Deviation*	*Standardized Coefficients Beta*	*t*	*Sig.*	*R Square*
(Constant)				-4.503	< 0.001	
Knowledge	3.54	1.34	-1.076	-1.207	0.229	
Outcome expectations	21.38	3.291	0.077	0.876	0.382	
Outcome expectancies	22.20	2.988	0.073	0.986	0.325	0.557
Observational learning	11.55	2.954	0.220	3.302	< 0.001	
Self-efficacy	21.52	7.704	0.455	6.559	< 0.001	
Social support	24.41	4.587	0.101	1.568	0.118	

Inclusion criteria

Students studying at Islamic Azad University Kermanshah Branch and a written informed consent to participate in the study.

Statistical analysis

After sending the online questionnaire and completing the questionnaires by the students, the data were analyzed using descriptive statistical tests, chi-squared test, linear regression, and correlation analysis via SPSS software, version 16. Also, $p<0.05$ was set as the cut-off value of statistical significance.

Results

Students' demographic information and their relationship with breakfast consumption behavior are presented in *Table* 1. On average, students consume breakfast 4.39 times a week. Overall, 40% of the students in the present study ate breakfast regularly every day, 17.6% never, 42.4% ate irregularly with one and six times a week. Among the demographic variables, only the grade point average of students had a significant relationship with breakfast consumption, so that students with higher grade point average ate breakfast more often. *Table* 2 shows the correlations between the structures of SCT and the average of weekly consumption of breakfast. All components of SCT had a significant relationship with students' breakfast consumption behavior ($p<0.001$). In the next step, components were entered in the regression model. The purpose of this analysis was to determine the predictors of breakfast consumption in the studied students. *Table* 3 shows the predictors of breakfast consumption. The results of linear regression analysis showed that among the components of this theory, self-efficacy and observational learning could significantly predict 55.7% changes in breakfast consumption ($p<0.001$).

Discussion

To the best of our knowledge, few studies have applied SCT to predict breakfast consumption and its effective factors in students. This study was designed to examine the predictors of regular breakfast consumption based on SCT in students. The results showed that the average of breakfasts consumption in students was 4.39 times a week. In addition, 40% of them ate breakfast regularly and 60% did not eat breakfast at all or ate it irregularly. The findings of a study by Mansouri et al. with the participation of students from 28 different provinces in Iran showed that 4.1% of students consume breakfast less than once a week [31]. Different percentages of breakfast consumption have been reported among students in different countries. In this connection, the study of Pengpid et al., which was conducted among students from 28 Asian countries, revealed that 13.8% of students never eat breakfast, 34.2% had it irregularly, and 51.9% eat breakfast daily and regularly [32]. These different results may be due to differences in dietary patterns in cultures or discrepancies in the definition and evaluation of regular breakfast consumption [12, 24, 33]. Among the studied demographic variables, only the grade point had a direct and significant correlation with the average of breakfasts consumption. The results of several studies show a direct relationship between breakfast consumption and academic performance [34, 35]. Adolphus et al. reported that regular breakfast consumption by adolescents and a high score in math are directly and statistically significantly associated with each other [12]. In the present study, all components of the SCT were significantly associated with breakfast consumption behavior, but among these six components, only self-efficacy and observational learning were significant predictors of breakfast consumption behavior among students of this university. Moreover, it could explain 55.7% of the variance in breakfast consumption. Several theories have been investigated for predicting the pattern of breakfast consumption with varying results. The study of Mirzaei et al. indicated that SCT significantly predicts breakfast consumption and the components of this theory were able to explain 41.4% of the variance in breakfast consumption. In Mirzaei's study, self-regulation was the strongest predictor of breakfast consumption behavior [26]. In a study that used Pender Health Promotion Model (HPM) to predict breakfast consumption, this theory was able to predict 47% of breakfast consumption changes [36]. Additionally, Morvati Sharifabad et al. found that the Theory of Planned Behavior (TPB) could predict 50% of the variance of behavioral intention and 8% of the variance in breakfast consumption behavior [37]. Mullan et al. showed that TPB could predict 47.6% and the Health Action Process Approach (HAPA) could explain 44.8% of the variance in breakfast consumption [38]. The results of our study confirmed the successful performance of SCT in predicting breakfast consumption and showed that self-efficacy was the strongest predictor in breakfast consumption. Students with higher self-efficacy consumed breakfast more regularly. Numerous studies have accentuated an important role of self-efficacy as a predictor of breakfast consumption [20, 25, 26, 39]. Higher self-efficacy seems to increase breakfast by overcoming barriers. In the study by Pournarani et al., there was a significant correlation between the mean of perceived barriers and self-efficacy in breakfast consumption. They demonstrated that to change breakfast behavior, self-efficacy can be enhanced by reducing perceived barriers [40]. In the present study, barriers such as lack of time, lack of sleep, repetitive and dislike of breakfast foods, lack of support from family and friends in preparing and consuming breakfast, as well as, overweight in measuring students' self-efficacy were discussed. After self-efficacy, observational learning is another important predictor of breakfast behavior in this study. Observational learning is a natural human tendency to observe and imitate the behaviors of others. Accordingly, it is thought that individuals may learn a behavior by observing the experiences of others and not just by their own experience [41]. Some studies

have shown that observational learning is not related to breakfast consumption [23, 25, 26]. To explain this lack of relation, they stated that living in a dormitory, being away from family and parents, and having less access to television as an important source of observational learning could be involved. In our study, about 80 percent of the students lived with their families and only 20 percent lived in dormitories, which can be a compelling reason. Although awareness, outcome expectations, outcome expectancies, and social support did not significantly predict breakfast behavior, all these components were significantly associated with breakfast consumption.

Like other studies, this study had some limitations such as being cross-sectional that makes it difficult to infer between dependent and independent variables. Also, measuring breakfast eating behavior by self-reporting may lead to the under- or overestimation of this behavior

Conclusion

In general, it can be stated that SCT is an appropriate framework for predicting breakfast behavior in young people. Also, self-efficacy and observational learning could predict 55.7% of changes in breakfast behavior in students. It seems that by designing and implementing educational interventions based on these structures, it is possible to deal with skipping the breakfast.

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Conflict of interest

All authors have no conflict of interest to declare.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Declaration of Helsinki and its later amendments, or comparable ethical standards.

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Authors:
Shadi Askari – BSc, Student of Public Health, Department of Public Health, Kermanshah Branch, Islamic Azad University, Kermanshah, Iran. https://orcid.org/0000-0003-2689-3217.
Nooshin Salimi – PhD, Assistant Professor, Department of Public Health, Kermanshah Branch, Islamic Azad University, Kermanshah, Iran. https://orcid.org/0000-0001-9989-5227.
Ehsan Bakhshi – MSc, Researcher, Kermanshah Health Center, Kermanshah University of Medical Science, Kermanshah, Iran. https://orcid.org/0000-0003-2118-8025.

Appendix 1. Fulltext of questionnaire

Knowledge

1. Does eating a regular breakfast cause obesity?
Yes ☐ No ☐ I do not know ☐
2. Does eating a regular breakfast help you learn better?
Yes ☐ No ☐ I do not know ☐
3. Does eating a regular breakfast improve your mood?
Yes ☐ No ☐ I do not know ☐
4. Does regular breakfast improve the general health of the body (nervous system, gastrointestinal tract, metabolism ....). Is it possible?
Yes ☐ No ☐ I do not know ☐
5. Does skipping breakfast cause depression?
Yes ☐ No ☐ I do not know ☐
6. Does skipping breakfast cause stress?
Yes ☐ No ☐ I do not know ☐

Outcome expectations

1. I will be healthier by eating breakfast.
Strongly agree ☐ Agree ☐ No comment ☐
Strongly disagree ☐ Disagree ☐
2. Eating breakfast makes my learning better.
Strongly agree ☐ Agree ☐ No comment ☐
Strongly disagree ☐ Disagree ☐
3. Eating breakfast can help prevent obesity.
Strongly agree ☐ Agree ☐ No comment ☐
Strongly disagree ☐ Disagree ☐
4. Eating breakfast makes me more energetic and refreshed.
Strongly agree ☐ Agree ☐ No comment ☐
Strongly disagree ☐ Disagree ☐
5. Eating breakfast will be enjoyable for me.
Strongly agree ☐ Agree ☐ No comment ☐
Strongly disagree ☐ Disagree ☐

Outcome expectancies

1. Health for me is...
Very important ☐ Important ☐ No comment ☐
Slightly Important ☐ Not important ☐
2. To have a better learning for me is...
Very important ☐ Important ☐ No comment ☐
Slightly Important ☐ Not important ☐
3. Not to get fat and be fit for me is...
Very important ☐ Important ☐ No comment ☐
Slightly Important ☐ Not important ☐
4. To be healthier and more energetic for me is...
Very important ☐ Important ☐ No comment ☐
Slightly Important ☐ Not important ☐
5. Enjoyable breakfast for me is...
Very important ☐ Important ☐ No comment ☐
Slightly Important ☐ Not important ☐

Observational learning

1. When my friends eat breakfast it motivates me to eat.
Strongly agree ☐ Agree ☐ No comment ☐
Strongly disagree ☐ Disagree ☐
2. When my family members eat breakfast, it motivates me to eat.
Strongly agree ☐ Agree ☐ No comment ☐
Strongly disagree ☐ Disagree ☐
3. Seeing or hearing about eating breakfast in advertisements and media programs (TV, radio, magazines, etc.) motivates me to eat.
Strongly agree ☐ Agree ☐ No comment ☐
Strongly disagree ☐ Disagree ☐

Self-efficacy

1. How successful are you in eating breakfast when you do not feel good about it?
Too much confidence ☐ Much confidence ☐
Too little confidence ☐ Little confidence ☐
No comment ☐
2. How successful are you in eating breakfast when your family or friends are not with you?
Too much confidence ☐ Much confidence ☐
Too little confidence ☐ Little confidence ☐
No comment ☐
3. How successful are you in eating breakfast when you are in hurry to go to the university?
Too much confidence ☐ Much confidence ☐
Too little confidence ☐ Little confidence ☐
No comment ☐
4. How successful are you in eating breakfast when breakfast is repetitive for you?
Too much confidence ☐ Much confidence ☐
Too little confidence ☐ Little confidence ☐
No comment ☐
5. How successful are you in eating breakfast when you do not like breakfast?
Too much confidence ☐ Much confidence ☐
Too little confidence ☐ Little confidence ☐
No comment ☐
6. How successful are you in eating breakfast when you are overweight?
Too much confidence ☐ Much confidence ☐
Too little confidence ☐ Little confidence ☐
No comment ☐
7. How successful are you in eating breakfast when you have a lack of sleep?
Too much confidence ☐ Much confidence ☐
Too little confidence ☐ Little confidence ☐
No comment ☐

Social support

1. Breakfast is available at my place of residence (house, dormitory)
Never ☐ Rarely ☐ Sometimes ☐
Usually ☐ Always ☐
2. I have breakfast with my family or friends
Never ☐ Rarely ☐ Sometimes ☐
Usually ☐ Always ☐
3. My parents and friends encourage me to eat breakfast
Never ☐ Rarely ☐ Sometimes ☐
Usually ☐ Always ☐
4. My family and friends advise me that: don't forget to eat breakfast
Never ☐ Rarely ☐ Sometimes ☐
Usually ☐ Always ☐
5. If I am disabled, my family or friends will prepare breakfast for me
Never ☐ Rarely ☐ Sometimes ☐
Usually ☐ Always ☐
6. My family and friends help me prepare and have a regular breakfast
Never ☐ Rarely ☐ Sometimes ☐
Usually ☐ Always ☐

Behavior

1. How many breakfasts have you had in the last week? (Breakfast is a complete meal that can include bread, jam, cheese, milk, butter ..., not a small amount of food)
I never ate ☐
1 time ☐
2 times ☐
3 times ☐
4 times ☐
5 times ☐
6 times ☐
7 times ☐