



Applying the Health Belief Model Constructs to Determine Predictors of Dietary Behavior among High-School Students

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Healthy nutrition during adolescence and adulthood, compared with childhood, is considered important since the basal metabolic rate decreases with age and there is often a reduction of physical activities. Furthermore, educational achievement is dependent on a healthy diet. Therefore, the present study investigated predictors of dietary behavior on the basis of the

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Health Belief Model (HBM) among high-school students in Kermanshah, Iran.

Materials and Methods: This cross-sectional study was both descriptive and analytical. The multistage random sampling method was applied and 500 high-school students (250 male students and 250 female students) were selected. The research tool was a two-part questionnaire, including questions about personal information and a healthy diet. Descriptive and analytical tests were conducted using the SPSS18 software.

Results: The most important predictor of the students' healthy dietary behavior was perceived benefits. Perceived barriers and self-efficacy were not effective predictors. Moreover, there was a positive and significant relationship between healthy-diet patterns and perceived self-efficacy as well as perceived barriers. The mean score of self-efficacy for a healthy diet among the male students was significantly higher than among the female students ($P < 0.001$).

Discussion and Conclusion: The results of the present study indicate that some of the HBM constructs are sufficient for detecting the predictors of dietary behavior. Therefore, other psychosocial models should be considered for changing dietary behavior among students.

Keywords: Nutritional behaviors; students; health belief model.

1. INTRODUCTION

According to published literature, Iranian adolescent population is about 13 million, i.e. over a sixth of the country's total population [1]. Nutrition in adolescence and adulthood, compared with childhood, is very important due to a reduction in the basal metabolic rate (BMR) and physical activities [2]. Moreover, educational achievements of adolescents depend on a healthy diet [3,4]. Additionally, dietary habits are formed in this period [5]. Studies show that, as in lots of other developing countries [6], inappropriate dietary behavior among 6-18 year-old students in Iran is growing so that Iranian adolescents have increasingly developed an interest in snack foods, and hence suffering from poor and improper nutrition [7]. Poor nutrition, high-calorie and high-fat foods, an imbalance between the intake and expenditure of energy, and a change in lifestyles have led to obesity and other chronic diseases [8-10]. Eating nothing for breakfast, taking nourishment from potato chips, cheese puffs, and fast food, consuming a small quantity of milk and dairy products as well as fruit and vegetables, and having low-quality oil are observed in various studies [6,8-9,11-12]. Mirmiran et al. [13] indicated that 74% of Tehrani adolescents need to modify their dietary intake. Constructs and reasons for an unhealthy diet are explored in different studies. The gap between knowledge, attitude, and intention in consuming fruit and vegetables, advertisements for unhealthy foods, encouragement by friends despite healthy-diet programs, low self-efficacy, and inadequate social supports have been introduced as unhealthy dietary factors [8,11,14]. Studies demonstrate that there is no considerable knowledge about a healthy diet in

Iran [13]. In addition, the efficiency of studies based on theories such as the Health Belief Model (HBM) has already been maintained, particularly in preventive health behavior [15]. Core constructs of this theory are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy [16]. In fact, if individuals perceive a negative health outcome to be severe, they perceive themselves to be susceptible to it. Then, they perceive benefits of adopting healthy behavior to be higher than its barriers and therefore adopt healthy behavior [17]. This theory is used to predict healthy behavior. Hence, the present study attempts to design a theory-based study to find factors related to dietary behavior among high-school students in Kermanshah, Iran. As a result, dietary interventions based on effective factors could be made to improve students' dietary regimens in order to have a healthy population in the future.

2. MATERIALS AND METHODS

This cross-sectional descriptive and analytical study examined high-school students in Kermanshah, Iran. The sample of 500 research participants consisted of 250 male students and 250 female students. They were selected using the multistage sampling method. A permit from the Kermanshah Education Office was obtained and then certain schools were visited. Three Education districts in Kermanshah were selected as clusters. First, one boys' high school and one girls' high school were randomly selected from each district. Ultimately, 3 boys' high schools and 3 girls' high schools were included in the study. At first, "The Kermanshah University of Medical Sciences provided ethical approval for the study.

This was followed by written informed consent given by students and their parents”.

The students were in the 15-19 age range. Afterwards, the students were asked to fill out the questionnaire. The inclusion criteria were possessing the ability to answer all questions and following no specific diet for a particular reason. More than 20% of questions in some questionnaires remained unanswered. Therefore, incomplete questionnaires were excluded from the study. A questionnaire comprising 24 questions grouped into two sections was utilized for the data collection. The questionnaire consisted of questions regarding demographic characteristics (such as age, gender, monthly family income, height, and weight to calculate the body mass index of participants) and a healthy diet. There were 9 questions about a healthy diet. The questions were about the daily intake of fruit and vegetables, red and white meat, milk, cereals, and legumes at meals; consumption of breakfast on most days of the week; and abstinence from confections, fast food, soft drinks, and concentrated fruit juices. Answers to them were scored on a four-point Likert scale (0 = never, 1 = sometimes, 2 = most often, and 3 = daily). The lowest and highest scores indicated unhealthy and healthy diets respectively. The formal and content validity of the questionnaire was confirmed. The questionnaire was pre-tested in a pilot study. Its reliability was measured by using the Cronbach’s alpha coefficient (0.702).

The self-efficacy questionnaire included questions concerning the rate of the participants’ self-confidence about the consumption of foods low in fat and salt, even when they were at a party or alone, and the avoidance of consuming sweet junk food high in fat or calories. Answers were scored on a five-point Likert scale, from “I am not sure at all” to “I am totally sure.” Items which were addressed as the perceived barriers to a healthy diet included friends’ and family members’ negative influence, the time-consuming ness of preparing healthy food and its considerable expense, its being unappetizing, and limited access to it. The perceived benefits questionnaire consisted of such options as more health, the prevention of cardiovascular diseases, more attractive appearance, more fitness, and more vitality. Questions related to these constructs were scored on a five-point Likert scale, from “never” to “always”.

Out of a total of 500 students participating in the study, 250 were male students and the others female students. The samples were randomly

selected using attendance sheets, from the 3 different high-school grades (27 students from each field), and from different classrooms (depending on students’ population in each class). According to the equation $n = \frac{(z_1+z_2)2 \times (2s^2)}{d^2}$ and regarding the confidence coefficient and test-power coefficient as 95% and 80% respectively, the number of the samples was 500. The data were analyzed using SPSS¹⁸, and statistical tests. The results showed the non-normal distribution of the variables. Therefore, the analysis was done using the Mann-Whitney test. The Spearman and Pearson correlation coefficients and multiple regression were also used. The criterion for statistical significance was $p < 0.05$.

3. RESULTS

The age range was 15-20 years old (15.6 ± 1.77). The maximum and minimum body mass indices (BMIs) for them were 37.87 ± 3.65 and 14.77 ± 3.65 respectively. There was no difference between the male and female students regarding demographic characteristics as shown in Table 1. The average BMI of the male and female students were (21.97 ± 4.35 and 21.50 ± 4.35 respectively). In general, the results showed that there was a positive and significant correlation between the perceived benefits and healthy-diet patterns among all of the students ($r = 0.243$, $p < 0.001$). Furthermore, a positive and significant relationship was observed between the female students’ perceived self-efficacy and healthy-diet patterns ($r = 0.131$ and $p = 0.04$). this relationship wasn’t strong. In addition, an inverse relationship was noted between the perceived barriers and healthy-diet patterns among the female students; however, the relationship was not significant according to the Pearson correlation test among the male students. Moreover, the Pearson correlation coefficient showed that there was an insignificant relationship between the perceived self-efficacy and healthy-diet patterns. There was no significant difference between the healthy-diet patterns and gender. Furthermore, in the analysis of the HBM constructs, it was revealed that there was no significant difference between the perceived benefits of and perceived barriers to the following of a healthy diet among the two genders. Nevertheless, the perceived self-efficacy for a healthy diet among the male students was significantly higher than among the female students (276 and 221 respectively; $p < 0.001$) (Table 2). The Spearman test showed that, among the HBM constructs, only was there

a significant and positive relationship between the BMI and perceived barriers to a healthy diet among the male students ($r = 0.144$ and $p = 0.023$). A positive and significant relationship was observed between the male students' family income and the perceived self-efficacy for a healthy diet ($r = 0.175$ and $p = 0.006$) (Table 3). A linear multiple regression analysis was used to determine the predictors affecting the students' healthy dietary behavior and the relationship between the score for healthy-diet patterns and the HBM constructs. The results of this test revealed that the most important predictive factor for the healthy-diet patterns was the perceived benefits. The perceived barriers and self-efficacy did not affect the healthy-diet patterns (Table 4). Ultimately, it must be mentioned that, regarding the barriers, the students believed that healthy foods were unappetizing, preparing them was time-consuming, and access to them was limited.

4. DISCUSSION

Health and healthy nutrition are essential to develop a great capacity for education because they affect students' intellectual growth and learning abilities. Various studies have reported that there is a significant relationship between students' dietary conditions and cognitive tests as well as their performance at school [18].

The purpose of the study was to analyze the predictors of dietary behavior on the basis of the HBM constructs among high-school students. The result suggested that the perceived benefits had the most significant effect on dietary behavior. This result is confirmed by other studies [19].

In the present study, among the perceived benefits of a healthy diet were physical fitness for the female students and the prevention of illness for the male students. These results are consistent with those in a study by O'Dea (2003). It was conducted during 38 focus-group sessions

in 34 schools and revealed that physical fitness and sensation (feeling physically good) were among the most important perceived benefits from the perspective of 17-18 year-old students [20].

The results of the current study showed that female students' self-efficacy in dietary behavior was significantly lower than the male students'. The role of self-efficacy as a promoting skill to achievement in a specific behavior such as nutrition has established previously [21].

Although the self-efficacy construct in the present study did not expect healthy dietary behavior, there was no highly significant relationship between self-efficacy and healthy nutrition. The results of a study by Franko [22] are in accord with those in the present study. In fact, the interventions which had been designed for enhancing nutrition self-efficacy led to the improvement of dietary behavior.

Table 1. Demographic characteristic of students

Demographic variable	Mean (SD)	#P value
Age	16.15 ± 1.07	<0.090
Weight	63.05 ± 9.07	<0.05
Height	169.97 ± 7.23	<0.05
BMI (kg/m ²)	21.74 ± 3.65	<0.001
Number(percent)		
Monthly income		
< 143 \$	115 (23)	**P=0.243
144-285 \$	142 (28.4)	
285 \$ <	243 (48.6)	
Age		
15-17 year old	451 (90.2)	**P=0.325
18-20 year old	49 (9.8)	
BMI category		
< 18.5	83 (16.6)	**P=0.092
18.5 – 25	340 (68)	
25 – 30	57 (11.4)	
> 30	20 (4)	

#: differences between female and male students

*: T test

** : chi-square

Table 2. Comparison of the graded mean for healthy diet pattern and the structures of Health Belief Model in the students (male =249, female= 250)

Independent variable	Categories	Mean square	Mann-Whitney test	(p-value)
Healthy diet pattern	Male	256.99	29384	0.278
	Female	243.04		
Perceived benefits for healthy diet	Male	239.37	28267	0.083
	Female	261.63		
Perceived barriers for healthy diet	Male	253.92	30394	0.595
	Female	247.08		
Perceived self-efficacy for healthy diet	Male	276	23931	P<0.001
	Female	221		

Table 3. Relationship between some components of health belief model and demographic variables in female and male students

	Age			BMI			Family income		
	Males	Females	Total	Male	Female	Total	Male	Female	Total
Perceived benefits for healthy diet	R=0.026 P=0.681	R=-0.103 P=0.105	R=-0.054 P=0.230	R=0.015 P=0.816	R=0.040 P=0.528	R=0.019 P=0.679	R=0.020 P=0.747	R=0.134* P=0.034	R=-0.056 P=0.213
Perceived barriers for healthy diet	R=0.182* P=0.004	R=0.040 P=0.529	R=0.117 P=0.009	R=0.144* P=0.023	R=0.012 P=0.845	R=0.089 P=0.047	R=-0.037 P=0.559	R=-0.066 P=0.298	R=-0.052 P=0.244
Perceived self-efficacy for healthy diet	R=-0.148* P=0.020	R=-0.134 P=0.035	R=-0.093 P=0.039	R=0.036 P=0.575	R=0.014 P=0.828	R=0.038 P=0.395	R=0.175* P=0.006	R=0.018 P=0.775	R=0.086 P=0.056

Table 4. Regression analysis for healthy nutrition behavior based on some components of HBM (perceived benefits, barriers and self-efficacy)

Variables	Indicator variables coefficient	β standardized coefficient	Significance level (p-value)
Fixed value	17.27		P<0.001
Perceived benefits	0.238	0.233	P<0.001
Perceived barriers	0.042	0.041	0.349
Perceived self-efficacy	0.001	0.076	0.088

It is essential to design, implement, and evaluate instructional interventions by focusing on females to sharpen their skills for having dietary behavior.

In a study by Hossennejad et al. [23] this relationship was based on bivariate regression and was significant. According to the regression test, the perceived barriers in the current study did not predict healthy nutrition for the students. However, there was a significant relationship between the perceived barriers and healthy nutrition among the females. According to the results in this research, the students thought that healthy foods were unappetizing, preparing them was time-consuming, and access to them was limited. Furthermore, Jennifer et al. [24] in a study on 213 students in Sydney identified and classified the main barriers to a healthy diet. They found various factors as the main barriers, including social factors, convenience, and taste. Additionally, in another study that was done on 203 adolescents, it was shown that a shortage of time, access limitations to healthy foods in schools, and lack of concern for a healthy diet were the predictors of unhealthy nutrition [25]. Presumably, the reason for this difference between females and males is that men do not give any credence to healthy nutrition, as was observed in a study by Rojas [26].

The Pearson correlation coefficient showed a significant and positive relationship between the perceived barriers and age. The barriers to a

healthy diet exert more negative effects on the adoption of a healthy diet as one becomes older. In fact, with age, the perceived barriers were more nutrition. In the present study, there was no significant difference between the healthy-diet patterns and gender. In a study by Yahia [27], in contrast with our result, revealed that females more than males followed healthy nutrition. The difference was probably due to the discrepancy in ages in the two studies. In Yahia's study, the mean of participants' ages was 20. Seemingly, the older females get, the more sensitive about their appearance and how they look they become. The females in the present study were still not as much obsessed with the concept of body image as they would be during their university years. This is due to the social attitude which persists that females should be slender, particularly in their youth.

5. RECOMMENDATIONS

According to the results of this research, in order to influence young students' belief about their healthy nutrition, it is necessary to underscore the benefits of healthy nutrition. In fact, emphasis on usefulness of healthy diet such as being energetic, fitness, and healthy body are advantages that should be particularly considered in the educational curriculum. Furthermore, it is also better to provide suitable patterns to bolster self-confidence in them to

overcome the barriers and, moreover, provide healthy foods in school cafeterias.

One of the limitations in this study was collecting information about dietary behavior via self-reporting. It is therefore recommended that interview methods and proper observations be considered in future studies so as to compare results with the self-reporting technique.

6. CONCLUSION

The results of the present study indicate that some HBM constructs are appropriate predictors for healthy dietary behavior. Hence, it is useful to apply this model and try to increase the perceived benefits and self-efficacy to change students' dietary behavior. Since perceived benefits have a dramatic role in following a healthy diet, the emphasis should be on messages such as physical beauty, physical fitness, and cardiovascular fitness. Apparently, positive messages influence the youth more than cautionary and frightening messages.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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