

## Effect of breast cancer prevention program on the awareness and performance of female high school students

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A – Study Design, B – Data Collection, C – Statistical Analysis, D – Data Interpretation, E – Manuscript Preparation, F – Literature Search, G – Funds Collection

**Summary Background.** Breast cancer (BC) is the most common type of cancer in women and the most common cancer among women in Iran. The lack of awareness and of an early-detection program in this developing country is the main reason for the escalating morbidity and mortality.

**Objectives.** The aim of this study was to assess the impact of a BC prevention program on the awareness and behavior of female high school students in Abadeh, Iran.

**Material and methods.** This study was a quasi-experimental study. The sample consisted of 220 female students who were selected by the multi-stage sampling method and divided into two groups: intervention and control. The required data were collected by a researcher-designed questionnaire and then analyzed by SPSS 17 software using descriptive analytical tests.

**Results.** There was no significant difference in awareness and behavior scores between the two groups before the intervention ( $p > 0.05$ ), but after the intervention the mean scores of those variables in the test group had increased significantly ( $p < 0.05$ ). A Spearman correlation test showed that the correlation between the variables (awareness and behavior) was significant and direct ( $p < 0.001$ ,  $r = 0.340$ ).

**Conclusions.** Given the effect of educational programs on the awareness and behavior of students, the results of this study can be effective in attracting the attention of health officials and making them aware of the importance of providing training programs on BC through educational programs in schools.

**Key words:** breast neoplasms, awareness, students, risk factors.

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## Background

Advances in controlling contagious diseases have led to non-contagious diseases, including cancer, becoming the major challenges of the healthcare system [1]. The increasing incidence of breast cancer (BC) in recent decades and its detrimental effects in the physical, emotional, psychological, social and economic realms have led to the increased focus of specialists and individuals on this issue. In fact, specialists consider BC to be a major health concern of this century [2]. Breast cancer, as the most common malignant disease in women around the world, accounts for 28% of all cancers. The highest and lowest incidence of BC is seen in the United States and Asian countries, respectively. However, the incidence of the disease is rising rapidly in Asia. In fact, it has increased several-fold in some Asian countries in the last few years [3]. The incidence of BC in Iran is about 20 new cases per 100,000 women per year. BC accounts for 10.7% of all cancer cases in Iran and is the most common cancer among Iranian women [4]. Gender (it is more common in women than men), age (there is a higher prevalence in women aged over 40 years and postmenopausal women), genetics,

pregnancy at older ages, menopause after age 55 and a history of other cancers (endometrial and ovarian) are among the risk factors for developing BC [5]. Moreover, due to the increases in life expectancy and the aging of societies, as well as the spread of environmental pollutants and the lack of healthy lifestyles in recent years, we are confronted with an increase in the prevalence of BC and a decrease in the age of BC patients [6].

Nevertheless, this fatal illness is largely preventable. Cancer prevention, especially if it is combined with the prevention of other chronic diseases, is the most economic and effective way to deal with cancer. According to World Health Organization (WHO) statistics, by following a healthy lifestyle, getting proper nutrition and sufficient physical activity and avoiding cancer-related risk factors, 40% of cancer cases can be prevented [7]. Several studies have been conducted in order to determine women's awareness of breast cancer. The findings of these studies have proposed that in order to prevent the disease, better health education should be provided to increase women's awareness about the risk factors in society [8].

Health education is essentially a learning process which aims at promoting good health behaviors. Through health education, by providing information and knowledge, we lead the



individuals towards autonomous decision-making. As a result, they can decide to do what is required in order to continue and maintain a healthy lifestyle that ultimately leads to behavioral change and health promotion [9]. Educating people about the disease is the basis for health education; providing information, changing attitudes and changing behaviors are the main goals of health education. Appropriate education is one of the fundamental and most often emphasized methods of increasing awareness. In many studies, the role of education in raising awareness has been significant [10].

Due to the lack of systematic and well-developed prevention programs for controlling cancer in Iran, there seems to be low awareness of the risk factors and the signs and symptoms of cancer [11, 12]. Various studies have suggested that improving the knowledge and attitude of society towards cancer can have a positive influence in the screening behaviors of people in the community [13]. Therefore, given the high prevalence and the earlier onset of BC developing in our country, improving girls' awareness of BC seems necessary, especially at an early age. The present study aims to investigate the impact of a BC prevention program on the awareness and behavior of female high school students in Abadeh, Iran.

## Material and methods

### Setting

This semi-experimental study was conducted on a population of female students aged 15–18 years at the high schools of Abadeh. The participants were selected by multi-stage sampling and were divided into an intervention group and a control group. The required sample size of 110 subjects in each group was calculated by considering a Type I error of 5% and a precision of 0.05. Two of the high schools in Abadeh were randomly selected to serve as the intervention group. Two other high schools in the vicinity of the intervention schools (due to geographical and socio-cultural coherence) were selected to be the control group. The inclusion criteria were female students aged 15–18 years with no benign or malignant disease of the breasts. Also, any high school students who did not want to continue to cooperate and those who did not participate in training sessions and group discussions after the beginning of the study were excluded.

### Ethical approval

After selecting the eligible participants, the researcher was introduced to them and the objectives of the study were elaborated for the participants. Informed consent was obtained from the subjects and they were assured that their information will remain confidential. It should be noted that the consent form was filled in with the help of the students' parents.

### Data gathering

The data were gathered through a researcher-designed questionnaire, consisting of three parts. The first part of the questionnaire included background information; the second part contained 10 items related to awareness; the third part consisted of 15 items regarding behavior. The validity of the questionnaire's content and appearance was confirmed by health and cancer education professionals. After conducting a preliminary study, in order to determine the reliability and internal consistency of the questionnaire, Cronbach's alpha was calculated and found to be 77%. After introducing and describing the goals of the study and obtaining the consent of the research participants, a pre-test was administered among the stu-

dents in both groups. After identifying the educational needs, the cancer prevention education of the intervention group was performed in the form of two training sessions (two hours each). Simple and understandable information about recognizing cancer, tumor types, cancer symptoms and the important role of lifestyle in the development or prevention of cancer, the impact of cancer in human mortality, causes of cancer, cancer prevention, cancer treatment, proper nutrition, the role of tobacco and pesticides in cancer and the relationship between exercise and cancer were provided for students through lectures, posters and films. In addition, group discussions were conducted in the form of multiple questions and oral answers. At the end of the course, educational pamphlets were provided to students about breast cancer. After completing the training program and following the waiting period of one month, the intervention and control groups were asked to complete the questionnaires again (post-test). Regarding the awareness questions, the correct choice scored 1 point, while the other options scored 0 points (minimum score = 0; maximum score = 10). For the questions about behavior, the following scores were assigned to the answers: always = 3 points, often = 2 points, rarely = 1 point and never = 0 points (minimum score = 0; maximum score = 45). The significance level was considered to be 0.05.

### Data analysis

The data obtained from this study were entered into SPSS software (version 17) and were analyzed with nonparametric tests (due to the non-normal distribution of data based on the results of the Shapiro-Wilk and Kolmogorov-Smirnov tests) – Mann-Whitney, chi-squared, and Spearman's correlation tests – in order to determine the effectiveness of the courses.

## Results

A total of 220 female high school students, aged between 15–18 years, participated in this study, and their awareness of breast cancer was compared before and after the training. The analysis showed that the mean age of students in the intervention group was  $16.7 \pm 0.95$  years and  $16.3 \pm 0.73$  years in the control group. The Mann-Whitney test revealed that this difference was not statistically significant ( $p = 0.453$ ). Most of the study participants in both groups were in their second year of high school (a three-year high school system), and the majority of them were studying experimental sciences. Additional background information is summarized in Table 1.

The Mann-Whitney test showed no statistically significant difference in the mean awareness score between the control and intervention groups before the training ( $p = 0.253$ ), whereas afterwards the difference between the groups was statistically significant ( $p = 0.012$ ). In addition, the test showed that the difference in the mean change of scores before and after education was statistically significant ( $p < 0.001$ ). There was no statistically significant difference in the mean score of behavior between the control and intervention groups before the training ( $p = 0.085$ ), while afterwards a statistically significant difference was noted between the two groups ( $p = 0.003$ ). Furthermore, the test indicated that the mean change of behavior scores before and after the intervention was statistically significant ( $p = 0.018$ ) (Table 2). Spearman's correlation test demonstrated that the correlation between the awareness and behavior was direct and significant at the level of 0.01 ( $r = 0.340$ ,  $p < 0.001$ ).

In addition, regarding the correlation between demographic characteristics and the variables in this study, awareness and behavior variables had a significant correlation with the year of high school and the field of study ( $p < 0.001$ ) (Table 3).

**Table 1. Characteristics of the sample population (n = 220)**

Demographic features		Intervention group		Control group	
		n	%	n	%
Year of school	first year of high school	29	26.36	25	22.72
	second year of high school	30	27.27	36	32.72
	third year of high school	25	22.72	22	20
	pre-university	26	23.36	27	24.54
Father's occupation	employee	22	20	28	25.45
	self-employment	29	35.45	45	40.9
	farmer	16	14.54	11	10
	other	33	30	26	23.63
Mother's occupation	employee	18	16.36	21	19.09
	housewife	48	43.63	65	59.09
	farmer	11	10	9	8.18
	other	33	30	15	13.63
Field of study	human sciences	32	29.09	35	31.81
	natural sciences	45	40.9	39	35.45
	mathematics and physics	33	30	36	32.72
Father's level of education	illiterate	9	8.18	12	10.9
	under diploma and diploma	61	55.45	52	47.27
	associate's degree	24	21.81	28	25.45
	bachelor's degree	10	9.09	14	12.72
	master's degree and PhD	6	5.45	4	3.36
Mother's level of education	illiterate	13	11.81	15	13.63
	under diploma and diploma	58	52.72	49	44.54
	associate's degree	27	24.54	36	32.72
	bachelor's degree	6	5.54	3	2.72
	master's degree and PhD	6	5.54	7	6.36
Residence	urban	74	67.27	78	70.9
	rural	36	32.72	32	29.09

**Table 2. Comparison of the mean of awareness and behavior score before and after intervention and the difference between the intervention and control groups**

Time Group		Before intervention		After intervention		Difference	
		Mean	SD	Mean	SD	Mean	SD
Awareness	intervention group	5.63	2.10	7.35	2.35	1.72	0.25
	control group	5.21	1.68	5.56	2.22	0.35	0.54
	<b>Mann-Whitney test</b>	<b>p = 0.253</b>		<b>p = 0.012</b>		<b>p = 0.001</b>	
Behavior	intervention group	40.5	7.82	43.38	7.89	2.88	0.07
	control group	38.98	6.62	39.45	7.35	0.47	0.73
	<b>Mann-Whitney test</b>	<b>p = 0.058</b>		<b>p = 0.003</b>		<b>p = 0.018</b>	

**Table 3. The relationships between sociodemographic variables and awareness and behavior (n = 220)**

Variable		Intervention group n (%)	Control group n (%)	$\chi^2$	p
Year of school	first year of high school	29 (26.36)	25 (22.72)	30.32	< 0.001
	second year of high school	30 (27.27)	36 (32.72)		
	third year of high school	25 (22.72)	22 (20)		
	pre-university	26 (23.36)	27 (24.54)		
Father's occupation	employee	22 (20)	28 (25.45)	2.23	> 0.001
	self-employment	29 (35.45)	45 (40.9)		
	farmer	16 (14.54)	11 (10)		
	other	33 (30)	26 (23.63)		
Mother's occupation	employee	18 (16.36)	21 (19.09)	3.52	> 0.001
	housewife	48 (43.63)	65 (59.09)		
	farmer	11 (10)	9 (8.18)		
	other	33 (30)	15 (13.63)		
Field of study	human sciences	32 (29.09)	35 (31.81)	19.73	< 0.001
	natural sciences	45 (40.9)	39 (35.45)		
	mathematics and physics	33 (30)	36 (32.72)		

Father's level of education	illiterate	9 (8.18)	12 (10.9)	1.89	> 0.001
	under diploma and diploma	61 (55.45)	52 (42.27)	5.14	> 0.001
	associate's degree	24 (21.81)	28 (25.45)		
	bachelor's degree	10 (9.09)	14 (12.72)		
	master's degree and PhD	6 (5.45)	4 (3.36)		
Mother's level of education	illiterate	13 (11.81)	15 (13.63)	1.70	> 0.001
	under diploma and diploma	58 (52.72)	49 (44.54)		
	associate's degree	27 (24.54)	36 (32.72)		
	bachelor's degree	6 (5.54)	3 (2.72)		
	master's degree and PhD	6 (5.54)	7 (6.36)		
Residence	urban	74 (67.27)	78 (70.9)	2.03	> 0.001
	rural	36 (32.72)	32 (29.09)		

## Discussion

Breast cancer is a very common cancer in women worldwide and it continues to be a major cause of death [14]. The mean score of the students' awareness in the intervention and control groups before the training was  $5.63 \pm 2.10$  and  $5.12 \pm 1.68$ , respectively. These values increased after the intervention. The findings of the present study and a literature review of similar studies show the positive impact of education on knowledge about the behaviors which can prevent BC [15]. Such studies demonstrate that educating the women of a community at any age and situation is efficacious. Health education aimed at the community, at-risk groups or the groups which play an important role in controlling the disease is amongst the most important aspects of the control and prevention of the disease [16]. Likewise, enhancing public awareness of cancer is one of the WHO's strategies for controlling the disease [7].

In similar studies, education increased the awareness of breast self-examination, which is consistent with the results of our research and which emphasizes the urgent need for educating women in our country [17–19]. In Ertem and Kocer's study, breast self-examination training significantly increased the level of awareness and the attitude of nurses and midwives in the intervention group. Studies have also shown that in societies with a high level of knowledge about the disease, it is diagnosed in the early stages [20]. In a study by Karayurt et al., it was found that there is low level of awareness among high school students about the risk factors of the disease [21]. Likewise, Carelli et al. in Brazil found that the majority of women had a high level of awareness regarding breast self-examination and BC [11]. Perhaps this difference in awareness is due to the fact that Iran is a developing country and requires more coherent planning in this regard. Roudsari et al. also confirmed the impact of education on maintaining awareness [22].

In the present study, there was a significant increase in the mean behavior score of the students after education about cancer in the intervention group. In this regard, the study by Zakeri Darbaghi et al. regarding the impact of a cancer prevention educational program on the awareness, attitude and performance of students are in line with our findings [23]. Kumar et al. studied education on skin cancer prevention behaviors and found a positive impact of health education on improving the behavior of the target group regarding cancer prevention [24]. Consistent with the present study, Saatsaz et al. showed that

education is effective in improving awareness and performance of BC screening methods. In fact, they reported a statistically significant difference before and after education [25]. A study by Nourizadeh et al. also reflected the importance of education in the early diagnosis of BC in society [26].

We found a statistically significant correlation between the awareness and behavior of the participants, as higher awareness led to better performance. These findings are in line with those of Ghazanfare et al., who found a statistically significant correlation between awareness and performance [27]. Similarly, in their study regarding the awareness and performance of women regarding BC in Fasa, Rastad et al. corroborated this correlation [28]. Akhigbe and Omuemu, in their study on the awareness and performance of health staff on screening for breast cancer, reported 45.8% and 77.6% for awareness and performance, respectively [29]. Similarly, Okobia et al. reported 87.2% of awareness in their study among Nigerian women [30].

The cross-sectional nature of this study and the dependability of the students' responses to the time and place of education and their moral situations were amongst the limitations of the present study. In order to reduce the bias of the interviewer on the interviewee, necessary training was provided. Since the subjects in this study included female high school students, the results of the study cannot be generalized to the larger population in Iran. Finally, it is recommended that similar studies be conducted in other cities around the country in order to estimate the training needs of this stratum more accurately and to design and implement more detailed training programs for protecting female students against breast cancer.

## Conclusion

Early diagnosis of BC in women leads to lower mortality and increased quality of life. Educational programs represent an economic way to improve students' awareness and behavior. It is recommended that appropriate training programs be provided to all high school students through the country's health networks. In addition, coherent training sessions about BC and its preventative methods should be implemented in schools.

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