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Original Article

Predictors of Healthy Nutrition Behaviors among Elderlies of Kalat County based on Health Belief Model

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A B S T R A C T

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Introduction: Rapid changes in lifestyle, especially in nutritional aspects of the elderly, have led to many chronic diseases. Therefore, attention to nutritional needs of the elderly is an essential issue. The purpose of this study was to determine the predictors of healthy nutrition behaviors based on health belief model (HBM) in the elderlies of Kalat city, Razavi Khorasan Province, Iran.

Methods: The cross-sectional study was carried out on 200 elderlies aged 60 years and older who were covered by comprehensive health services centers in the city of Kalat. The participants were selected by multistage random sampling. The data collection tools included a researcher-made questionnaire for measuring HBM constructs regarding healthy nutrition and also a Food Frequency Questionnaire for measuring Healthy nutrition behaviors. Data were analyzed by SPSS software using descriptive statistics, t-test, one-way ANOVA, Pearson correlation coefficient and linear regression.

Results: The mean score of nutritional knowledge of the elderlies was 7.75 ± 2.14 (possible score 0-15) and the mean score of healthy nutrition behaviors was 1.62 ± 1. 23 (possible score 0-5). Healthy nutrition behaviors were significantly correlated with perceived benefits ($r = 0.254$), self-efficacy ($r = 0.244$) and cues to action ($r = 0.334$) ($p < 0.05$). Linear regression showed that cues to action ($\beta = 0.353$), perceived benefits ($\beta = 0.199$) and self-efficacy ($\beta = 0.181$) were significant predictors of healthy nutrition behaviors.

Conclusion: The level of healthy nutrition behaviors in the elderlies is not desirable, and cues to action, perceived benefits and self-efficacy are the most important predictors of these behaviors. Paying attention to these factors helps educators and other health professionals in designing appropriate intervention programs.

Keywords: Health Belief Model, Nutrition, Behavior, Knowledge, Aged

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Introduction

One of the major problems affecting the lifestyle of ageing people is nutritional problems (1). Increase in age causes a marked change in the health and function of the body's organs, including the gastrointestinal tract. These changes include reduced saliva secretion, food intake disorders, esophageal and stomach dislocation delays, and decreased gastrointestinal motility (2). On the other hand, chronic illnesses, frequent hospital admissions, drug use, loneliness, depression, lack of oral health and

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low quality of life, aggravate the nutrition of the elderly and make them more vulnerable to malnutrition and the risk posed by it (3, 4). Meanwhile, nutrition is one of the most important components of maintaining and improving health (5, 6), such that malnutrition has a high relation with mortality rate in the elderly (7). Most elderly people fail to provide a desirable diet, and on the other hand, unhealthy lifestyle-related behaviors are often associated with beliefs, attitudes and motivational factors (8).

Health Belief Model (HBM) is the first theory created exclusively for health-related behaviors (9) and is one of the most effective in health education. HBM shows the relations between health beliefs and health behaviors and is based on the hypothesis that preventive behavior is based on personal beliefs. This model considers the behavior as a function of knowledge and attitude of the individual (10). The HBM is recommended as a conceptual framework for increasing the effect of training programs, including nutrition education (11).

Limited studies have been carried out on the predictors of nutritional behavior based on the HBM in elderly people. In a study aimed to investigate the knowledge, attitude and Practice of the elderly in the city of Ahram by Soleymani et al. showed that 75.7% of the elderly had a poor nutritional knowledge. In terms of daily consumption of bread and cereals, only 51.5% had a desirable consumption and in other food groups the desirable usage level was less than this rate (12). In a study by Al Riyami et al. regarding nutritional knowledge, beliefs and eating habits of the Omani elderly, poor nutritional knowledge was reported and 43% believed that nutritional quality should change with age(13). Tanjani et al. in investigation of the health status of the elderly in Iran, reported 5.5% malnutrition, 41.3% subject to malnutrition and 53.2% normal nutrition status (14). In the study by Shaw et al. aimed at assessing nutritional risk factors in elderly Indian women living in nursing homes, 79% of the elderly women were likely to be malnourished (15). Also Ghorbani et al. in a study on elderly people admitted to the therapeutic centers of Qazvin, reported an adequate nutritional status of 29.8% and malnutrition of 13.8% (16).

Since nutrition plays a prominent role in the quality of life, health and illness of the elderly, and given that there are limited studies in the field of nutrition and awareness of the elderly in Iran, and most studies on the status of nutrition and malnutrition have taken place in specific social environments (nursing home and hospital), the present study aimed to determine the predictive factors of healthy nutrition behaviors in the elderly of Kalat city, Razavi Khorasan Province, Iran , based on HBM.

Methods

Procedure and sampling

The cross- sectional study was conducted on the elderly in Kalat city in 2016. Kalat is located 150 km from Mashhad city, the center of Razavi Khorasan Province, in north- east of Iran. Required sample size was estimated196 people, considering proportion of desirable healthy nutrition behaviors (p = 50%), and 0.7% error estimate. To ensure the adequacy of the sample, 200 participants were included in the study. Multistage random sampling was used to recruit the participants. That way the 6 centers of comprehensive health services in the city has were weighted according to the number of elderly people covered, and was multiplied by the sample size to obtain the proportion of required sample in each center. Then, the participants were selected using a systematic random sampling from the elderly names list. The selected participants were asked to attend the center for interview and completing the questionnaires. If the elderly were not able to come to the comprehensive health center, the questionnaire was completed in their houses.

Instrument

Data collection tool included a researcher designed questionnaire consist of demographic questions (age, gender and education level), constructs of HBM and a Food Frequency Questionnaire.

The HBM's constructs part included 15 questions for measuring knowledge about healthy nutrition, e.g. "Consumption of at least 2 glasses of milk or yoghurt prevents osteoporosis" 2 questions for perceived sensitivity e.g. "consumption of high salt food increase my risk of developing hypertension", 2 questions for perceived severity e.g." nutritional problems will take a long time to be cured", 7 questions for perceived barriers e.g. "Healthy foods are expensive for me", 7 questions for perceived benefits e.g. "adequate consumption of dairy will prevent me from osteoporosis", 4 questions for self-efficacy e.g. "I think , I am able to consume beans instead of red meat", and 3 questions for cues to action e.g. "have you ever participated any educational programs regarding healthy nutrition ".

Knowledge questionnaire included true/false/don't know items and for scoring, 1 point was assigned to correct answers and 0 to wrong and don't know answers. Possible score range was 0 to 15. To categorize the level of knowledge, scores ranging from 0-5 were considered as poor, 6-10 as moderate, and 11-16 as a good knowledge level.

Other HBM constructs, with the exception of cues to action, the possible answers to items were a 5 point Likert scale from completely disagree (1) to completely agree (5). Possible score ranges in perceived sensitivity and severity scales were 2-10, perceived barriers and benefits were 7-35, and self-efficacy was 4-20. On the cues to action scale, the possible responses were "Yes" which scored 1 and "No", which scored 0, so the possible score range was 0-3.

In Food Frequency Questionnaire, the amount of consumption of each of desired food items on a daily, weekly, monthly and annual basis, and the amount of consumption per time were asked. Nutritional behavior scoring was that after assigning food items

to the appropriate food groups for each of the five main food groups based on the daily serving of the individual according to food frequency questionnaire, the food pattern of the participants intake was divided into two groups with appropriate and inappropriate practice based on minimum servings usage. Accordingly, the group of bread and cereals in the range of 6 to 11 servings per day, the group of meat, grains, eggs and nuts in the range of 2 to 3 servings per day, the group of fruits in the range of 2-4 daily servings, the vegetable group in the daily servings range of 3-5, the dairy group in the range of 2 to 3 servings per day have been defined appropriate and otherwise inappropriate, which score 1 was assigned to appropriate function and 0 to inappropriate function, so possible score range for healthy nutrition behaviors was 0 - 5.

To assess the qualitative content validity of the instruments, the questionnaire was provided to 10 experts in health education and health promotion, nutrition and ageing health disciplines, and minor revisions was conducted according to comments from them. The experts also were asked to answer the questions of content validity ratio and content validity index which was approved according to Lavsheh table. To determine the internal consistency of the scales, Cronbach's alpha coefficient was calculated in a pilot study by 20 participants and all scales received an acceptable coefficient score.

Ethical Considerations

The study was approved by Ethics Committee of Shahid Sadoughi University of Medical Sciences, Yazd, Iran (Code of Ethics: IRSSU.SPH.REC.1396.63). The participation in the study was informed and voluntary, and all participants orally expressed their consent to participate in the study. In addition, participants were convinced of the confidentiality of their information.

Statistical analysis

Collected data were analyzed using SPSS statistical software. To describe the data, the descriptive indices including frequency distribution tables, mean and standard deviation, were used. Student T-test was used to compare the mean score of HBM constructs by gender and one-way analysis of variance to compare them in terms of education level. Pearson correlation coefficient was used to determine the correlation between HBM constructs and linear regression was used to determine predictors of healthy nutrition behaviors.

Results

The mean age of the participants was 70.12 ± 7.4 years in the age range of 60-95 years. Of the participants, 56.5% were female and 60% were illiterate.

The mean score of knowledge was 7.75 ± 2.14 (possible score range 0 – 15) and perceived sensitivity and severity were 8.49 ± 1.41 and 8.05 ± 1.37 respectively (possible score range 2 – 10). Also the mean score of perceived benefits and barriers were 27.5 ± 4.2 and 22.03 ± 5.10 respectively (possible score range 7 – 35) and cues to action was 0.96 ± 1.04 (possible score range 0 – 3), and self-efficacy was 12.16 ± 3.12 (possible score range 4 – 20). The mean score of healthy nutrition behaviors was 1.62 ± 1.23 (possible score range 0 – 5).

Regarding the nutritional status of the participants according to five main groups of foods, 53% (n = 104) in terms of bread and cereals, 34.5% (n = 69) in terms of meat and meat substitutes, 17.5% (n = 35) for fruit group use, 13 %(n = 26) for vegetables use and 22%(n = 44) for dairy consumption, Were evaluated appropriate.

There was not statistically significant difference on HBM constructs and healthy nutrition behavior by gender. Knowledge ($p < 0.001$), perceived benefits ($p = 0.007$), perceived barriers ($p < 0.001$) and self-efficacy ($p = 0.030$) were significantly different by education levels (Table 1).

There was a significant inverse correlation between age and knowledge ($r = -0.207$) ($p < 0.05$). Also a positive significant correlation between age and perceived barriers ($r = 0.269$, $p < 0.001$).

Healthy nutrition behaviors had a positive significant correlation with perceived benefits ($r = 0.254$), self-efficacy ($r = 0.244$) and cues to action ($r = 0.324$) ($p < 0.05$). Also, there was a significant positive correlation between knowledge and perceived sensitivity ($r = 0.239$), perceived severity ($r = 0.233$) and perceived benefits ($r = 0.276$) ($p < 0.05$). (Table 2)

Constructs of HBM including knowledge, perceived sensitivity, severity, benefits, barriers, self-efficacy, and cues to action predicted 20.2% of the variance of healthy nutrition behaviors. In the meantime, cues to action ($\beta = 0.335$), perceived benefits ($\beta = 0.199$) and self-efficacy ($\beta = 0.181$) were statistically significant predictors of healthy nutrition behaviors. (Table 3)

Discussions

The study was aimed to investigate the predictors of healthy nutrition behaviors in the elderly of Kalat city based on HBM. The results revealed that, except daily consumption of bread and cereals, which 52% of participants had a desirable consumption, in other food groups, the amount of consumption was evaluated undesirable which is consistent with the study of Soleymani et al., conducted to determine the knowledge, attitude and practice of the elderly about nutritional behaviors in the city of Ahram in 2013 (12). Although we did not studied the prevalence of malnutrition among the participants, but the high prevalence of malnutrition among this group is not far from expected.

Table 1. Mean and SD distribution of HBM constructs scores by demographic variables

Variable	Variable labels	N (%)	Knowledge		Perceived sensitivity		Perceived severity		Perceived benefits		Perceived barriers		Cues to action		Self- efficacy		Behavior	
			M (SD)	p	M(SD)	p	M(SD)	p	M(SD)	p	M(SD)	p	M(SD)	p	M(SD)	p	M(SD)	p
Gender	Female	113 (56.5)	7.53 (1.97)	0.107	8.48 (1.47)	0.970	8 (1.36)	0.519	27.42 (4.92)	0.677	22.18 (4.77)	0.646	0.93 (1.03)	0.736	11.95 (3.27)	0.299	1.56 (1.24)	0.484
	Male	87 (43.5)	8.03 (2.33)		8.49 (1.35)		8.13 (1.37)		27.71 (7.4)		21.85 (5.52)		0.98 (1.06)		12.42 (3.10)		1.68 (1.21)	
Education level	Illiterate	120 (60)	7.01 (1.74)	0.000	8.37 (1.33)	0.290	8.05 (1.34)	0.345	26.75 (4.92)	0.007	23.01 (4.57)	0.000	1.05 (1.08)	0.158	11.96 (3.19)	0.030	1.70 (1.24)	0.104
	reading and writing	13 (26)	8.38 (1.94)		8.73 (1.42)		8.46 (1.06)		27.65 (5.97)		23.34 (5.68)		1.11 (1.07)		12.30 (3.33)		1.53 (1.27)	
	Guidance	51 (25.5)	9.01 (2.36)		8.56 (1.60)		7.88 (1.55)		29.03 (3.35)		19.60 (4.83)		0.68 (0.90)		13.01 (2.82)		1.39 (1.09)	
	High school diploma	3 (1.5)	10.33 (1.52)		9.66 (0.57)		7.66 (1.52)		33 (1.0)		13 (3.0)		0.66 (1.15)		15 (2.64)		3 (1.73)	
	Total		7.75(2.14)		8.49(1.41)		8.05(1.37)		27.5(4.82)		22.03(5.10)		0.96(1.04)		12.16(3.16)		1.62(1.23)	

Table 2. Correlation Matrix of HBM constructs

	Knowledge	Perceived sensitivity	Perceived severity	Perceived benefits	Perceived barriers	Cues to action	Self-efficacy	Behavior
Knowledge	1							
Perceived sensitivity	0.249**	1						
Perceived severity	0.233**	0.477**	1					
Perceived benefits	0.276**	0.228**	0.156*	1				
Perceived barriers	-0.273**	0.031	0.211**	-0.274**	1			
Cues to action	0.085	0.020	0.135	0.009	-0.061	1		
Self- efficacy	0.083	0.062	0.146*	0.296**	-0.201**	0.047	1	
Behavior	0.073	0.073	0.018	0.255**	-0.066	0.324**	0.224**	1

*P<0.05 **p<0.001

Table3. Regression analysis of HBM constructs as predictors of healthy nutrition behaviors

Variables	Standardized Beta	p	R^2	Dependent variable
Knowledge	0.036	0.614		
Perceived sensitivity	0.003	0.965		
Perceived severity	-0.007	0.929		
Perceived benefits	0.199	0.007	0.202	**Healthy Nutrition Behaviors**
Perceived barriers	0.016	0.833		
Cues to action	0.335	0.000		
Self-efficacy	0.181	0.009		

Nutritional knowledge level of 75.5% of the participants was at moderate level, which was not consistent with the studies of Soleymani et al. (12), and Al Riyami et al. (13), in which nutritional knowledge was poor. The elderlies' participation in the ageing community health education classes in Kalat city which is held by health care authorities may be a reason for their better knowledge in the present study.

There was a statistically significant relationship between mean score of knowledge and education level, as illiterate elderly had lower knowledge level than other groups which is consistent with the study of Soleymani et al. (12). It can be said that a higher level of education leads to more nutritional information. Consequently, given the fact that most elderly people are illiterate or with low level of education, providing educational materials in plain and understandable language seems essential.

There was a statistically significant difference in perceived benefits, barriers and self-efficacy by education level. The mean score of perceived barriers in elderly people with high school diploma education and higher were lower than other groups and the mean score of perceived benefits and self-efficacy in those with high school diploma and higher was higher than that of illiterate individuals and people with reading and writing education level. The higher the level of education, cause the higher level of nutritional knowledge, which makes people more aware of the benefits and barriers of the healthy nutrition and then make them more confident that they are able to do healthy nutrition behaviors. Therefore, in educational interventions, more attention is needed to people with lower education level.

There was no significant difference between mean scores of HBM constructs and also healthy nutrition behaviors by gender which is consistent with the study of Soleymani et al. (12), and it means both gender are the same in terms of healthy nutrition behaviors and it's determinates.

There was a reverse significant correlation between knowledge and age. As age increases, the elderly's knowledge about healthy nutrition decrease which is consistent with that of Soleymani et al. (12). There was also a positive significant correlation between age and perceived barriers which can attributed to physical constraints of more aged participants.

Healthy nutrition behaviors was significantly correlated with perceived benefits, self-efficacy, and cues to action. As the elderlies perceive the benefit of their own behaviors and understand their ability to do this, and on the other hand, if they have a good guide to behave properly, they are more likely to change their nutritional behaviors. Along with the findings of this research, the study of Karimi et al. (17) on the nutritional behaviors of pregnant women in Saveh based on the HBM, showed that there is a positive significant correlation between nutritional behaviors and perceived sensitivity, severity, benefits, and self-efficacy. Bandura considers self-efficacy as a person's judgment about his abilities to perform a particular act and the most important prerequisite for behavior change, and believes that self-efficacy and empowerment of a person can be achieved by establishing the appropriate field for acquiring the skills and knowledge required and achieving success in it. A person with low self-efficacy is less likely to try new health behaviors or behavior change (18).

Finally, HBM constructs could predict 20.2% of the variance of healthy nutrition behaviors. The main predictors of nutritional behaviors were cues to action, perceived benefits and self-efficacy. In Karimi et al. (17) perceived barriers, self-efficacy and perceived benefits were the strongest predictor of nutritional behaviors. Future studies should include strategies for enhancing self-efficacy and perceived benefits for adopting healthy nutrition behaviors. Also, the cues to

action, especially the appropriate training of health care staff, increases the self-efficacy and perception of the benefits of the elderly and thus increases the likelihood of appropriate changing of the nutritional behaviors. The most important cues to action is education programs of health staff regarding healthy eating.

Conclusion

Perceived benefits, self-efficacy, and cues to action are the most important predictors of healthy nutrition behaviors in the elderly and daily consumption of food groups are not desirable in most of food group pyramid. Educational interventions using HBM and emphasizing perceived benefits and self-efficacy is recommended.

Study limitations

The cross-sectional nature of the study, the high percentage of illiterate and low literate people participating in the study, as well as the special cultural context of the city of Kalat (being bordered by Turkmenistan and the existence of different ethnicities of Kurds, Turks and Fars in this city) are of the study limitations which should be considered using the results.

Conflict of interest

The authors declare no potential conflicts of interests.

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Authors' contribution

Designing the study: MAM, FA, FK, SMN
Acquisition of data: FA
Analysis and interpretation of data: MAM, FA, SMN
Drafting the manuscript: MAM, FA
All authors have read, critically reviewed and approved the final manuscript and agreed to be accountable for all aspects of the work.

References

1. Constans T. Malnutrition in the elderly. La Revue du praticien. 2003; 53 (3): 275-9.
2. Nieuwenhuizen WF, Weenen H, Rigby P, Hetherington MM. Older adults and patients in need of nutritional support: review of current treatment options and factors influencing nutritional intake. Clinical Nutrition. 2010; 29(2): 160-9.
3. Appleton KM. Increases in energy, protein and fat intake following the addition of sauce to an older person's meal. Appetite. 2009; 52(1): 161-5.
4. De Marchi RJ, Hugo FN, Hilgert JB, Padilha DMP. Association between oral health status and nutritional status in south Brazilian independent-living older people. Nutrition. 2008; 24(6): 546-53.
5. Smeltzer SC, Bare BG, Hinkle JL, Cheever KH, Townsend MC, Gould B. Brunner and Suddarth's textbook of medicalsurgical nursing. 10th edition. Philadelphia: Lipincott Williams & Wilkins; 2008.
6. Masomy N, Jefroodi S, Ghanbari A, Kazemnejad E, Shojaei F, Rafiei A. Nutritional status assessment and related factors in the retired senile. Journal of Guilan University of Medical Sciences. 2012; 21(84): 65-70.
7. Ulger Z, Halil M, Kalan I, Yavuz BB, Cankurtaran M, Gungor E, et al. Comprehensive assessment of malnutrition risk and related factors in a large group of community-dwelling older adults. Clinical Nutrition. 2010; 29(4): 507-11.
8. Miller LMS, Gibson TN, Applegate EA. Predictors of nutrition information comprehension in adulthood. Patient Education and Counseling. 2010; 80(1): 107-12.
9. Saffari M, Shojaeizade D. Principles and foundations of health promotion and education. 1st ed.Tehran: Samat Publications; 2008. P. 82-175. [Pesian]
10. Shamsi MO, Bayati AK, Mohamadbeygi A, Tajik R. The effect of educational program based on Health Belief Model (HBM) on preventive behavior of self-medication in woman with pregnancy in Arak, Iran. Pejouhandeh. 2010; 14(6): 324-31. [Persian]
11. Sharifirad G, Entezari MH, Kamran A, Azadbakht L. The effectiveness of nutritional education on the knowledge of diabetic patients using the health belief model. Journal of Research in Medical Sciences. 2009; 14(1): 1-6.
12. Soleymani L, Tahmasbi R. Knowledge, attitude and practice declaration of elderly in Ahram city toward nutrition behavior in 2013. Iranian South Medical Journal. 2015; 18(2): 370-82.
13. Al Riyami A, Al Hadabi S, Aty A, Al Kharusi H, Morsi M, Jaju S. Nutrition knowledge, beliefs and dietary habits among elderly people in Nizwa, Oman: implications for policy. Eastern Mediterranean Health Journal. 2010; 16(8): 859-67.
14. Tanjani PT, Motlagh ME, Nazar MM, Najafi F. The health status of the elderly population of Iran in

2012. Archives of Gerontology and Geriatrics. 2015; 60(2): 281-7.
15. Shaw A, Fulton L, Davis C, Hogbin M. Using the food guide pyramid: a resource for nutrition educators. US Department of Agriculture Food, Nutrition, and Consumer Services Center For Nutrition Policy and Promotion, 1996. Available from: http://www. nal. usda. gov/fnic/Fpyr/guide. pdf. 1996. Accessed on 2017 May 10
16. Ghorbani A, Karimzadeh T, Azadmanesh Y. nutritional assessment in elderly hospitalized patients in qazvin teaching hospitals in 2011. Iranian Journal of Ageing. 2013; 8(1): 33-40. [Persian]
17. Karimy M, Taher M, Azarpira H. Measurement of health belief model construct in relation with nutritional practices of pregnant women in Saveh university of medical sciences. Journal of Hamadan Nursing and Midwifery. 2016; 24(3):167-73. [Persian]
18. Zareban I, Karimy M, Niknami S, Haidarnia A, Rakhshani F. The effect of self-care education program on reducing HbA1c levels in patients with type 2 diabetes. Journal of Education and Health Promotion. 2014; 3(1): 123. [Persian].