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Original Article (Pages: 4889-4898)

Association between Social Cognitive Theory Constructs and Fruit and Vegetable's Consumption in Adolescent Girls

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Abstract

Background: Unfortunately just a few numbers of children and adolescents use sufficient amounts of fruit and vegtableless. This study aimed to investigate the Association between social cognitive theory constructs and fruit and vegetables consumption in adolescent girls.

Materials and Methods: This is a descriptive analytic study conducted on 308 high school girls (first grade) who were selected by cluster sampling method in Shahrekord, Chaharmahal and Bakhtiari province, Iran. A researcher made questionnaire was used to collect the needed data like demographic variables, substructures of perceived self-efficacy, outcome expectations and outcome evaluation. In order to investigate the fruit and vegetables consumption status, the standard questionnaire of Food Frequency Questionnaire (FFQ) was used. The data were analyzed using SPSS 18.0 software.

Results: The mean scores of outcome expectation, outcome evaluation and perceived self-efficacy were 35.52±16.26, 34.60±20.21 and 32.55±19.81, respectively of the total score of 100. The mean scores of fruit and vegetables consumption and vegetables consumption were reported as 1.45±0.68 and 1.47±0.95, respectively, as well. There was a direct significant correlation between adolescents' perceived self-efficacy and outcome expectations (P = 0.034, r = 0.040). A direct significant correlation was also observed between fruit consumption and both outcome evaluation (P = 0. 033, r = 0.012), and perceived self-efficacy (P = 0.051, r =0.064).

Conclusion: Regarding the status of fruit and vegetables consumption and the mean scores of social cognitive theory constructs and relationship between them and also the importance of promoting healthy diet in the critical period of adolescence, it seems necessary to use efficient patterns and theories of health education and promotion has been considered.

Key Words: Adolescents, Fruit, Social cognitive theory, Vegetables.

*Please cite this article as: Ramezankhani A, Tavasso E, Babaei Heydarabadi A, Gharlipour Z, Motlagh Z, Alidosti M. Association between Social Cognitive Theory Constructs and Fruit and Vegetable's Consumption in Adolescent Girls. Int J Pediatr 2017; 5(5): 4889-98. DOI: **10.22038/ijp.2017.22222.1858**

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Received date: Feb.11, 2017; Accepted date: Mar. 22, 2017

1- INTRODUCTION

Consumption of the sufficient amounts of fruit and vegetables is a part of the recommended diet. Since fruit and vegetables have some protective compounds like potassium, folate, vitamins, fiber and other phenolic compounds, their consumption leads to reduction in chronic diseases (1). In terms of calorie and micronutrients fruits and vegetables have low density and are considered as critical parts of a healthy diet. It is recommended for children to consume 4-5 units of fruit and vegetables according to age and gender (2).

Unfortunately, a few of American children in the United States follow the recommendations in fruit and vegetables consumption (3). In Lock et al.'s study on low consumption of fruit and vegetables in 14 geographic areas of the world in 2005, the total global number of deaths due to insufficient consumption of fruit and vegetables was estimated to be more than 2.635 million deaths per year. Results of this study showed that by 600 grams increase in consumption of fruit and vegetables the global burden of all diseases may decrease by 18%, while the burden of ischemic heart diseases and brain stroke may decrease by 31% and 19% respectively. With increase in consumption of fruit and vegetables, cancers of stomach, digestive system, lung and colorectal may decrease by 19%, 20%, 12% and 2%, respectively (4).

According to the World Health Organization (WHO), with consumption of sufficient fruit and vegetables, more than 2.7 million people may be saved from death, worldwide (5). In a study on the burden of diseases in Australia, it was shown that about 11% of all cancers that cause 300 deaths are due to insufficient consumption of fruit and vegetables. According to this study, consumption of insufficient amounts of fruit and vegetables in this country is responsible for about 3% of the overall burden of disease (6). Hazavehei et al. (7) reported in their study, the average consumption of fruit and vegetables in teenagers 3 units that is a small amount. Since fiber decreases the hunger and increases the satiety, its consumption reduces the calorie intake (8). Fiber intake which is abundant in fruits and vegetables leads to weight loosing. Probably, a diet full of fruit and vegetables is healthier than one with fewer amounts of them. Unhealthy diets include a lot of saturated fats, salt and purified carbohydrates and less fruit and vegetables (9). According to the reports from WHO and Food and Agriculture Organization (FAO) on diet and chronic diseases prevention, it is recommended to take at least 400 grams of fruit and vegetables every day to prevent chronic diseases like obesity, heard diseases, cancers and diabetes (10).

American Cancer Association and American Heart Association also have some recommendations on fruit and vegetables consumption. In 2006 American Cancer Association recommended adult people to eat 5 units or more of various fruits and vegetables every day (11). In 2007 American Heart Association also recommended adults to consume 4 to 5 units of fruit and 4 to 5 units of vegetables every day (12). In addition, the diet guideline for Americans show that adults should consume at least 2 units of fruit and 3 units of vegetables every day (13). Many factors contributing to fruit and vegetables consumption. One of the main predictors of proper consumption of fruit and vegetables in children and adolescents is perceived self-efficiency (13), and it has an effective role in improvement of their consumption (14).

Outcome expectations and outcome evaluation also are strong predictors of increase in fruit and vegetables consumption (15). Outcome expectation is defined as prediction of the probable

outcomes of the involvement in the desired behavior (16) and outcome evaluation is a value that one put for the outcomes of the desired behavior. The higher the values are, the more probable to get involved with the desired behavior (17). Social cognitive theory emphasizes that individual and environmental characteristics affect behaviors. This theory believes in the bilateral oppositions of individual, behavior and environment. Therefore, consumption of fruit and vegetables in children and adolescents depends on personal characteristics and external factors (18). This study aimed to investigate the association between fruit and vegetables consumption and perceived self-efficiency, outcome expectations and outcome evaluation in adolescent girls in Shahrekord city, Chaharmahal and Bakhtiari province, Iran.

2- MATERIALS AND METHODS

2-1. Study design and population

This is a descriptive-analytical study conducted on 308 high school student girls in Shahrekord city, Chaharmahal and Bakhtiari province, North West of Iran during 2013-2014 (the study lasted 5 months). These students were selected by cluster sampling. At the beginning, we obtained the approval from the education department of Chaharmahal and Bakhtiari province to perform study in 2 districts of Shahrekord city.

Then a list of all first grade high schools for girls was provided. Among high schools, 8 governmental ones were selected randomly. By using the attendance list (giving a code to each student), a number of students were selected randomly to participate in this study.

2-2. Inclusion criteria

The inclusion criteria were as follows: being Iranian girl students of the first grade high school studying in governmental high schools in Shahrekord city, having informed consent to voluntary participate in all levels of the study.

2-3. Exclusion criteria

The exclusion criteria were as follows: lack of desire to cooperate in any level of the study, absence or moving to another school.

2-4. Ethical considerations

After getting the official confirmation letter from Shahid Beheshti University of Medical Sciences (ID number: 8992.4), was presented the confirmation letter to the education department of Chaharmahal and Bakhtiari province and obtaining the confirmation letter to offer to education departments of area 1 and 2 of Shahrekord city and selection of schools, then go to the schools and obtaining consent from teacher and managers, and was presented comprehensive explanations to the participants about objectives of the study and getting their written consent to voluntary participation in the study and assurances were given to girls about confidentiality of the collected information.

2-5. Measuring tools: validity and reliability

A researcher made questionnaire including 5 parts was used in this study. The first part of the questionnaire included demographic variables (students' age and parents' age, parents 'job and parents 'education level). The second part included perceived self-efficiency measurement questions (3 questions). The third part included questions to assess outcome expectations (5 questions), and the forth one includes questions about outcome evaluation (6 questions).

Outcome expectations are the beliefs that carrying out a specific behavior will lead to a given outcome, in the other words to learn a particular behavior, people must

understand what the potential outcome is if they repeat that behavior. The observer does not expect the actual rewards or punishments incurred by the model, but anticipates similar outcomes when imitating the behavior (19). Outcome evaluation is a value that one put for the outcomes of the desired behavior. The higher the values are, the more probable to get involved with the desired behavior (17). The expectations scale assessed beliefs about the fruit and vegetables intake and cognitive benefits of healthy eating (19).

In order to investigate the status of fruit and vegetables consumption, the standard questionnaire of Food Frequency Questionnaire (FFQ) was used (20). This questionnaire includes questions about consumption of 17 types of vegetables and 27 types of fruits. The adolescent girls were asked to write down the frequency of consuming any of those fruits and vegetables according to the units mentioned in to the form (it was explained to girls how to measure the consumed fruit and vegetables in units for example one unit equals to an average orange or 2 to 4 fresh figs or a glass of shredded lettuce and so on). The frequency of fruit and vegetables consumption in a day, week and month was asked from participants. Then the amounts and frequencies were changed in to the consumption in a day and therefore the amount of fruit and vegetables consumed by each adolescent was calculated in unit form.

The answers to perceived self-efficiency, outcome expectations and outcome evaluation was measured in Likert scale (completely disagree, disagree, no idea, agree and completely agree). Therefore the "completely agree" was scored 4, "agree" 3, "no idea" 2, "disagree" 1 and "completely disagree" scored zero. On completion of the questionnaires the scores of knowledge and skill substructures were calculated based on 100.

In order to assess the face validity of the questionnaire, a list of all items was provided to a group of 30 high school girls with the similar demographic, economic and social characteristics to the target population. The purpose of this level, was to determine the index of the item effect score in samples similar to the target group. So, in front of each item, 5 choices including "completely important, important, moderately important, a little important and completely non-important" was offered and a sore from 1 to 5 was given to each choice.

In order to calculate the index of effect score, some items that their scores were more than 1.5 were selected as suitable items and kept for the next levels. At this level, items were assessed from the perspective of the target group in terms of difficulty (in understanding the words and phrases), irrelevancy (of phrases with questionnaire subscales) and ambiguous (the probability of misunderstanding the phrases). The students' comments were used to improve the questionnaire. In order to assess the content validity of the questionnaire, 5 experts in field of health education and promotion and 4 experts in nutrition were asked to comment if the questionnaire includes relevant phrases to measure subscales.

The internal consistency method was used to assess the reliability of the questionnaire. The calculated Cronbach's alphas for outcome expectation, outcome evaluation and perceived self-efficacy were $\alpha= 0.71$, $\alpha= 0.76$ and $\alpha= 0.69$, respectively.

2-6. Data analysis

The collected data was analyzed using SPSS software version 18.0 with descriptive and analytical tests. Kolmogorov - Smirnov test was used to test the normality of data distribution. One way analysis of variances (to investigate the association between demographic

variables like parents' job and education level and studied subscales), and Pearson correlation (to investigate the association between outcome expectations, outcome evaluation and perceived self-efficacy and the behavior of fruit and vegetable's consumption) were used to data analysis.

3- RESULTS

The mean age of the participants was 13.86 ± 1.3 years old. The average scores for outcome expectations, outcome evaluation and perceived self-efficacy were 35.52 ± 16.26, 34.60 ± 20.21 and 32.55 ± 19.81 out of 100, respectively (**Table.1**). The mean scores of fruit and vegetables consumption and vegetables consumption were 1.45 ± 0.68 and 1.47 ± 0.95, respectively which was very low in comparison with standards.

As it is shown in **Table.2**, there is a statistically significant association between father and mother's education level and outcome expectations (P=0.05). In contrast, adolescent girls whose parents' education level was above high school diploma, had higher scores in outcome expectations. There was also a significant association between mother's age and outcome evaluation (P= 0.002) such that girls whose mothers were less than 30 years old, had higher scores in outcome evaluation part.

There was a significant association between father's education level (P=0.001) and mother's education level (P= 0.048) and outcome evaluation score such that students whose parents' education level was academic, got higher scores in outcome evaluation subscale. There was a significant association between mother's age and perceived self-efficacy subscale (P=0.038). Therefore girls, whose mothers' age was less than 30 years old, had better confidence in doing correct behaviors in fruit and vegetables consumption. In addition, there was a significant association between father's education level (P= 0.000) and job (P=0.020) and perceived self-efficacy score such that students whose fathers' education level was above high school diploma and their fathers' job was employee, reported higher self-efficacy.

The association between adolescents' perceived self-efficacy and outcome expectations was direct and significant (r=0.040 and P=0.034). In contrast, girls who expected more positive outcomes about fruit and vegetables consumption like health promotion and being fresh and energetic, were more confident that they can properly consume fruit and vegetables.

A direct and significant association was observed between fruit consumption and outcome evaluation (r=0.012 and P=0.033). Such that students who considered more value for their own health or being fresh and energetic were important for them, reported a higher daily consumption of fruits. There was also a significant direct association between daily consumption of fruits and perceived self-efficacy (r=0.064 and P=0.001). such that girls who had higher perceived self-efficacy or in other words a higher confidence, reported higher daily consumption of fruits (**Table.3**).

Table-1: The mean and standard deviation (SD) of social cognitive theory constructs scores in girl students about fruit and vegetables consumption

Constructs	Mean ± SD
Outcome expectations (a total of 100 scores)	35.52±16.26
Outcome evaluation (a total of 100 scores)	34.60±20.21
Perceived self-efficacy (a total of 100 scores)	32.55±19.81

Table-2: The association between outcome expectations, outcome evaluation and perceived self-efficacy in adolescent girls

Variables	Outcome expectations	Outcome evaluation	Perceived self-efficacy
Father's age	0.789	0.109	0.200
Mother's age	0.111	0.002*	0.038*
Father's education level	0.05*	0.001*	0.000*
Mother's education level	0.05*	0.048*	0.401
Father's job	0.121	0.409	0.020*
Mother's job	0.878	0.677	0.174

*The significance level P<0.05.

Table-3: The association between fruit and vegetables consumption and social cognitive theory constructs in adolescent girls

Variables	Outcome expectations	Outcome evaluation	Perceived self-efficacy	Fruit consumption status	Vegetables consumption status
Outcome expectations					
Outcome evaluation	p = 0.071 r = 0.022				
Perceived self-efficacy	*p = 0.034 r = 0.040	p = 0.699 r = -0.029			
Fruit consumption status	p = 0. 232 r = -0.068	p = 0. 033* r = 0.012	p = 0.001* r = 0.064		
Vegetables consumption status	p = 0. 159 r = 0.080	p = 0. 087 r = 0.098	p = 0. 861 r = 0.170	p = 0.075 r = 0.102	

*The significance level P<0.05

4- DISCUSSION

This study was conducted on 308 girl high school students aimed to investigate the association between fruit and vegetables consumption and perceived self-efficiency, outcome expectations and outcome evaluation in adolescent girls in Shahrekord city, Chaharmahal and Bakhtiari province-Iran during 2013-2014. A significant association was observed between parents' education level and outcome expectations such that adolescent girls, whose parents' education level was more than high school diploma, got higher scores in outcome expectations part. It is obvious that adolescents, whose parents' education level was higher, have more information about benefits and positive outcomes of fruit and vegetables consumption and they believe that their consumption leads to health, normal weight and freshness. There was a significant association between mother's age and outcome evaluation as well. Therefore girls whose mothers' age was less than 30 years old obtained higher scores in outcome evaluation part. This result may be due to patience of younger mothers in explaining more about benefits of fruit and vegetables consumption for their daughters and let them believe that health is an important issue. Having a balanced weight, more energy and being fresh and vivid are important issues for them. There was also a significant

association between parents' education level and outcome evaluation score. In contrast, students whose parents' education level was academic had higher scores in outcome evaluation substructure. It is obvious that when parents have more scientific information, they can positively affect their daughters and show the value of being healthy, energetic and fresh to them and let them believe that fruit and vegetables consumption affects these items. A direct and significant association was observed between perceived self-efficacy and outcome expectations in adolescents. Girls who expected more positive outcomes about fruit and vegetables consumption like being healthy, fresh and energetic, have more confidence that they can competently consume fruit and vegetables.

Outcome expectations are defined as prediction of the probable outcome of involvement in the desired behavior. Three outcomes is determined including: *1.* Physical outcomes which include positive and negative consequences of the behavior that in this study are health, natural weight and a fit body. *2.* Outcomes caused by social approve or disapprove of the behavior like having more friends and *3.* Positive and negative self-evaluation such as being vivid and energetic (16).

Outcome expectation is one of the predictable aspects of the behavior. There was a significant direct association between outcome evaluation and fruit and vegetables consumption. In contrast, students who considered more importance for their health or being fresh and energetic was more important for them, reported higher daily consumption of fruits. The higher these values are, the probability of getting involved with that behavior is more (17). So students, who considered higher values to the positive outcomes of fruit and vegetables consumption, had more daily consumption. There was a significant direct association between daily consumption of fruits and perceived self-efficacy as well. In contrast, girls who had higher perceived self-efficacy or in other words were more confident reported higher fruit consumptions per day. Perceived self-efficacy also is a very important and effective factor in behaviors preventing obesity. In childhood and adolescence the growth is very fast. Therefore, it is better to start preventing obesity from childhood, so that we can adjust the periodic changes of growth and metabolism according to the needs of body. Obesity in adulthood is one of the main complications related to obesity in childhood and adolescence. Most of the current obese children will be future obese adults (21).

Some of the causes of obesity in this era are hereditary factors, life style, fast food and junk food consumption and eating high fat foods (22). As it was mentioned before, perceived self-efficacy, outcome expectations and outcome evaluation are some of the main factors that may affect fruit and vegetables consumption. Sharma et al., conducted a study on 159 students in Cincinnati, Ohio- USA to investigate four strategies to prevent obesity including fruit and vegetables consumption, regular physical activity, water consumption and restriction of television watching. Results of that study showed that perceived self-efficacy is one of the main factor in this regard (23).

Results of the current study show that the mean scores of outcome expectations, outcome evaluation and perceived self-efficacy were 35.52 ± 16.26, 34.60 ± 20.21 and 32.55 ± 19.81, respectively which is very low. In illustration of the importance of the perceived self-efficacy, it should be mentioned that positive perception of the learners about their own abilities in doing their duties affects their stimulation. Because of this feeling of efficacy and competency, they do their bests and put

more time to do the desired behavior and use proper strategies to solve the problem. Results of a study conducted by Neumark-Sztainer et al. in 2009 on students in St. Paul's state of America showed that at the beginning of the study the mean perceived self-efficacy was low (24), and in 2009, another study was conducted on 58 people in Ohio-USA by Branscum and Kaye to promote obesity preventing behaviors by using Social Cognitive Theory. Results of that study indicated that before educational interventions, the mean score of perceived self-efficacy and outcome evaluation had been low (25).

Abbasian et al., conducted a study with the title of "Effect of a School-based intervention based on social cognitive theory on fruit and vegetables consumption in Middle school students in Tehran", this research was a school based experimental field trial which was conducted on 10 to 13 years old students. Results of that study showed that at the beginning of the study, the mean score of perceived self-efficacy and other substructures had been low (26).

In Hashemi et al.'s study with the title of "Effect of a family-based intervention based on social–cognitive theory on fruit and vegetables intake of Middle school female students in a district of Tehran", it was found that at the beginning of the study, the mean scores for all of the substructures of the theory had been low (27). Results of the current study showed that the mean score of fruit and vegetables consumption were 1.45 ± 0.68 and 1.47 ± 0.95, respectively that in comparison with standards was low. Results of the studies conducted by Hashemi et al. (27), Abbasian et al. (26), and Branscum and Kaye (25), are consistent with this finding.

A three years study with the title of "Exposure to comprehensive school intervention increases vegetables consumption", was conducted by Wang at al. on 327 students in 2010. Results of that study showed that vegetables consumption was low (28). Regarding the importance of fruit and vegetables consumption as an important behavior in life style to prevent overweight and obesity and its significant role in health, it is very important to improve it. In the field of health issues, whenever we talk about making a change in human behaviors, we have to refer to health education. In case of obesity, some people think that it is a part of the problems related to getting old and it is normal, while it is threatening the active life of many people.

At the moment, the life expectancy is increasing and as life gets longer, it is expected that some of the diseases such as obesity also increase. Therefore, education may prevent diseases and their related complications and inabilities and also their related costs and economic burden, since adolescence is an important period in terms of establishing healthy nutritional behaviors (29), although healthy nutritional behaviors are weaker compared to other age groups (30), promotion of healthy diet especially fruit and vegetables consumption among them may have many considerable long term benefits.

4-1. Limitations of the study

The limitations of current study comprise its use of self-report questionnaires and study, surveyed only high schools girls in government schools in Shahrekord city, Iran.

5- CONCLUSION

The mean scores of outcome expectations, outcome evaluation and perceived self-efficacy for adolescent girls were 35.52 ± 16.26, 34.60 ± 20.21 and 32.55 ± 19.81 respectively (these scores were lower than the standards). The mean scores of fruit and vegetables consumption and vegetables consumption were 1.45 ± 0.68 and 1.47 ± 0.95, respectively which were lower than standards as well.

A significant direct association was observed between perceived self-efficacy and outcome expectations and also between fruit consumption and both outcome evaluation and perceived self-efficacy. In order to increase adolescents' ability in doing behaviors related to a healthy life style and let them believe that it is possible to see positive outcomes and understand the value of these outcomes, theories of health education and promotion that emphasize on the roles of individuals, families and the environment should be used.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGMENTS

This article is derived from a research proposal which was approved in Shahid Beheshti University of Medical Sciences with the reference number of 8992/4. Authors of this article would like to thank all of the authorities and students who cooperated in this study.

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