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The Effect of Individual Education on the Participation of Relatives of Cancer Patients in General Health and Cancer Screenings: A One Group Pretest-Post Test Study

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ABSTRACT

Objective: The aim of this study was to evaluate whether or not there were changes in the behaviors of relatives of cancer patients such as learning the warning signs of cancer, engaging in cancer prevention strategies, and participating in screenings after education sessions in the clinic.

Methods: This one-group pretest-posttest study was conducted with 238 relatives in a medical oncology clinic in Antalya, Turkey. Individual education sessions were conducted as an intervention, banners were hung about cancer, and general health information on checkups in the form of leaflets were distributed to each relative regarding cancer screenings. Reminder messages were sent to individuals to participate in screenings one and two months after the first interview. The posttest data were collected by phone in the third month. Four questionnaires were prepared based on the literature and national cancer screening standards. The face validity of the tools was evaluated by three experts and 15 relatives who not included as participants.

Results: The rate of having a mammography increased from 19.8% to 33.9%, rates of having the fecal occult blood test increased from 16.9% to 23.8%, and rates of having the HPV test increased from 43.5% to 49.6%. The rate of having blood pressure checks within the last 12 months increased from 75.8% to 83.1%, rates of blood cholesterol measurement increased from 68.5% to 79%, and rates of blood glucose measurement increased from 70.2% to 79%.

Conclusion: Education provided to the relatives increased participation in screenings.

Keywords: Relatives, individual education, cancer screening, health behaviors, cancer prevention

1. INTRODUCTION

A wide range of studies have revealed the impact of family history in terms of the etiology of cancer in addition to environmental factors. People with a family history of cancer have a higher risk of cancer themselves (1-5). The National Comprehensive Cancer Network (NCCN) suggests different screening protocols for first and second degree relatives (FSDR's) other than community screenings (3). Taking family history regarding cancer from relatives up to the fourth degree can provide a more comprehensive view of the individual's health history, assist in evaluating potential risks, and help in providing preventive care (6). But, there is no screening standard for FSDRs in Turkey (7). According to the Turkey Health Survey data for 2016, the mammography rate during the previous two years was 16.1%, the Human Papillomavirus (HPV)/pap test rate during the previous five years was 25.6%, the Fecal Occult Blood Test (FOBT) rate was 11.4%, and the colonoscopy rate was 2.5% (7, 8). These rates show that participation in cancer screenings is relatively low.

The presence of individuals diagnosed with cancer in their immediate family, relatives, and acquaintances may make people more aware of cancer and more willing to think about cancer, to participate in cancer screening, and to learn about cancer. In the active treatment period of a diagnosed patient, educating the relatives about cancer in the clinic and directing them to a screening can be much more effective than the referrals made to asymptomatic people in the community. It has been emphasized that early diagnosis and treatment can be provided by determining the risk levels of individuals and participating in screening programs required for the appropriate age ranges (9). In a study conducted in Turkey in which the first-degree relatives of the patients diagnosed with breast cancer were specified as the sample group, the rate of participation in screenings

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was determined to be 18%, not different from the tendencies of the general population (10); whereas, in another study, it was revealed that relatives of patients diagnosed with lung cancer changed their attitudes positively because 10.2% of them began exercising, 13.8% of them paid more attention to nutrition, 21.1% of them quit smoking, and 2.8% of them showed interest in and participated in cancer screening (11). With respect to the other study, it was concluded that the rate of colonoscopy of the first degree relatives of patients with colorectal cancer (CRC) was low (22.2%) and that they were more likely to participate if the health motivation was increased. It is recommended that strategies should be developed to increase knowledge, awareness, and participation in CRC screening tests of first-degree relatives for patients diagnosed with CRC (12). In another study, first and second-degree relatives of breast cancer patients that knowledge of regarding inheritance characteristics of breast cancer and risk reduction strategies was moderate. But still majority of women have moderate or higher level of risk perception and are worried about getting breast cancer (13).

In a case-control study, while the participation rates of caregiver spouses in the colorectal, cervical, gastric, and breast cancer screenings were higher than the control group, no significant difference was found between controls for risky health behaviors and controls for chronic diseases (hypertension, diabetes, and hypercholesterolemia) (14). In another study, individuals with a family history of cancer showed no differences in terms of their preventive health behaviors such as routine screening, smoking, and physical activity behavior compared to the general population (15). But, in a systematic review, a clear link between breast cancer risk perception and some cancer preventive behaviour was determined (16). Whether it is biologically driven or not, a diagnosis of cancer in the family history may cause a person to think about cancer, participate in cancer and general health checkups, and being aware of the need for cancer screening. For this reason, oncology clinics can be used as an opportunity to inform and direct relatives of patients. Nurses can provide individual education to patient of relatives in here. Since the relatives of patients who are hospitalized in oncology clinics are both sensitive and a high-risk group due to their family history, they may benefit more from the training given about cancer prevention, participation in screenings and knowing the cancer signs.

The aim of this study was to evaluate the effect of individual education on the participation of relatives of cancer patients in general health and cancer screenings. The study was investigated the rates of awareness of the warning signs of cancer and rates of behaviors that support cancer prevention including cancer screening behaviors, general health checkups behaviors, and participation in post-referral scans in the relatives of cancer patients in Oncology Clinic. The answers to the following questions will be sought in this study;

- Is there a change in post-tests with respect to pre-tests in terms of knowledge of protection from cancer behaviours for the relatives of patients diagnosed with cancer?
- Is there a change in post-tests with respect to pre-tests in terms of actual practice of protection from cancer behaviours for the relatives of patients diagnosed with cancer?
- Is there a change in post-tests with respect to pre-tests in terms of the rate of knowledge of warning signs of cancer for the relatives of patients diagnosed with cancer?
- What is the rate of warning signs of cancer' for the relatives of the patients diagnosed with cancer?
- Is there a change in post-tests with respect to pre-tests in terms of the rate of participation in cancer screenings for the relatives of patients diagnosed with cancer?
- Is there a change in post-tests with respect to pre-tests in terms of the rate of participation in general health screenings for the relatives of patients diagnosed with cancer?

2. METHODS

This study, which evaluates the effect of an intervention in design of one-group pretest-posttest was conducted in the Medical Oncology Clinic in a university hospital. Chemotherapy, radiotherapy and palliative treatment are carried out in the 46-bed medical oncology clinic where the study was conducted. Relatives accompanies the patients in the clinic. There are informative educational materials for patients, and two nurses providing training. Relatives are only informed about the patient. The data collection was initiated on 01.06.2016 and continued for 15 months until adequate sample numbers were reached.

2.1. Ethical Approval and Informed Consent

Informed consent from the relatives of the patients and approvals from the clinic (dated 04.08.2016 with no. 60590709/ONK-2502) and from the ethics committee (dated 24.02.2016 with decision no. 161) were obtained in order for the study to be conducted. Ethical approval was obtained from the Clinical Research Ethics Committee of Akdeniz University, Antalya, Turkey.

2.2. Sample

The population of the study was comprised of the relatives of the patients diagnosed with all forms of cancer and hospitalized at the Medical Oncology Clinic. Relatives of all patients who were hospitalized with a diagnosis of cancer, whether biological or non-biological, who were over 30 years of age, who not to have a sort of mental disability, and who volunteered were included in the study. Since cervix cancer screening in Cancer Early Diagnosis, Screening and Training Centers (CEDSTC) starts at the age of 30, relatives aged 30

and over were included. Both biological and non-biological relatives were included in this study. One relative of each cancer patient was included the study. The biological relatives of the cancer patients were included in this study because of they were more at risk than the general population and the non-biological relatives would have more awareness than the general population. The sample size was calculated by using a formula appropriate for studies in which the actual number of the population is unknown, but the ratio of a variable is examined, and, for this particular study, the power was assumed to be 80%, and the error margin was assumed to be five % (17). For the related calculation, the reference value of a prior study (20%) was taken into consideration (18) and, with respect to this, 250 relatives of patients were included in the sample group. The data collection process continued until the specified number of a minimum of 250 individuals had been reached, and 270 individuals could for be reached the pre-test. Thirty two relatives could not be reached for the post-test level. For this reason, the comparison analyses of the pre-test and the post-test were conducted on 238 matched individuals.

2.3. Measurement

Four measurement tools were used to collect data. Questionnaires were prepared based on the literature and national cancer screening standards (7, 11, 12, 14, 15, 19-21) The face validity of the tools was evaluated by three experts, an oncologist, a physician from CEDSTC, and a public health nurse with a convenience sample of 15 relatives. Minor comments were then evaluated in the research team, and the final instruments were formulated. At baseline, we obtained sociodemographic information (Table 1) from a self-reported questionnaire and medical information from electronic records. After that, a questionnaire on the knowledge and application of behavior that support cancer prevention with 13 statements revealing the cancer prevention behavior of the relatives of cancer patients was prepared (Table 4).

A third questionnaire was used for the participants to evaluate whether they were aware of the warning signs of cancer and the status of having these symptoms (Table 5).

The fourth questionnaire was used for participants to determine whether they participated in general health checkups and cancer screenings (Table 2, 3).

The dependent variables of the study were knowing and doing cancer prevention behaviors of cancer patients' relatives, knowing the early danger signs of cancer, having of signs, participation in cancer screening and general health checkups. The independent variable of this study was the information and guidance to be made in the clinic.

Table 1. *Sociodemographic Attributes of the Patient's and Patient's Relative(s).*

Patient's Sociodemographic Variables (n=270)		**n**	**%**
Gender	Woman	103	38.1
	Man	167	61.9
Education	Illiterate	29	10.7
	Literate	9	3.3
	Elementary and Secondary School	148	54.8
	(Senior) High School	47	17.4
	College/University and above	37	13.7
Diagnosis of Patients'	Lung Cancer	69	25.6
	Gastric Cancer	39	14.4
	Colon Cancer	23	8.5
	Breast Cancer	17	6.3
	Pancreatic Cancer	17	6.3
	Brain Tumor	11	4.1
	Pharyngeal Cancer	11	4.1
	Others (malignant melanoma, over cancer, cervical cancer, renal cell carcinoma...)	83	30.7
Current treatment of the patient	Chemotherapy	161	59.6
	Radiotherapy	34	12.6
	Surgical	4	1.5
	Palliative care only	71	26.3
Patient's Relative(s) Sociodemographic Variables (n=270)			
Gender	Woman	237	87.8
	Man	33	12.2
Education	Illiterate	16	5.9
	Literate	17	6.3
	Elementary School	128	47.4
	Secondary School	28	104
	(Senior) High School	52	19.3
	College/University and above	29	10.7

Table 1. *(Continued)*

Marital Status	Married	244	90.4
	Single	26	9.6
Health Insurance	Available	252	93.3
	N/A	18	6.7
Income Status	My income is less than my expenditures	143	53
	My income is equal to my expenditures	118	43.7
	My income is more than my expenditures	9	3.3
Affinity degree to the patient	Spouse	137	50.7
	First Degree Relative (Daughter, Sister, Mother, Son, Brother)	98	36.3
	Others (Daughter-in-law, wife's sister-in-law, nephew/niece, maternal aunt, paternal aunt , son-in-law, cousine etc.)	39	15.4
Chronic illness	Available	113	41.9
	N/A	157	58.1
Frequent chronic diseases	Hypertension	63	23.3
	Diabetes Mellitus	35	13.0
	Thyrocele	23	8.5
	Respiratory system diseases such as asthma	9	3.3
Smoking habits	I have never smoked	172	63.7
	I smoke	59	21.9
	I have quitted smoking	39	14.4
Do you consider quitting if you are a smoker?	No	34	57.6
	I consider quitting smoking in a month	6	10.2
	I consider quitting smoking in 6 months	19	32.2
Did the family health center guide provide guidance to you for screening programs?	Yes	96	35.6
	No	174	64.4
Have you had a discussion with the physician who treated your relatives who had cancer that family history increased the risk of cancer?	Yes	36	13.3
	No	234	86.7
Did the physician who treated your relative who had cancer provide guidance to you for screening programs?	Yes	27	10
	No	243	90
Do you know that screening services are free of charge in CEDSTC?	Yes	130	48.1
	No	140	51.9
Have you been to cancer screenings sutiable for your age and gender prior to cancer diagnosis of your relative?	Yes	104	38.5
	No	166	61.5

Table 2. *Participation Status to Cancer Screenings and General Health Checkups.*

Participation status to cancer screenings*		**Pre-test n (%)**	**Post-test n (%)**	**P****
CBE***		55 (25.7)	77 (31.0)	**0.000**
Mammography (within the last 2 years)		49 (19.8)	84 (33.9)	**0.000**
Breast Ultrasonography		49 (19.8)	59 (23.8)	**0.013**
BSE**** (regular in monthly basis)		155 (62.5)	168 (67.7)	**0.007**
FOBT***** (within the last 2 years)		42 (16.9)	59 (23.8)	**0.007**
Colonoscopy (within the last 10 years)		27 (10.9)	30 (12.1)	0.219
Pap smear test (within the last 5 years)		108 (43.5)	123 (49.6)	**0.000**
Spiloma control		4 (1.6)	10 (4.0)	0.109
General Health Checkups*				
Blood pressure control	I have done it during the last 12 months	188 (75.8)	206 (83.1)	**0.000 %7.3 ↑**
Blood cholesterol measurement	I have done it during the last 12 months	170 (68.5)	196 (79.0)	**0.000 %9.5↑**
Blood glucose measurement	I have done it during the last 12 months	174 (70.2)	196 (79.0)	**0.000 %8.8↑**

**Only the number of participants and the percentage are given in the table. **McNemar analysis had been conducted. ***CBE: Clinical Breast Examination, ****BSE: Breast Self-Examination, *****FOBT: Fecal Occult Blood Test.*

Table 3. *The Reasons for not Having Screening for Breast Cancer, Colorectal Cancer and Cervical Cancer.*

The reasons for not having screening for breast cancer (n=238)	**n (%)**
Not within the suitable age range for screenings	35 (14.1)
The relative of the patient is a man	24 (9.7)
I was not aware that I should have had a screening	**50 (20.2)**
I did not know where to go and how to have a screening	**49 (19.8)**
I have procrastinated	**48 (19.4)**
I did not know that this service was complimentary of charge	32 (12.9)
I did not have time	25 (10.1)
I was afraid that a malady would come up	22 (8.9)
I did not have the opportunity since I am giving caretaking for my patient	17 (6.9)
I was ashamed	5 (2.0)
The procedure is painful	4 (1.6)
The reasons for not having screening for cervical cancer (n=238)	**n (%)**
Not within the suitable age range for screenings	7 (2.8)
The relative of the patient is a man	24 (9.7)
I am not sexually active	5 (2.0)
I did not know where to go and how to have a screening	**34 (13.7)**
I was not aware that I should have had a screening	**33 (13.3)**
I have procrastinated	**28 (11.3)**
I was afraid that a malady would come up	20 (8.1)
I did not know that this service was complimentary of charge	17 (6.9)
I did not have time	12 (4.8)
I did not have the opportunity since I am giving caretaking for my patient	12 (4.8)
I had histerectomy before	11 (4.4)
I was ashamed	6 (2.4)
The procedure is painful	1 (0.4)
The reasons for not having screening for CRC* (n=238)	**n (%)**
Not within the suitable age range for screenings	102 (41.1)
I was not aware that I should have had a screening	**77 (31.0)**
I did not know where to go and how to have a screening	**52 (21.0)**
I have procrastinated	**29 (11.7)**
I did not know that this service was complimentary of charge	28 (11.3)
I was afraid that a malady would come up	18 (7.3)
I did not have the opportunity since I am giving caretaking for my patient	14 (5.6)
I did not have time	10 (4.0)
I was ashamed	5 (2.0)
The procedure is painful	2 (0.8)

**CRC: Colorectal Cancer.*

Table 4. *Knowledge and Practice of Cancer Prevention Behaviours (n=238)*

Knowledge and practice of cancer prevention behaviours*		**Pre Test n (%)**	**Post Test n (%)**	**P****
Increase consumption of fresh vegetables and fruits	Knows	177 (74.4)	232 (97.5)	**0.000**
	Practices	218 (91.6)	233 (97.9)	**0.001**
Increase consumption of fiber food	Knows	168 (78.6)	231 (97.1)	**0.000**
	Practices	204 (85.7)	235 (98.7)	**0.000**
Increase consumption of vitamin A and C	Knows	167 (70.2)	230 (96.6)	**0.000**
	Practices	207 (87.0)	237 (99.6)	**0.000**
Decrease consumption of fats	Knows	159 (66.8)	224 (94.1)	**0.000**
	Practices	175 (73.5)	206 (86.6)	**0.000**
Decrease consumption of salty, additives and nitrite including foods and smoked food	Knows	205 (86.1)	234 (98.3)	**0.000**
	Practices	200 (84)	224 (94.1)	**0.000**
Maintenance of ideal body weight	Knows	182 (76.5)	222 (93.3)	**0.000**
	Practices	77 (32.4)	75 (31.5)	0.727
Not smoking or quit smoking	Knows	231 (97.1)	236 (99.2)	0.125
	Practices	188 (79.0)	196 (82.4)	**0.021**
Keeping away from smoking free environments in order not to breathe in cigarette smoke	Knows	233 (97.9)	237 (99.6)	0.125
	Practices	197 (82.8)	209 (87.8)	**0.000**
Not consuming alcohol or quitting	Knows	212 (89.1)	232 (97.5)	**0.000**
	Practices	221 (92.9)	228 (95.8)	**0.039**
At least 30 minutes of exercise at least three days a week	Knows	176 (73.9)	225 (94.5)	**0.000**
	Practices	112 (47.1)	132 (55.5)	**0.001**
Not being exposed to harmful solar rays – protection from sun	Knows	201 (84.5)	226 (95.0)	**0.000**
	Practices	208 (87.4)	232 (97.5)	**0.000**
Having protective sexual intercourse (monogamy, using condoms with multiple partners)	Knows	174 (73.1)	215 (90.3)	**0.000**
	Practices	232 (97.5)	236 (99.2)	0.125
Sleeping for 6-8 hours a day	Knows	164 (68.8)	217 (91.2)	**0.000**
	Practices	199 (83.6)	234 (98.3)	**0.000**

**Only the number and rate individuals who know and practice are given in the table. **McNemar analysis is applied.*

Table 5. *Warning Signs of Cancer (n=238)*

Warning Signs of Cancer*		Pre Test n (%)	Post Test n (%)	P**
Weight loss (losing more than 5% of body weight within a month)	Knows	171 (71.8)	224 (94.1)	**0.000**
	Available	4 (1.7)		
Fever (recurrent fever and infection)	Knows	103 (43.3)	195 (81.9)	**0.000**
	Available	3 (1.3)		
Malaise and prostration other than the reason of being obliged to caring for the patient in the hospital (decrease of performance, lack of energy, excessive sleepiness, insomnia)	Knows	139 (58.4)	204 (85.7)	**0.000**
	Available	39 (16.4)		
Pain (unknown origin, intractable pain nonresponsive to treatment)	Knows	112 (47.1)	204 (85.7)	**0.000**
	Available	6 (2.5)		
Mass felt in breasts or in body	Knows	218 (91.6)	235 (98.7)	**0.000**
	Available	23 (9.7)		
Variations on skin (jaundice, livering and rubescence on skin)	Knows	134 (56.3)	215 (90.3)	**0.000**
	Available	5 (2.1)		
Bleeding/ haemorrhage (blood in pituitary, urine, faeces or abnormal vaginal bleeding)	Knows	177 (74.4)	234 (98.3)	**0.000**
	Available	7 (2.9)		
Change of defecation habits (diarrhea lasting longer than 2-3 weeks, defecation twice or less than twice per week, transition from diarrhea to intestinal obstruction)	Knows	124 (52.1)	220 (92.4)	**0.000**
	Available	22 (9.2)		
Persistent cough nonresponsive to treatment	Knows	135 (56.7)	202 (84.9)	**0.000**
	Available	5 (2.1)		
Alteration of body marks and papillomas	Knows	176 (73.9)	231 (97.1)	**0.000**
	Available	20 (8.4)		

**Only the number individuals who know about the risks are given in the table. The number and rate of individuals who have the risks are given. **McNemar analysis is applied.*

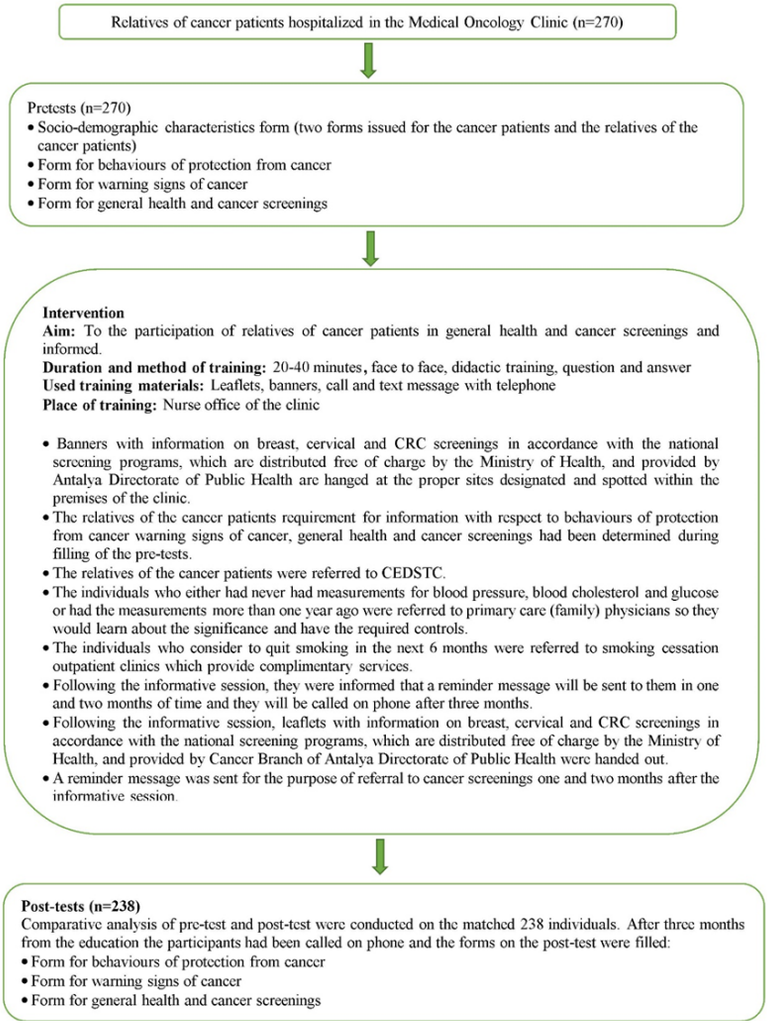

Figure 1. *Flow chart of the study*

2.4. Intervention Procedures

Banners with information on breast, cervical, and colorectal cancer screenings in accordance with the national screening programs, which are offered free of charge by the Ministry of Health and provided by Antalya Directorate of Public Health, were hung at the proper sites designated and visible within the premises of the clinic. At least one of the participants was chosen, and she/he was educated with respect to behaviors that support cancer prevention including knowledge of the warning signs of cancer, general health checkups, and cancer screenings was specified during the completion of the pre-tests. Indispensable, detailed was given to the individuals who lacked information during the data collection process. The data was collected by the first researcher, an oncology nurse, by the face-to-face interview method. Each individual education interview lasted between 20 minutes and 40 minutes depending on the level of education and the perception skills of the participant. The interventions made are explained with the flow chart of the study (Figure 1). Each subject was enriched by examples in accordance with the needs of the participant; thus, clarification and understanding of the matter was realized. Each relative of the patients was referred to CEDSTC that offer cancer screening free of charge according to age, gender, and risk factors. In this individual education, reference was made to the national screening program guide.

The individuals who either had never had measurements for blood pressure, blood cholesterol, and blood glucose or had the measurements more than one year ago were referred to primary care (family) physicians so they would learn about the significance of these tests and have them performed. The individuals who was considering quitting smoking in the next six months were referred to smoking cessation outpatient clinics which provide complimentary services. Following the education session, they were informed that a reminder message would be sent to them after one month and again after two months, and they would be called on phone after three months. Following the education session, leaflets with information on breast, cervical, and colorectal cancer screenings in accordance with the national screening programs were handed out; these are distributed free of charge by the Ministry of Health and provided by the cancer branch of the Antalya Directorate of Public Health. A reminder message was sent for the purpose of a referral to cancer screenings after one month and again after two months after the education session. The post tests were completed by telephone three months after the individual education intervention in the clinic.

2.5. Statistical Analysis

Comparative analysis of pre-test and post-test were conducted on the matched 238 individuals. Data were analyzed using IBM SPSS Statistics 20. Frequency distributions were determined for categorical variables. The relationship between two independent categorical variables was examined with c^2 tests. The McNemar test was used to evaluate and analyze the relationship between the pre-test and post-test for the categorical data. Statistical significance level was accepted as $p<0.05$.

3. RESULTS

The average age of 270 cancer patients hospitalized in the Oncology Clinic who had participated in this particular study was 59.4±12.0 (min=21, max=89); 61.9% of them were men, 54.8% of them were elementary school graduates, 25.6% of them were diagnosed with lung cancer, the elapsed time after the diagnosis was 19.4±26.3 months (min=1, max=132), and 59.6% of them were receiving chemotherapy (Table 1).

The average age of the 270 relatives of the cancer patients who were involved in the study was 51.16±9.85 (min=30, max=70). 87.8% of them were women, 47.4% of them were elementary school graduates, 90.4% of them were married, 93.3% of them had health insurance, 43.7% had income equal to expenditures, 50.7% of them were wives of the cancer patients. 21.9% of the smoked cigarettes. 35.6% of them were referred to cancer screening programs by the primary care (family) physician/nurse whereas 10% of them were referred to cancer screening programs by the physician in charge of treatment of the cancer patient, and 13.3% of them discussed the increase in cancer risk when there is cancer in their family history with the physician in charge of treatment of the cancer patient. 48.1% of them knew that cancer screening services are provided on a complimentary basis from CEDSTC, and 38.5% had their cancer screening done prior to the cancer diagnosis of the relative (Table 1).

The participants' rates of clinical breast examination, mammography, breast ultrasonography, breast self-examination, screening for HPV, and FOBT doing behaviors frequency increased as significant ($p<0.05$). According to the pre-test mammography, HPV screening and FOBT rates were 19.8%, 43.5%, and 16.9%, respectively, whereas the rates increased up to 33.9%, 49.6%, and 23.8%. According the evaluation and analysis of general health checkups, the rate of individuals who had their blood pressure taken during the last 12 months increased by 7.3%, those who had their blood cholesterol measurement increased by 9.5%, and those who had their blood glucose measured increased by 8.8%. (Table 2). There was not a significant change in terms of body-mass index (BMI) measurement [for pre-test and post-test respectively 28.4±5.2 (min=18.2, max=49.1), 28.3±5.0 (min=18.2, max=49.1)]

The participants stated the three most prominent reasons for not having breast cancer, CRC, and cervical cancer screenings as not being aware of the necessity to have a screening, not knowing where to apply for a screening or how to get the screening done, and being inclined to procrastination (Table 3).

An increase was observed in knowledge of behaviors that support cancer prevention other than not smoking, quitting smoking, and keeping away from heavy smoking environments**,** and the rates in the range of 66.8% and 97.96% before the intervention increased to the range of

90.3% and 99.6% after the intervention. An increase was observed in knowledge of behaviors that support cancer prevention other than maintaining ideal body weight and having protective sexual intercourse, and the rates in the range of 32.4% and 97.5% before the intervention increased to 31.5% and 99.6% after the intervention (Table 4).

The knowledge level of the participants who participated in the study on the warning signs of cancer showed a significant change in terms of all subjects during the post-test. The rates of knowledge of the warning signs of cancer were between 43.3% and 98.7% before the intervention whereas the range increased to between 84.9% and 98.7% after the intervention. The presence of the warning signs of cancer varied between 1.3% and 16.4% (Table 5).

4. DISCUSSION

4.1. Participation in Breast Cancer, Cervical Cancer, and CRC Screenings

In the study, a significant increase in the rates of breast, cervical, and CRC screening of the relatives of cancer patients who were hospitalized in the Oncology Clinic was determined. More than half of the participants stated that they had done breast self-examination during the pre-test and post-test. However, the mammography rate, which is deemed the gold standard for breast cancer screening, was lower than expectations according to the pre-tests. According to 2016 Turkey Health Survey data, the mammography rate for women in the last two years was 16.1%, the HPV test rate in the last five years was 25.6%, and the rate of FOBT during the last two years was 11.4% (7, 8). Within the scope of this study, participation in mammography screening and FOBT was found to be slightly above the average in Turkey for individuals who have a cancer diagnosis in their family history whereas the rate for HPV screenings were almost twice as much. This situation may be explained by the fact that cervical cancer screenings are initiated at before more than breast and colorectal cancer screening in Turkey, and cervical cancer screenings are easily accessible in numerous family health centers. With respect to a prior study conducted in the same hospital, the mammography rate for the participants was 18% (10) and, although the rate increased up to 19.8%, the participation was still insufficient for the group prone to a high risk of breast cancer.

With respect to the findings of this particular study's pre-test, the participation rates in screenings was slightly higher than the screening rates of the general population in Turkey who have a normal (middle) risk (7, 8) and the rates stated in other studies (10, 19). Participants in the study were better at participating in cervical cancer screening, but four out of five did not participate in breast and CRC screenings. In a study conducted in Australia, approximately 30% of first-degree relatives had undergone CRC screening in the last five years (22). In a comparative study in South Korea, it was determined that the rates of participation of the spouses of cancer patients in breast, cervical, and CRC screenings were higher than the general population (14). These results suggest that initiatives are needed to provide opportunities for high risk groups to participate in such screenings, particularly breast cancer and CRC screenings.

In this study, participation in breast, cervical, and CRC screenings increased with the help of education sessions in the clinic and referrals (Table 2). Similarly, initiatives in clinic areas such as training and education during the other studies (23) consultancy (23-25), and referral (23-26) increased participation in breast, cervical, and colorectal cancer screenings. Based on the studies, it can be asserted that individuals with a family history have similar rates of participation in cancer screening as other individuals, which was lower than expected, but interventions are effective in increasing participation in screenings. The fact that perceived sensitivity in this group, is high may have had a positive effect on the result. Nurses are the ideal professionals for mobilizing an aware group in clinical settings.

4.2. Participation in General Health Checkups

The participation rates of the participants involved in the study for the previous 12 months in terms of measurements based on blood pressure, blood cholesterol, and blood glucose were much better compared to cancer screenings and had been increased through the medium of interventions (Table 2). The rate of individuals who had blood pressure checks, blood cholesterol measurement and blood glucose measurement increased. In a study conducted in South Korea, it was determined in general health checkups that the participation of spouses who cared for cancer patients was not different from the comparison group (14). As a result, the interventions in our study group, who had high awareness due to family history, increased their participation in general health checkups and cancer screening.

4.3. Reasons for Not Having Done Cancer Screenings

When the participants' level of knowledge about cancer screening was examined, it was concluded that about half of them knew that cancer screening services are given free of charge in CEDSTC, which implements the National Cancer Control Program, and 35% of them were directed to cancer screening by the family health center employees. The participants stated that the three most prominent reasons for not having cancer screenings as not being aware of the necessity to have a screening, not knowing where to apply and how to get the screening done, and being inclined to procrastination. Although according to the results of research investigating the lack of information about cancer screenings in Turkey varied with respect to the regions where the data was collected, knowledge of breast, cervical, and CRC was in the range of 17% and 51% (27, 28). Similarly, in a study conducted in the USA, it was concluded that the most important obstacle to participating in screening for colorectal cancer was not their provider had not recommended it (29).

The reason that the lack of awareness in terms of breast and CRC was higher in comparison to cervical cancer is thought to be related to the fact that cervical cancer is started the earliest the national cancer screening program (21). Cervical screening starts at an earlier age than others and is also applied in family health centers. We should aim to eliminate barriers by means of initiatives by determining the participation barriers to screenings.

4.4. Behaviors That Support Cancer Prevention

When the behaviors of the participants involved in our study regarding behaviors that support cancer prevention were evaluated, we observed that not smoking or quitting smoking and keeping away from heavy smoking environments were the best-known subjects, so a significant increase could not be determined. The high initial knowledge of the importance of not smoking and avoidance of heavy smoking environments suggested that public health programs (30) for tobacco control promoted by the Ministry of Health had been effective. The fact that there is a significant increase in the rates of knowing the anti-cancer behaviors such as being aware of the need for good nutrition, limiting alcohol consumption, doing exercise, avoiding excessive sun exposure, having safe sexual intercourse, and sleeping for at least 6-8 hours a day indicated that the education provided within the scope of this study was effective.

Studies show that the behaviors of the individuals with a family history of cancer were based on anti-cancer elements such as physical activity, good nutrition, not smoking, and weight control are not different from those in the larger society (15, 20), yet they revealed that interventions with this group were effective (20, 26, 31). Similarly, in our study, a significant increase was determined in terms of anti-cancer behaviors in terms of subjects other than maintaining ideal body weight and having protective sexual intercourse. Lack of change in these two areas could be explained by the fact that weight loss is a time-consuming action, and the participants were monogamous. On the other hand, there was a significant increase in quitting smoking. This shows that the education given about smoking cessation in outpatient clinics is effective and that individuals who are ready to quit smoking will have an increase in the rate of using smoking cessation outpatient clinics. In this study, the higher rates of anti-cancer behaviors may be explained by the fact that the everyone in the study group was related to a cancer patient. When family members observed the symptoms of the patient in the clinic, their awareness increased, and their positive health behaviors were developed; thus, the education sessions were effective for the aware group.

4.5. Knowledge of the Warning Signs of Cancer

While the rate of the participants' knowledge of the warning signs of cancer was in the range of 43.3% to 91.6% before the intervention, it ranged between 84.9% and 98.7% after the intervention. This result indicated that the individual education initiated in the clinic had been effective. The most well-known signs include a lump in the breast, bleeding, changes in body marks and warts, and weight loss while lesser known signs include fatigue, persistent cough, skin changes, change in defecation habits, and pain and fever. The studies conducted in Turkey, it was determined that the rate of knowledge of the signs of cancer was lower than in our study (19, 27). In our study, the fact that the rate of knowledge of the signs of cancer was higher than in the other studies suggested that the participants may have learned by observing the signs experienced by the patient. Our education interventions may have affected the learning process, and the experiences of other patients and their relatives may have affected their learning about the signs of cancer.

Limitations

The biggest limitation of this study was that the study was done with all biological and non-biological relatives of cancer patients (spouse, uncle, in laws, etc.). In this study, we worked with relatives whom we thought would be aware due to the diagnosis of cancer. In future studies, we recommend that biological relatives and non-biological relatives should be included in the study separately. In addition, the pre-test-post-test design is the only group in which the effect of an initiative was evaluated. When evaluating the results of this study, it should be noted that only face validity was used for the questionnaires used. In future studies, it is recommended more validity and reliability evidence for surveys be provided.

5. CONCLUSIONS

With the help of education sessions and referral lasting for nearly half an hour to relatives of hospitalized cancer patients and reminder messages to them with respect to cancer screenings in the following one or two months, the relatives of cancer patients were observed to have increased knowledge, increased inclination toward anti-cancer action and prevention behaviors, increased recognition of cancer signs, and increased participation in general health checkups and cancer screenings suitable for their age and gender. The individual education and guidance given by the nurses to the relatives while the cancer patient is lying in the clinic is effective. In order to increase the participation of individuals with a family history of cancer in general health and cancer screening, relatives of patients in oncology clinics can be considered as the target population. Educational programs can be created for this population.

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Competing Interests

The authors declare that they have no competing interests

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Authors' Contributions

OH, GS and CHS conceived and designed of study. OH acquired, analysed and interpreted the data. OH and GS analysed and interpreted the data. OH, GS and CHS drafted the manuscript. All authors read and approved the final manuscript.

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