



Prediction of Self-Efficacy and Behavioral Expectations with Consumption of Fruits and Vegetables in Elderly Patients with Functional Constipation

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ABSTRACT

Aims Elderlies are one of the vulnerable groups in the society that are increasing every day. Senility is associated with disability and many chronic diseases. This study was performed to predict the self-efficacy and behavioral expectations in consumption of fruits and vegetables in elderly patients with functional constipation.

Instrument & Methods This cross-sectional study was performed in the elderly's population who had 60 years old or higher that were members of Isfahan retirement centers in 2013. 163 elderlies were entered to the study by purposeful sampling. Data collection was done by a researcher-made questionnaire. Collected data were analyzed by SPSS 20 statistical software by one-way variance analysis, Pearson correlation coefficient, independent T test and regression.

Findings The mean daily consumption of fruits in elderlies who suffered from functional constipation was 1.61 ± 0.73 units and the mean daily consumption of vegetables was 1.31 ± 0.87 units. There was no significant difference between the amount of consumption of fruits and vegetables between females and males. There was a significant difference between gender and behavioral expectations ($p < 0.001$). The awareness, self-efficacy and behavioral expectations of married people were higher than singles ($p < 0.001$). All 3 constructs of awareness, self-efficacy and behavioral expectations were the predictor of fruits and vegetables consumption.

Conclusion The amount of fruits and vegetables consumption among the elderlies who suffered from constipation is very low.

Keywords Elderly; Fruit; Vegetables; Self Efficacy

CITATION LINKS

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Introduction

Elderlies are one of the vulnerable groups in the society that are increasing every day. In recent years, the growth of more than 60 years old elderlies was higher than the growth of children in Iran, while this increasing in the elderly's population has become a global crisis [1]. According to the worldwide statistics in 2006, the total number of elderlies is nearly 687.923.000 persons, which will be doubled in 2025 and will reach to nearly 2 billion in 2050 [2-4]. Studies show that developing Asian countries are aging much faster than developed countries and this rapid speed leads to many problems in the countries failed to adapt to the consequences of this phenomenon [4, 5]. According to the census in 2011, about 8.3% (more than 6 million) of the 75 million people of Iran were over 60 years old [6] and it is anticipated to reach to 10 million in the next 20 years and to more than 26 million (26% of the total population) in 2050 [2, 3, 5].

Senility is associated with disability and many chronic diseases that are caused by the creation of disorders in body's physiological systems. One of the most common complications in old ages is chronic constipation. Studies have shown that the incidence of constipation peaked in elderlies and it has a prevalence of 8-43% [5]. According to the studies, symptoms of functional constipation have been reported in 10.8% of Asian elderly population [7]. The rate of constipation in elderly population of Iran has been reported 21.3% [8]. Constipation is not naturally associated with the aging process. A review of the literature shows that the elderlies are constipated due to aging, lack of exercise due to disability, poor diet, low fluid intake and dehydration, excessive drug use (more than 5 medications), hypertension, malnutrition and lack of adequate fruit and vegetable consumption [9, 10]. Since the constipation have long-term complications, e.g. hemorrhoids, anal fissures and rectal prolapse, for elderlies and have lots of effects on their quality of life and routine activities and imposes a lot of cost in the aspect of medical treatment, it is considered as an important health issue [9, 11].

To prevent constipation, using fiber-full diets that emphasizes on consumption of fruits and vegetables has an important role. Many

studies show the relationship between enough consumption of fruits and vegetables and decreasing the risk of chronic diseases, e.g. cancers especially gastrointestinal cancer, constipation, obesity, diabetes, decrease of blood pressure, metabolic syndrome, decreasing the risk of heart attack and cardiovascular diseases [12-19]. According to this issue that near 16 million (1.0%) of "disability adjusted of life years" (Daly) and 1.7 million (2.8%) of worldwide deaths have been attributed to the not consuming enough fruits and vegetables [20], it is recommended that elderlies have adequate intake of fruits and vegetables. The World Health Organization has reported the enough amounts of fruits and vegetables at least 400g (equivalent of 5 units) per day [13, 18]. Nevertheless, the consumption of at least 5 units of fruits and vegetables per day, is not accepted as an appropriate strategy for health. Salehi *et al.* have reported the mean daily consumption of fruits and vegetables as 1.76 units [18] and Steptoe *et al.* have shown that adult awareness about consumption of fruits and vegetables is low and this will reduce the consumption of them [21].

The main obstacle in implementing changes in eating habits of elderlies is lack of public awareness about the nutrition. One of the most efficient theories for explaining the nutritional behaviors and prediction of fruits and vegetables usage and nutrition education programs is the cognitive-social theory. Awareness, self-efficacy and behavioral expectations are some constructs of this theory. Self-efficacy construct is the degree of belief of a person to the own ability to perform the desired behavior, favorably. Its use in the training process caused to this process increase from the processes of increasing awareness and knowledge and confidence in performing the desired behaviors is reinforced [22]. According to the studies [23], elderlies who were under training program of promotion of self-efficacy, have better functions and higher satisfaction. The construct of outcome expectations predict the probable outcomes arising from conflicts in desired behavior.

In the fields of consumption of fruits and vegetables in elderlies, whatever behavioral expectations, e.g. improvement of constipation, visual power, longer lifetime etc.,

are, the possibility of adequate consumption of fruits and vegetables will increased. Anderson *et al.* have shown that the expectations of physical outcomes and self-efficacy are the important predictors of nutritional behaviors [24].

According to inadequate consumption of fruits and vegetables in Iran's elderlies and its outcomes, and by considering that low studies were performed for recognition of associated and effective factors in elderlies health, who suffered from functional constipation, this study was performed to predict the self-efficacy and behavioral expectations in consumption of fruits and vegetables in elderly patients with functional constipation.

Instrument & Methods

This cross-sectional study was performed in the elderly's population who had 60 years old or higher that were members of Isfahan retirement centers in 2013. The purposeful sampling was done in two stages. Inclusion criteria were the age of 60 or higher than 60 years old, consent to enter the study and. At the first step, all of elderlies who had 60 years old or higher who have referred to the retirement centers of Isfahan and had functional constipation were asked to fulfill the Rome III questionnaire after being explained for the aims of the study. 163 elderlies were entered to the study at this stage.

Data collection was done in the second stage by a researcher-made questionnaire with 2 parts; First part include demographic data, e.g. age, gender, education level, marital status, economic status (Good: higher than 285\$ income per month; Moderate: 142 to 285\$; Weak: below 142\$), teeth type and the person who lived with. The second part had 8 questions about awareness (the correct answer was given the score 1 and the false answer was given the score 0), 8 questions about self-efficacy (in 5-items Likert spectrum from "I am not assure absolutely" to "I am assure completely" with the scores of 1 to 5) and 8 questions about outcome expectations (in 3-items Likert spectrum from "I agree" with the score 2, "I haven't any idea" with the score 1 and "I have opposite idea" with the score 0). To determine the validity, comments were wanted from 8 experts in health and nutrition training and the necessary changes

was conducted. To calculate the reliability of the questionnaire, test-retest (15 days interval for 25 people) was done and the correlation coefficient was calculated 0.76. In addition, the reliability of this tool was obtained by Cronbach's alpha method as 0.76 for knowledge, 0.9 for self-efficacy and 0.83 for behavioral expectations.

To determine the amount of consumption of fruits and vegetables in under-studied people, the past 24h reminder checklist was used. Finally, under-studied peoples completed the questionnaires by interview. To respect the ethical issues, the questionnaires were completed anonymously and explain the purposes of study and informed consent was achieved.

Collected data were analyzed by SPSS 20 statistical software by one-way variance analysis (for relationship between age, marital status, education, lived with and income and consumption of fruits and vegetables), Pearson correlation coefficient (for relationship between self-efficacy, awareness and behavioral expectations and consumption of fruits and vegetables), independent T test (for relationship between gender and consumption of fruits) and regression.

Findings

The mean age of samples was 70.0 ± 6.5 years (most of them in the age range of 60-86 years). 85 of samples (52.1%) were women, 53.4% was married, 32% had dentures and 31% lived alone.

The mean daily consumption of fruits in elderlies who suffered from functional constipation was 1.61 ± 0.73 units and the mean daily consumption of vegetables was 1.31 ± 0.87 units.

4.3% of the samples used no fruits and 19.6% no vegetables. 44.2% of the samples used lower than 2 units of fruits and 55.8% lower than 2 units of vegetables. 10.4% of the samples used 3 units or more of fruits and 6.1% 3 units or more of vegetables. By increasing the level of monthly income of family and the level of education, the level of fruits and vegetables consumption increased and by increasing the age, the level of fruits and vegetables consumption decreased. There was no significant difference between the amount of consumption of fruits and vegetables between females (1.68 ± 0.75) and

males (1.55±0.69). In addition, the amount of fruits and vegetables consumption in samples who lived with their family was higher than others (Figure 1).

Figure 1) The mean of daily consumption of fruits and vegetables according to demographic variables

Parameters	Number (percent)	Mean of fruits	p Value	Mean of vegetables	p Value
Age					
60-65	43 (26.4)	1.83±0.65	0.007	1.58±0.12	0.001
65-70	58 (35.6)	1.74±0.71		1.48±0.82	
70-75	26 (16.0)	1.50±0.76		1.23±0.81	
75-80	26 (16.0)	1.26±0.66		0.83±0.78	
80-85	9 (5.5)	1.22±0.83		0.66±0.86	
>85	1 (0.6)	1.00±0.01		0.00±0.00	
Gender					
Female	85 (52.1)	1.68±0.75	0.25	1.45±0.90	0.25
Male	78 (47.9)	1.55±0.69		1.15±0.80	
Marital status					
Married	87 (53.4)	1.81±0.63	0.001	1.57±0.74	0.001
Un-married	9 (5.5)	2.00±0.86		1.44±1.01	
Without mate (divorce)	5 (3.1)	1.20±0.44		0.60±0.54	
Without mate (death)	62 (38.0)	1.32±0.74		0.98±0.91	
Education status					
Illiterate	17 (10.4)	1.11±0.60	0.001	0.58±0.61	0.001
Elementary	50 (30.7)	1.28±0.70		0.86±0.80	
Diploma	53 (32.5)	1.77±0.66		1.02±0.77	
Supra-diploma	26 (16.0)	2.03±0.59		1.80±0.63	
Licensed	17 (10.4)	2.00±0.61		1.94±0.74	
Lived with					
Alone	52 (31.9)	1.38±0.77	0.003	1.03±0.92	0.001
With mate	33 (20.2)	1.84±0.71		1.45±0.79	
With mate and children	56 (34.4)	1.78±0.59		1.62±0.72	
With family	22 (13.5)	1.40±0.79		0.95±0.89	
Income					
Weak	47 (28.8)	1.20±0.73	0.001	0.78±0.90	0.001
Moderate	84 (51.5)	1.70±0.72		1.42±0.81	
Good	32 (19.6)	1.90±0.53		1.78±0.55	

There was a significant difference between gender and behavioral expectations (p<0.001) and behavioral expectations was higher in females than males. Although the awareness and self-efficacy of females were higher than males but there was not any significant difference. The awareness, self-efficacy and behavioral expectations of married people were higher than singles (p<0.001). Also, the awareness, self-efficacy and behavioral expectations of the peoples who lived with

their spouse or family were higher than the peoples who lived alone or with their children alone (p<0.001)

Age had significant negative correlations with consumption of fruits (r=-0.37), consumption of vegetables (r=-0.35), awareness (r=-0.45), behavioral expectations (r=-0.51), self-efficacy (r=-0.39), education (r=-0.33) and income (r=-0.33). Positive significant correlations were seen between all other studied variables (Figure 2).

Figure 2) The correlation between the constructs of age, literacy, education level, the amount of fruit consumption and the amount of vegetable consumption (**significant at p<0.05; *significant at p<0.001)

Variables	1	2	3	4	5	6	7
1- Fruit consumption	1						
2- Vegetable consumption	0.72*	1					
3- Awareness	0.71*	0.75*	1				
4- Self-efficacy	0.72*	0.74*	0.73*	1			
5- Behavioural expectations	0.70*	0.74*	0.75*	0.75*	1		
6- Education	0.46*	0.52*	0.65*	0.51*	0.63*	1	
7- Income	0.32*	0.42*	0.46*	0.49*	0.39*	0.48*	1
8- Age	-0.37**	-0.35**	-0.45**	-0.51**	-0.39**	-0.33**	-0.33**

All 3 constructs of awareness, self-efficacy and behavioral expectations were the predictor of fruits and vegetables consumption. Self-efficacy was the best predictor of fruit consumption (32%) and awareness was the best predictor of vegetables consumption (31%). In total, mentioned constructs could explain the 59% and 66% of fruit and vegetable consumption, respectively ($p < 0.001$).

Discussion

The amount of fruits and vegetables consumption in elderlies who suffered from constipation was very low, in a way that 55.8% of under-studied elderlies consumed vegetables less than 2 times per day and 44.2% consumed fruits less than 2 times per day, which are lower than recommended contribution rate. Yang *et al.* have shown that the consumption of fruits and vegetables in Chinese elderlies have increased from 325/7g in 1991 to 379g in 2009, but it is still less than 400g per day that was recommended by WHO [28]. According to Viebig *et al.*, nearly 39% of Brazilian elderlies do not use any fruits and vegetables per day and only 19% of them use the combination of fruits and vegetables in the amount of 5 units per day [29]. Another study in Isfahan City, Iran, has shown the mean consumption of fruits and vegetables in male elderlies (1.3 ± 4.5 units) more than female elderlies (1.3 ± 4.7 units) [30] that in line with the present study shows that the amount of fruits and vegetables consumption among Iranian elderlies is lower than the recommended amounts.

We have found that the amount of fruits and vegetables consumption have a significant statistical relationship with education level and family monthly income, in a way that by increasing the educational level and income, the amount of fruits and vegetables consumption also increased in line with other studies' findings [29-32]. Furthermore, higher educational level led to the higher socioeconomic level.

According to our findings in line with other studies [33], the amount of fruits and vegetables consumption in elderlies who lived with their spouses or family is higher than elderlies who lived alone. In another study, the amount of consumption in married people was reported higher than singles [18].

However, in our study, the amount of fruits and vegetables consumption in married elderlies was higher than elderlies who were unmarried and was higher than widows were. In Riediger *et al.*, a direct relationship was seen between the amount of fruits and vegetables consumption and family income and marital status [31]. The results of our study like other studies [18] showed that by increasing the age of elderlies, their consumption of fruits and vegetables is decreasing that can be due to oral-dental disorders, lonely or low income and the lack of purchasing power that probably, these factors increasing multiplied.

A significant correlation was observed between the mean score of awareness and the amount of consumption of fruits and vegetables in our study. The findings of Lin & Lee also confirmed that by increasing the awareness and nutrition knowledge in elderlies, feeding behaviors improve [34]. In addition, Wolf *et al.* have found a significant relationship between the amount of fruits and vegetables consumption and the awareness score [35]. These studies confirmed the findings of our study and emphasize on training in order to increase the awareness and knowledge of elderlies.

Our study showed no significant relationship between gender and the amount of fruits and vegetables consumption that are aligned with other studies [30-36]. But Riediger *et al.* have reported gender as an important factor in consumption of fruits and vegetables in Canadian elderlies that is not aligned with our study.

The findings of our study showed a significant and positive relationship between self-efficacy and the consumption of fruits and vegetables that is aligned with other studies [37-39]. Gulilaumie *et al.* have also emphasized on relationship between self-efficacy and the amount of fruits and vegetables consumption. Therefore, self-efficacy as a construct of social-cognitive theory is one of the important factors in the consumption of fruits and vegetables, particularly in elderlies. In addition, in Sharifirad *et al.* study, increasing in awareness and self-efficacy of diabetic patients has led to the improvement in nutritional function [41].

In our study, outcome expectations had a significant correlation with the amount of

consumption of fruits and vegetables in elderlies who suffered from constipation. Granner & Evans have perceived that outcome expectations of students have a significant relationship with the amount of consumption of fruits and vegetables [42]. According to Nijimi *et al.* there is a significant relationship between behavioral expectations and weight losing after 7 weeks [43].

In our study, in the line with other studies [43], awareness and behavioral expectations are from the most important predictors for consumption of fruits and vegetables in elderlies who suffered from functional constipation. In Anderson *et al.*, physical behavioral expectations and self-efficacy are the important predictors of nutritional behaviors [24], which are aligned with the findings of our study. Self-efficacy is the most important component predictor of health behavior, so people who have high self-efficacy in specific fields are more manifested on behavior change [44].

The findings of this study cannot be generalized for other groups and populations. In addition, the use of self-report instruments in this study was due to the lack of observation for consumption fruit and vegetables, descriptive form of the study, and lack of following up the effect of the study in future that all of these items are the limitations of this study. Since the constructs of awareness, self-efficacy and behavioral expectations are the predictors of the amount of fruits and vegetables consumption, the need for designing an appropriate educational interventions with emphasized on increase in awareness, self-efficacy and outcome expectations is felt. Since the appropriate nutritional trainings in elderlies who suffered from constipation can cause nutritional diet improvement in the short-time and in long-time improve the constipation in these peoples and be a step towards the elderlies and social health.

Conclusion

The amount of fruits and vegetables consumption among the elderlies who suffered from constipation is very low.

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References

- 1- Heidari M, Shahbazi S. Effect of self-care training program on quality of life of elders. *Iran J Nurs.* 2012;25(75):1-8. [Persian]
- 2- Hekmatpou D, Shamsi M, Zamani M. The effect of healthy lifestyle education programs on promotion of physical activity in elderly of Arak. *Daneshvar.* 2012;19(98):1-11. [Persian]
- 3- Namjoo A, Niknami M, Baghaee Mozhgan Ssm, Atrkar Roshan Z. Survey health behavior of elderly referring to retirement centers in Rasht city in 20. *Holist Nurs Midwifery.* 2010;20(63):40-8. [Persian]
- 4- Sadeghiyan F, Raei M, Hashemi M, Amiri M, Chaman R. Elderly and health problems: A cross sectional study in the Shahroud township. *Iran J Ageing.* 2011;6(20):26-30. [Persian]
- 5- Nanbakhsh F, Mohadesi H, Amirabi A, Hajishfiha M, Brumand F, Bahadori F, et al. The effect of health education on elderly women life quality. *Payavard Salamat.* 2011;5(1):47-57. [Persian]
- 6- Statistical Center of Iran [Internet]. Population and Housing Census in 2011 [cited 2012 July 21]. Available from: <http://www.amar.org.ir/Default.aspx?tabid=1191>.
- 7- Namirah J, Lee ze, Olden kw. Diagnostic approach to chronic constipation in adults. *Am Fam Physician.* 2011;84(3):299-306. [Persian]
- 8- Amy Zapata. Bureau of Family Health, Louisiana Department of Health. 2010. Available from: <http://new.dhh.louisiana.gov/index.cfm/page/546>
- 9- Tramonte S, Brand M, Mulrow C, Amato MG, O'Keefe ME, Ramirez G. The treatment of chronic constipation in adults: A systematic review. *J Gen Intern Med.* 1997;12(1):15-24.
- 10- Rahimi R, Ardekani MRS. Medicinal properties of *Foeniculum vulgare* Mill. in traditional Iranian medicine and modern phytotherapy *Chin J Integr Med.* 2013;19(1):73-9.
- 11- Pourhoseingholi A, Moghimi-Dehkordi B, Pourhoseingholi MA, Kaboli SA, Safaee A, Vahedi M, et al. The relationship between body mass index and constipation: A population-based study in Tehran province. *J Kermanshah Univ Med Sci.* 2012;16(4):317-22.
- 12- Khezeli M, Ramzankhani A, Bakhtiary M. Effect of education on nutritional knowledge and stages of fruit and vegetable consumption in elders based on stages of change model. *J Mazandaran Univ Med Sci.* 2009;22(91):89-101. [Persian]
- 13- Dehdari T, Kharghani Moghadam M, Mansouri T, Saki A. Survey of daily fruit consumption status among

- girl student who are living in dormitories and its predictors based on the theory of planned behavior constructs. *Razi J Med Sci.* 2013;20(106):10-8. [Persian]
- 14- Salehi S. A study of relationship between fruit and vegetable consumption and related factors in hospitalized elderly people in Zahedan Hospitals. *Iran J Ageing.* 2012;6(22):30-6. [Persian]
- 15- Bazzano LA, Li TY, Joshipura KJ, Hu FB. Intake of fruit, vegetables, and fruit juices and risk of diabetes in women. *Diabetes Care.* 2008;31(7):1311-7.
- 16- DiBello JR, Kraft P, McGarvey ST, Goldberg R, Campos H, Baylin A. Comparison of 3 methods for identifying dietary patterns associated with risk of disease. *Am J Epidemiol.* 2008;168(12):1433-43.
- 17- Kimmons J, Gillespie C, Seymour J, Serdula M, Blanck HM. Fruit and vegetable intake among adolescents and adults in the United States: percentage meeting individualized recommendations. *Medscape J Med.* 2009;11(1):26-30.
- 18- Salehi L, Eftekhari Ardebili H, Mohammad K, Taghdisi MH, Shogaei Zadeh M. Some factors affecting consumption of Fruit and vegetable by elderly people in Tehran. *Iran J Ageing.* 2010;4(14):34-44. [Persian]
- 19- Sharkey JR, Johnson CM, Dean WR. Food access and perceptions of the community and household food environment as correlates of fruit and vegetable intake among rural seniors. *BMC geriatrics.* 2010;10:32.
- 20- Lopez AD, Mathers CD, Jamison DT, Murray CJL. Global and regional burden of disease and risk factors, 2001: Systematic analysis of population health data. *Lancet.* 2006;367(9524):1747-57.
- 21- Steptoe A, Perkins-Porras L, McKay C, Rink E, Hilton S, Cappuccio FP. Psychological factors associated with fruit and vegetable intake and with biomarkers in adults from a low-income neighborhood. *Health Psychol.* 2003;22(2):148-55.
- 22- Rafiei M, Rostami A, Tavakoli A, Ghiasi M. Principles of nutritional training and counseling for patients in group training sessions based on behavioral change theory. *Iran J Med Educ.* 2010;10(1):92-100. [Persian]
- 23- Torki Y, Hajikazemi E, Bastani F, Haghani H. General self-efficacy in elderly living in rest-homes. *Iran J Nurs.* 2011;24(73):55-62. [Persian]
- 24- Anderson ES, Winett RA, Wojcik JR. Social-cognitive determinants of nutrition behavior among supermarket food shoppers: A structural equation analysis. *Health Psychol.* 2000;19(5):479-86.
- 25- Thompson VJ, Bachman CM, Baranowski T, Cullen KW. Self-efficacy and norm measures for lunch fruit and vegetable consumption are reliable and valid among fifth grade students. *J Nutr Educ Behav.* 2007;39(1):2-7.
- 26- Chuan Ling AM, Horwath C. Perceived benefits and barriers of increased fruit and vegetable consumption: validation of a decisional balance scale. *J Nutr Educ.* 2001;33(5):257-65.
- 27- Baranowski T, Watson KB, Bachman C, Baranowski JC, Cullen KW, Thompson D, et al. Self-efficacy for fruit, vegetable and water intakes: Expanded and abbreviated scales from item response modeling analyses. *Int J Behav Nutr Phys Act.* 2010;7(1):1-10.
- 28- Yang L, Dan L, Cheng-yuan M, Chao-Ying L, Zhong-Mei W, Li-ping P. Consumption of, and factors influencing consumption of, fruit and vegetables among elderly Chinese people. *Nutrition.* 2012;28(5):504-8.
- 29- Viebig RF, Pastor-Valero M, Scazufca M, Menezes PR. Fruit and vegetable intake among low income elderly in the city of São Paulo, Southeastern Brazil. *Rev Saúde Pública.* 2009;43(5):806-13.
- 30- Sabzghabae AM, Mirmoghtadaee P, Mohammadi M. Fruit and vegetable consumption among community dwelling elderly in an Iranian population. *Int J Prev Med.* 2010;1(2):98-102. [Persian]
- 31- Riediger ND, Shooshtari S, Moghadasian MH. The influence of sociodemographic factors on patterns of fruit and vegetable consumption in Canadian adolescents. *J Am Diet Assoc.* 2007;107(9):1511-8.
- 32- Tsai AC, Liou J-C, Chang M-C. Food patterns that correlate to health and nutrition status in elderly Taiwanese. *Nutr Res.* 2006;26(2):71-6.
- 33- Maruapula S, Chapman-Novakofski K. Health and dietary patterns of the elderly in Botswana. *J Nutr Educ Behav.* 2007;39(6):311-9.
- 34- Lin W, Lee Y-W. Nutrition knowledge, attitudes and dietary restriction behaviour of Taiwanese elderly. *Asia Pac J Clin Nutr.* 2005;14(3):221-9.
- 35- Wolf RL, Lepore SJ, Vandergrift JL, Wetmore-Arkader L, McGinty E, Pietrzak G, et al. Knowledge, barriers, and stage of change as correlates of fruit and vegetable consumption among urban and mostly immigrant black men. *J Am Diet Assoc.* 2008;108(8):1315-22.
- 36- Emanuel AS, McCully SN, Gallagher KM, Updegraff JA. Theory of Planned Behavior explains gender difference in fruit and vegetable consumption. *Appetite.* 2012;59(3):693-7.
- 37- Richert J, Reuter T, Wiedemann AU, Lippke S, Ziegelmann J, Schwarzer R. Differential effects of planning and self-efficacy on fruit and vegetable consumption. *Appetite.* 2010;54(3):611-4.
- 38- Henry H, Reimer K, Smith C, Reicks M. Associations of decisional balance, processes of change, and self-efficacy with stages of change for increased fruit and vegetable intake among low-income, African-American mothers. *J Am Diet Assoc.* 2006;106(6):841-9.
- 39- Keihner AJ, Meigs R, Sugerma S, Backman D, Garbolino T, Mitchell P. The Power Play! Campaign's School Idea & Resource Kits improve determinants of fruit and vegetable intake and physical activity among fourth- and fifth-grade children. *J Nutr Educ Behav.* 2011;43(4):122-9.
- 40- Guillaumie L, Godin G, Manderscheid J-C, Spitz E, Muller L. Self-efficacy and implementation intentions-based interventions on fruit and vegetable intake among adults: Impact at 12-month follow-up. *Global Health Promot.* 2013;20(Suppl 2):83-7.
- 41- Sharifirad Gh, Entezari MH, Kamran A, Azadbakht L. The effectiveness of nutrition education for patients with type 2 diabetes: the health belief model. *Iran J Diabetes Lipid Disord.* 2009;7(4):379-86. [Persian]
- 42- Granner ML, Evans AE. Measurement properties of psychosocial and environmental measures associated with fruit and vegetable intake among middle school adolescents. *J Nutr Educ Behav.* 2012;44(1):2-11.
- 43- Najimi A, Ghaffari M, Alidousti M. Social cognitive correlates of fruit and vegetables consumption among students: a cross-sectional research. *Pajoohandeh.* 2012;17(2):81-6. [Persian]
- 44- Aghamolaei T, Darsareh F, Ghanbarnejad A. Relation between decisional balance and self-efficacy with stages of change for fruits and vegetables consumption among high school students in Bandar Abbas. *J Prev Med.* 2015;2(1):36-46. [Persian]