

The effect of education on the improvement of fruits and vegetables consumption aiming to preventing colorectal cancer

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ABSTRACT

Aim: This study was performed to determine the effect of health education on the improvement of intake of fruits and vegetables aiming at preventing colorectal cancer among high school girls in the city of Shahr-e-kord.

Background: Colorectal cancer is one of the most important and most common cancers and the second leading cause of cancer death worldwide. Every year, nearly one million new cases of colorectal cancer are recognized around the world and nearly half of them lose their lives due to the disease.

Patients and methods: 130 students were randomly divided to two groups, which experimental (65) and controls (65) were chosen from the city of Shahr-e-kord for this experimental study. The instruments for data collecting were self-made questionnaire health belief model based and food frequency questionnaire. The HBM FFQ questionnaires were completed before, immediately and two months after education by participants. After pre-test, 5 educational session classes in experimental group were performed. Finally, data collected and analyzed by SPSS16 computer software (T-test, T-Paired, repeated measure ANOVA).

Results: Findings of the study showed that before the intervention there was no significant differences between the scores of different structures of HBM model in two groups ($P>0.05$), after the intervention there was significant differences between experimental and control groups in the levels of knowledge, structures of HBM model and performance for preventing colorectal cancer ($p<0.001$).

Conclusion: Performing educational programs based on health belief model increases the knowledge and improves the attitudes and practices of students regarding prevention of the colorectal cancer.

Keywords: Colorectal cancer, Health belief model, Intake of fruits and vegetables.

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Introduction

Nowadays, cancer is one of the most common causes of death, which affects individuals' quality

of life in the world (1, 2). According to WHO reports, about 7.6 million people have died of cancer in 2008 and approximately 12 million deaths will occur worldwide in 2030 (3). In addition, reports of the Iran national death registry

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showed that cancer is the second cause of non-accidental death in our country (4, 5).

Colorectal cancer (CRC) is one of the most important and prevalent cancers, which is considered as a second cause of death of humans worldwide due to cancer (6, 7). Since, around one million new cases of this cancer are recognized annually and approximately half of them lose their lives due to this disease (8). This disease, after lung cancer, is also recognized as the second most common cancer across The United States of America (9).

According to reports, the incidence of CRC in Iran has undergone a rising trend during the last 25 years, but the available information shows that this disease affects the younger population of Iran, compared with western countries (10), the shocking statistics of prevalence and deaths due to CRC shows how important it is to prevent this cancer (11). A study in the U.S. reviewed the effect of parental behavioral intervention on children nutritional habits as increased vegetable and fruit intake and decreased fat and sugar intake; and eventually increase consumption of fruit and vegetable compared with decreased consumption of fat and sugar was associated with significant reduction in increased percentage of children weight (12).

The necessity of educating individuals about healthy life style associated to colorectal cancer is felt more as first, a clear strategy for preventing cancer. The health belief model (HBM) is presented as the organizing theoretical framework for this research, which is also one of the most widely, used frameworks for trying to understand health behavior (13).

Despite the recommendation to provide education on prevention and training throughout the life span, many programs focus on individuals who are considered being at higher risk for colorectal cancer. The HBM was designed to understand why people at risk to a disease did not contribute in the disease diagnosis program. According to

HBM, a subject is more likely to take a "health action" if he perceives he is at risk; the disease is severe; health action is beneficial; understands limited barriers to the health action and receives a cue to get the health action (14). Therefore, aging students could be worried about their health and believe that they are susceptible to problems, colorectal cancer could have serious consequences, and following healthy recommendations will reduce threats, and believe that the benefits outweigh the costs of not following.

Thus, despite extensive literature on treatment and diagnosis of colorectal cancer, the number of studies of programs geared toward primary or secondary prevention is limited, especially those including younger adult women. This paper describes the results of a study that examines whether the application of the HBM can be used effectively to change the perception of high school girls about their risk for developing colorectal cancer and lead to a change in behavior for prevention of this disease later in life.

Patients and Methods

This is an experimental interventional study. 130 high school students constituted the research population that were randomly divided to two experimental (n=65) and control (n=65) groups. Sampling was multistage, which there was a total of two districts in Shahr-e-kord. District 2 was selected by simple random sampling for the study. Then, the samples were selected from two schools by random sampling.

Data gathering instrument was a 3-part questionnaire; the first part was used to obtain the demographic characteristics of the participants and the second one was a self-made health belief model-based self-made questionnaire that included: knowledge ($\alpha=0.65$), perceived susceptibility ($\alpha=0.88$), perceived severity ($\alpha=0.80$), perceived benefits ($\alpha=0.79$), perceived barriers ($\alpha=0.72$) and

healthy behavior action for colorectal cancer prevention, three parts was FFQ questionnaire. Validity of the questionnaire proved by qualified masters and its reliability was assessed by Cronbach's alpha test.

To ensure the clarity of questionnaire, pilot testing was also performed upon 35 students who were not included in the survey. Then, the questionnaire was modified based on their feedback. After completion of the questionnaire by both groups, the educational program was designed based on pre-test results and structures of health belief model. Educational intervention in experimental group was directly conducted through lecture, collaborative methods combined with questioning and answering, group discussion and brain storming in five sessions (40-60 minutes per each session). HBM constructs (perceived susceptibility, perceived severity, perceived benefits and perceived barriers) were utilized to formulate the strategies for the education. After completion of the questionnaire by both groups, the educational program was designed based on the pre-test results. After finishing the education, the questionnaire was filled out by two groups and compared two months later again with the

previous one in terms of findings of two previous stages in order to examine the degree of durability of the given educations.

This was carried out just one time (2 months follow-up) for consumption of fruits and vegetables. The students were informed that all data obtained were used without personal identifiers and were confidential. SPSS 16 software was used to analyze the data executing Repeated Measured ANOVA, Paired and Independent sample t-test (with the level of 95% confidence).

Results

In this study, 130 high school female students from Shahr-e-kord fully cooperated with the researchers. Based on the study results, most of the fathers in the under research units had a high school diploma in terms of the education (50% in the experimental group and 61.1 % in the control group), were self-employed (58.3% in the experimental group and 50 % in the control group), and most of the mothers had high school diploma (52.8% in the experimental group and 66.7 % in the control group) and were housekeepers (80.6 % in the experimental and 88.9 % in the control groups). Table 1 compares the two groups mean scores of knowledge and HBM

Table 1. Comparison of means scorers of the students' knowledge and Perceived Susceptibility, Severity, Barriersand Benefits about colorectal cancer in the 2 groups studied pre, post and follow up intervention.

Health Belief Model (HBM) Components Variables	Experimental group (N=65)			Control group (N=65)			R.M.ANOVA Test Results		
	Pre- test Mean (SD)	Post- test Mean (SD)	Follow up Test Mean (SD)	Pre- test Mean (SD)	Post- test Mean (SD)	Follow up Test Mean (SD)	Pre- test P	Post- test P	Follow up Test P
Knowledge	41.39 (14.47)	82.35 (7.89)	78.02 (9.54)	40.29 (12.10)	47.31 (45.61)	43.54 (16.09)	0.742	0.000*	0.000*
Perceived Susceptibility	38.27 (27.34)	68.28 (16.72)	62.71 (21.29)	40.32 (40.18)	41.22 (30.38)	39.81 (28.16)	0.827	0.000*	0.000*
Perceived Severity	34.19 (22.41)	86.32 (17.54)	81.12 (25.42)	36.31 (20.42)	39.12 (19.81)	34.17 (14.61)	0.348	0.000*	0.000*
Perceived benefits	41.21 (14.18)	90.25 (15.23)	86.36 (20.26)	45.14 (22.51)	52.76 (24.32)	47.37 (23.25)	0.602	0.000*	0.000*
Perceived Barriers	37.81 (27.41)	82.57 (24.31)	79.37 (19.73)	38.23 (17.81)	41.42 (22.32)	37.21 (12.73)	0.712	0.000*	0.000*

*= Repeated Measured ANOVA test result: significant difference between the groups.

Table 2. Comparison of the students' Consumption of fruits and vegetables for colorectal cancer prevention in the Groups studied during pre and follow up intervention.

Health Belief Model (HBM) Components Variables	Experimental group (N=65)	Control group (N=65)	T Test Results
vegetables	Pre- test Mean (SD) Follow up Test Mean(SD)	189.34(123.21) 398.17(67.26)	190.53 (126.17) 200.62(89.31) 0.823 0.000*
T- Paired fruits		0.000* 99.85(72.61)	0.071 100.49(65.21) 0.432
	Pre- test Mean (SD) Follow up Test Mean (SD)	200.48(58.76)	111.35(63.31) 0.000*
T- Paired		0.000*	0.068

*=significant difference between the groups

constructs of perceived susceptibility, perceived severity, perceived barriers, and perceived benefits, in three phases as before intervention, immediately and two months after program. For each of HBM constructs, R.M. ANOVA test indicated that the differences between groups were significant at before, immediately after and two months after intervention ($p < 0.001$). Table 2 shows health behavior (Consumption of fruits and vegetables) of two groups before and two months after the intervention. As it presents, practice before education had no significant difference between groups, but this was significant two months after education.

Discussion

Low fruit and vegetable consumption is one of the top 10 global risk factors for mortality according to the World Health Organization (15). Increased fruit and vegetable consumption can help protect overall health status and reduce both disease risk and burden (16). Fruit and vegetable intake among children is of particular interest due to growing recognition of the importance of nutrition for growth, development and prevention of chronic diseases (16).

Fruits and vegetables contain a wide variety of potential cancer-inhibitory nutrients and other phytochemicals. Substantial evidence has

indicated a biological link between dietary constituents and carcinogenesis (17).

Increasing the consumption of fruit and vegetables is a practical strategy for consumers to optimize their health and to reduce the risk of chronic diseases. Fruit juices and green leafy vegetables were inversely associated with risk for colorectal adenomas. Fruit and vegetable intake has been associated with a decreased risk for colorectal adenomas (18-20).

The most effective colorectal cancer reduction strategies include prevention through health education and health promotion. The results of the present study showed that prior to intervention; all elements of HBM (perceived susceptibility, perceived severity, perceived benefits and perceived barriers) were below average in two groups. After intervention, participants in experimental group had significant improvement for behavior assessed; while students of control group showed a slight change. This supports our hypothesis that a health education program based on HBM can be effective in promoting the adoption of behaviors by girls to prevent colorectal cancer.

Studies have identified several basic educational needs in participants, which increase their knowledge and change their intention to promoting preventive behaviors about colorectal

cancer. Knowledge of individuals about colorectal cancer significantly increased after intervention in experimental group. The findings of this study are consistent with the researches results of Amodeo et al. (13) and results of Khezli and et al. that prove the positive effects of educational program based on the stages of change model on nutrition knowledge and the stages of fruit and vegetable consumption (21).

Other findings of present study indicated that perceived susceptibility, severity, barriers and benefit scores of participants were significantly enhanced after intervention in experimental group. These results are similar and consistent with the findings of similar study conducted by Abood et al. (22). Also Tavassoli et al. in their study indicated there was significant differences observed after the intervention between experimental and control groups in the levels of knowledge, perceived susceptibility, perceived severity, perceived benefits, perceived barriers and performance about consumption of fruits and vegetables (23).

Given the prevalence of colorectal cancer and the associated morbidity and mortality, it is important to increase knowledge of colorectal cancer and encourage adoption of behaviors that help to prevent this condition, as opposed to waiting until the onset of the disease. The results of the study showed educational intervention focused on colorectal cancer prevention are ideally suited to reach these goals of increased knowledge, perceived susceptibility, severity, barriers and benefits and adoption of prevention-oriented behavior. Mean scores on consumption of fruits and vegetables of experiment group was significant before and after intervention ($p < 0.001$). The increase in performance of students in this study is also consistent with the findings in similar studies of Amodeo et al. (13), Abood et al. (22), Kipping et al. (24), Wilson et al. (25), Foster et al. (26), and Wang et al. (27); researches who reported the change and improvement in behavior of girl students. Childhood and adolescence are

critical periods for consumption of fruits and vegetables.

The results of this study showed that applying constructs of the health belief model can be valuable to enhance the effectiveness of an colorectal cancer education program. It is paradoxical that, as health researchers and educators become increasingly aware of the importance of good habits in nutrition in the prevention of a variety of chronic diseases, children and adolescents are adopting lifestyles that act counter to these. With regard to the important role of girls and women in foundation of families and the cost effectiveness of educational programs compared to treatment services (28), utilizing health education theories and models by the experts in schools is highly recommended to promote public health and well-being.

Considering the poor knowledge, attitude and performance of students regarding the fruit and vegetables intake and the positive effect of education on the above mentioned construct, it seems that education as one of the most important influencing factors can supply necessary grounds for increasing the knowledge, attitude and performance of the students and consequently the society. Besides, considering the important role of girls as the future mothers and low cost of preventive activities like nutrient education as compared with the treatment activities, it seems necessary to generalize such educational programs to all other related groups and populations.

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