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Investigation of factors related to healthy eating behavior based on the developed theory of planned behavior in adolescents

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Abstract:

BACKGROUND: Adolescence is a complicated and sensitive period, and proper nutrition in this period of life can influence the quality and quantity of growth and maturity. The aim of the present study is to determine the factors associated with healthy eating behavior based on the developed theory of planned behavior in adolescents.

MATERIALS AND METHODS: This is a descriptive-correlational study in which 400 female students of the first grade of high school in Bandar Anzali participated. Among the junior high schools in this city, two schools were randomly selected and sampling was done using census method. Data collection tool was Healthy Eating Behavior questionnaire based on Theory of Planned Behavior, which includes three sections of demographic information, constructs of Theory of Planned Behavior, including attitude toward behavior, subjective norms, perceived behavioral control, and behavioral intention, and food behavior, and food habits questionnaire. The scale was evaluated and confirmed by content validity ratio, content validity index, and alpha coefficient. *P* value was considered significant at less than 5%. Data analysis was performed using SPSS software 24, through linear regression and Pearson's correlation.

RESULTS: As shown by linear regression analysis, the developed theory of planned behavior is able to predict 26% of the variance of healthy eating behavior, and this predictive power is related to the constructs of behavioral intention, attitude, and habits.

CONCLUSIONS: In the present study, adding the variable of habits to the theory of planned behavior showed that this variable is very effective in predicting healthy eating behavior in adolescents, just like the constructs of behavioral intention and attitude. Therefore, it is suggested to carry out educational interventions based on the developed theory of planned behavior with the focus of the mentioned structures.

Keywords:

Adolescents, developed theory of planned behavior, healthy eating behavior

Introduction

Over the past few decades, with the successes and achievements in upgrading the health system and new technologies, considerable advances have been made in the control of contagious diseases, and after these steps, non-contagious diseases are now considered as a major health problem.[1] Non-contagious diseases (such as cardiovascular disease, diabetes, cancer, hypertension, obesity, etc.) are the leading cause of death worldwide.[2] According to the estimates of the World Health Organization, 71% of all deaths in the world in 2021 were due to

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non-contagious diseases, and according to this report, 77% of all non-contagious deaths occurred in low- and middle-income countries.[3] Iran, as an example of a middle-income country, accounts for 83.5% of all deaths and 78.1% of the total disease burden in 2019 due to non-contagious diseases.[4-6] Unhealthy diet, sedentary lifestyle, and smoking are the cause of 80% of non-contagious diseases.[7]

The increasing prevalence of non-contagious diseases imposes huge economic losses on countries.[8] The role of nutrition as the main cause of these diseases has been properly established.[9] Therefore, poor diet is one of the main concerns of the health sector in developed and developing countries.[10] In this regard, in particular, the unhealthy eating behavior of adolescents is worrying, because most of them do not consume enough fruits and vegetables, and instead, they prevalently consume high-fat and high-energy foods that lack nutrition.[11,12] According to the Global School-based Student Health Survey (GSHS) in 2019, almost half of countries reported that 10–30 percent of 13- to 15-year-old students did not eat fruit at all, a quarter reported that 10–30 percent of students did not eat vegetables at all, nearly 70 percent of countries reported that at least half of their students eat fast food on a weekly basis, and all countries have found that one in five students consumes carbonated beverages at least once a day.[13] Among Iranian adolescents, high consumption of unhealthy fast foods and snacks, not eating breakfast and low consumption of fruits, vegetables, whole grains, and dairy products have been commonly reported.[14] Childhood and adolescence are periods when eating habits and behaviors are formed in individuals.[15] Eating habits include a wide range of eating-related behaviors, and the findings indicate that the eating skills and behaviors learned in adolescence remain in later life and are difficult to change.[16,17] Adolescence, on the other hand, is a complicated and sensitive period, and the most important change in this period is puberty, and proper nutrition in this period of life can influence the quality and quantity of growth and maturity. Nutritional studies indicate that girls in particular follow incorrect eating patterns and models. While they are the future mothers of the community and learning nutritional concepts affects health of themselves and their children and families.[18-20]

Educational interventions and programs to change behavior require understanding of beliefs and attitudes, and due to the complexity of the nature of attitudes and beliefs and their relationship with health behaviors, theories of health education and health promotion are used.[21,22] Studies indicate that the most effective educational programs are based on theory-based approaches that are rooted in behavior change patterns[23] and "Theory of Planned Behavior" is also one of the most important models in the field of eating behavior, food selection, fruit and vegetable consumption, and eating breakfast.[24-30] The constituent constructs of this theory include attitude, subjective norms, perceived behavioral control, and behavioral intention. Attitude reflects a person's positive or negative evaluation of a behavior. Subjective norms refer to the fact that perceived social pressures may cause a person to perform or not to perform a particular behavior, and ultimately, perceived behavioral control is perceived as the perceived difficulty or simplicity to perform a particular behavior. A person evaluates a behavior positively and intends to do it when he believes that important people in his life want that behavior to be done and also has the behavior under his control. Intention includes thinking to perform behavior and is the main determinant of behavior.[31] There is ample evidence that habits are another powerful predictor of eating behavior.[32] When the power of habits increases, behavior is repeatedly reinforced by satisfactory experiences.[33-35] Thus, the variable of eating habits is added to the theory of planned behavior (developed theory of planning behavior) to be studied in predicting healthy eating behavior.

Considering the explanations, the current study was conducted aiming at determining the factors related to healthy eating behavior based on developed theory of planned behavior in adolescents.

Materials and Methods

Study design and setting

This is a descriptive-correlative study, which was conducted in 1401 with the aim of determining the factors related to healthy eating behavior based on developed theory of planned behavior in adolescents.

Study participants and sampling

The research population was 400 first-grade high school girls in Bandar Anzali. Among the public girls schools of the first high school period of this city, two schools that do not differ much in terms of cultural, economic, and social characteristics were randomly selected and sampled by census method. Inclusion criteria included: students' willingness to participate in research, lack of a special diet, and not suffering from chronic diseases, and exclusion criteria were unwillingness to participate and continued cooperation by students.

Data collection tool and technique

Data collection tools included healthy eating behavior questionnaire based on the theory of planned behavior[36] and eating habits questionnaire.[37] The first questionnaire includes three sections of demographic information, constructs of theory of planned behavior, and food behavior. The first part of this questionnaire included

eight items related to demographic characteristics, including student age, height, weight, parents' education, parents' occupation, and household size. The second part or constructs of the theory of planned behavior consist of 32 items, and the third part or food behavior part includes seven items, based on the five-point Likert scale each item, as strongly disagree, disagree, no idea, agree, and strongly agree with a minimum and maximum score of 1 to 5. The second part of the questionnaire includes attitudes toward behavior with 12 items with an achievable score range from 12 to 60, 13 items for subjective norm with an achievable score range from 13 to 65, perceived behavioral control with seven items with an achievable score range from 7 to 35, and behavioral intention with six items with an achievable score range from 6 to 30. The third part of the questionnaire included seven items related to eating behavior with an achievable score range from 7 to 35. Eating habits questionnaire consists of 16 items, based on five-point Likert scale for each item, in the form (always, often, sometimes, rarely, and never) with a minimum and maximum score of 1 to 5 and an achievable score range from 16 to 80.

In the present study, due to the limitation of answer options for items in both questionnaires, which were four-point Likert completely agree, agree, disagree, and completely disagree, and I have no opinion, it was not part of the answer options, and on the other hand, due to not expressing CVR and CVI values quantitatively, the questionnaire was re-validated and reliable. To assess the validity, content validity was used, so that the questionnaire was given to 10 health and nutrition experts and its validity was confirmed with a content validity ratio (CVR) of 0.81 and a content validity index (CVI) of 0.8. To assess the reliability, Cronbach's alpha test method was used. For this purpose, a questionnaire was given to 20 female high school students. Cronbach's alpha coefficient was 0.85 for attitude construct, 0.75 for subjective norm construct, 0.71 for perceived behavioral control construct, 0.76 for behavioral intention construct, 0.75 for eating behavior construct, and 0.80 for eating habits construct. Data analysis was done by SPSS software version 24, with a significant level of 5%.

Ethical consideration

This study was carried out with the permission of the ethics committee of Iran University of Medical Sciences and the necessary coordination with the education organization of Bandar Anzali city and the managers and officials of the relevant schools and with the informed consent of the students.

Results

In this study, the mean age of students was 14.9 ± 0.78 years. Their mean height and weight were 159.7 ± 10.7 and 54.7 ± 1.4, respectively, and the household size was 4.1 ± 0.8. In terms of employment, the highest frequency was for fathers (45%) as self-employment and 86% of mothers were housewives. In terms of education, 42% of fathers and 45% of mothers were at the level of high school and high school diploma, each of which with the highest percentage of frequency. Table 1 shows the mean, standard deviation, and achievable score range for the constructs of the developed theory of planned behavior and eating behavior in students. Table 2 shows the results of Pearson's correlation between the constructs of the developed theory of planned behavior, indicating a direct and significant correlation between all constructs (attitude, subjective norm, perceived behavioral control, behavioral intention, and habit) and eating behavior ($P < 0.001$). Behavioral intention construct showed the highest correlation with eating behavior (r = 0.374). In investigating the predictive power of the developed theory of planned behavior in Table 3, the results of regression analysis showed that the coefficient of determination is 26%. This means that this theory has the ability to predict 26% of eating behavior in students studied by the constructs of behavioral intention, attitude, and habits.

Discussion

The present study aimed to determine the predictive power of the constructs of the developed theory of planned behavior on eating behavior of adolescents. The research findings demonstrated that the developed theory of planned behavior is able to predict 26% of the variance of eating behavior, and this predictive power is related to the constructs of behavioral intention, attitude, and habit. Behavioral intention is the strongest predictor of eating behavior in this study, which is consistent with the results of other similar studies in the field of nutrition.[27,38-41] A meta-analysis by Milne *et al*.[42] indicated that the stronger the association between intention and behavior, the significantly higher the incidence of health-related behaviors.

Attitude is the second predictor of eating behavior in this study, which is in line with the study of Psouni *et al*.[43] on exercise and healthy nutrition and the study

Table 1: Mean, standard deviation, achievable score range for each constructs of the developed theory of planned behavior and eating behavior in students

Variable	Mean±SD	Range of attainable score
Attitude	40±6.21	12–60
Subjective norms	38.9±6.44	13–65
Perceived behavioral control	24.06±6.44	7–35
Behavioral intention	25.47±9.21	6–30
Habits	20.45±1.30	16–80
Behavior	17.98±4.90	7–35

Table 2: Correlations between the constructs of the developed theory of planned behavior

Variable	Attitude	Subjective norms	Perceived behavioral control	Behavioral intention	Habits	Behavior
Attitude	1					
Subjective norms	0/191	1				
Perceived behavioral control	0/276	0/145	1			
Behavioral intention	0/182	0/255	0/302	1		
Habits	0/194	0/134	0/086	0/031	1	
Behavior	0/303	0/194	0/098	0/374	0/242	1

Table 3: Predicting healthy eating behavior based on the developed theory of planned behavior in the studied students

	Model	*B*	Std. Error	Beta	sig
1	(Constant)	0.848	1.842	_	0.645
	Attitude	0.233	0.036	0.294	0.000
	Subjective norms	0.029	0.044	0.038	0.510
	Perceived behavioral control	0.043	0.055	0.048	0.428
	Behavioral intention	0.458	0.027	0.306	0.000
	Habits	0.173	0.168	0.121	0.007

[a]Dependent variable: eating behaviors. R^2=0.26

of Omondi *et al*.[44] on diet prediction and the study of Bagheri *et al*.[45] on explaining healthy eating behavior. Attitude reflects a person's general feeling about whether a subject is desirable or not, and sometimes people's attitudes throughout life and sufficient awareness and knowledge, which is a prerequisite for changing attitudes, lead to the intention to perform the desired behavior in the future.[46] Therefore, the attitude that originates from emotions and internal factors can affect a person's eating behavior by increasing his information and experiences regarding nutrition.

Habits are another predictor of eating behavior in this study, which is consistent with the study of Verhoeven *et al*.[47] on the power of habits in snack consumption and de Vries *et al*.[48] on the role of habits in fruit consumption and study of Toft *et al*.[49] on fruit and vegetable consumption and Canova *et al*.[50] study on fruit and vegetable consumption as a snack. There is ample evidence that habits are one of the strongest and most powerful predictors of eating behavior, and when behavior is normal, people need little information to make decisions and intentions are weak predictors of behavior.[32] The addition of the eating habits construct can increase the predictive ability of the theory of planned behaviour.[51] Also, Ajzan stated that intention does not obviously lead to behavior and there is a gap between intention and behavior that constructs such as past behaviors (eating habits) can fill this gap to some extent.[52] Another study indicated that the relationship between intention and fruit consumption was twice as strong when the habit was at a low level as when it was at a high level.[24]

The social norm and perceived behavioral control in this study did not affect students' eating behavior, which is consistent with the of studies by Gholami *et al*.[46] on fruit and vegetable consumption and Taghipour *et al*.[36] on nutritional behavior. However, it was inconsistent with the results of similar studies on nutrition.[38,45,53-55] Because understanding one's control over behavior is needed to perform that behavior successfully and is an important predictor of behavior. Whenever a person has strong control over the behavior and feels that the behavior is under his control, he will do it. Conversely, if one has strong controlling beliefs about behavioral inhibitors or perceives a low level of control over behavior, he will not engage in that behavior, even with the approval of others.[56] On the other hand, when a person has little information or available resources change, and when new elements such as eating habits are added to the situation, perceived behavioral control may not predict behavior.[52,57] Therefore, adolescents decide to choose foods that feel less personal and environmental barriers, and it seems that the opinion of others in their eating behavior is not so important. The diversity and complexity of health behaviors in different groups and in different situations can lead to the need for planning to use appropriate theories and constructs to achieve success in interventions in health education and health promotion.

Limitation and recommendation

The limitation of this study was the use of self-report. Considering that healthy eating behavior plays a very vital role in the health of adolescents, the use of educational programs and school-based interventions is suggested to improve their healthy eating behavior.

Conclusion

The developed theory of planned behavior showed a high predictive ability in healthy eating behavior in the studied adolescents. Based on the findings of this study, educational interventions based on this theory are suggested, and considering the role of constructs of behavioral intention, attitudes, and eating habits in predictive power, it is essential to emphasize these constructs in interventions to promote healthy eating behavior.

Ethical approval

The proposal of this study was approved by Iran University of Medical science viva ethics code IR.IUMS.REC.1401.080.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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