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ORIGINAL ARTICLE

Early Cancer Detection/Screening Behaviors of Individuals Aged 40 Years and Over in Trabzon and the Influencing Factors

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OBJECTIVE
The aim of this study was to determine early cancer detection/screening behaviors of individuals and the influencing factors.

METHODS
This descriptive study was conducted in the center of Trabzon, Turkey. The study population comprised a total of 105.071 individuals aged ≥40 years living in the city center, and the sample size was determined as 1.200. To collect the data, a questionnaire form was used, and a chi-squared test and logistic regression were used to evaluate them.

RESULTS
The mean age of participants was 54.90±11.16 years. A total of 16.1% had a fecal occult blood test (FOBT), and 15.2% underwent colonoscopy. A total of 45.3% of women had a breast self-examination (BSE), 22.7% had clinical breast examination (CBE), 14.3% had mammography, 29.2% had a Pap smear, and 15.8% of men had a prostate-specific antigen (PSA) test. The effective variables on screening behaviors were found as the age, education level, health insurance, cancer history in first-degree relatives for BSE; income, monthly income, first-degree death from cancer for CBE; health assurance, first-degree relative death from cancer for mammography; age, cancer history in first-degree relatives for the Pap smear test; age, gender, income for FOBT; age, income, the place where the individuals lived the longest, first-degree relative death from cancer for colonoscopy; and cancer history in first-degree relatives and first-degree relative death from cancer for PSA.

CONCLUSION
The participants were determined to have low screening tests/examinations. It is thought that the results of this study may provide important clues in the development of strategies to fight cancer in our city.

Keywords: Behavior; cancer; early detection; screening; Trabzon.

Introduction

Cancer is a public health problem both in our country and worldwide, with a tendency to increase its burden, fatality, and incidence.[1] According to the GLOBOCAN 2012 data, there were 14.1 million new cancer cases and 8.2 million cancer-related deaths in the world in 2012.[2] The World Health Organization

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(WHO) estimated that 20 and 24 million people, respectively, would be diagnosed with cancer in 2020 and 2030; 17 million people would die due to cancer in 2030; and 75 million people would live with cancer in 2030.[3] When projections are made about the current rate of increase, it is estimated that the incidence of cancer in our country will double and reach to 450 per 100.000 in 2030s.[4]

A rapid increase in the cancer burden has become a global crisis for public health and health systems. A major problem for many countries will be to treat all cancer patients diagnosed in the coming years and to ensure an adequate funding for palliative, supportive, and terminal care.[3]

As in the rest of the world, the increasing importance of cancer highlights its cost, early detection, and diagnosing in our country.[3] The cheapest way to prevent cancer is to educate individuals and apply screening methods to individuals from the risk groups.[5] Primary and secondary prevention gains importance if we particularly consider the cancers that can be prevented, death from cancer can be eliminated by screening and an early treatment contributes a lot to the quality of life.[1] Community-based screening programs for the detection of patients with breast and cervical and colorectal cancer at early stages are recommended by the WHO.[6] If the prevention activities can be widely applied, these measures will contribute to the alleviation of the global cancer burden.[3] In line with this goal, it is necessary to plan activities to battle with cancer consciously and to produce rational policies. For this purpose, all the activities under the National Cancer Control Program in our country are carried out under four main headings: prevention, screening, early detection, treatment, and palliative care. In all of these areas, it is important to raise awareness of cancer in individuals to be able to make successful policies.[7]

The purpose of this study was to determine the early cancer detection/screening behaviors of the individuals aged ≥40 years without any previous cancer diagnosis and its influencing factors. We believe that the results of the study may provide a basis for the content of future educational programs toward the prevention and early cancer detection and to contribute to the development of applicable strategies and policies to fight against cancer.

Materials and Methods

This descriptive research was conducted between 15th December, 2011, and 30th January, 2012, in the center of Trabzon, Turkey. The universe of the research comprised 105.071 individuals aged ≥40 years living in the center of Trabzon. It was assumed that the cancer screening rate was 40% in urban areas, and the number of the individuals sampled was calculated as 1.200 at β=0.20, the power of 80%, and α=0.05. In the selection of the sample, 30 cluster sampling methods proposed by the WHO for the developing countries were used. As the cluster unit, a neighborhood was identified. There were 40 individuals from each cluster selected, and the questionnaire was completed with 1.200 individuals. Both the genders were equally represented in the sample.

For the sample selection, the ratio of the population aged ≥40 years living in the center of Trabzon to the general population was first calculated according to the gender and age groups by using the Address Based Population Registration System (ABPRS) data. The number of individuals to be sampled was then calculated according to the gender and age groups. In the calculation, the ratio of the relevant gender and age groups to the general population of Trabzon was taken into account.

In the sample selection, the information regarding the gender, age, neighborhood, and address of the people aged ≥40 years was requested. For this purpose, computer software was created using the ABPRS data. The computer software was first used to identify the neighborhoods of the individuals aged ≥40 years living in the city center, and then those living in each neighborhood were divided according to their gender, and then the lists were formed according to the age groups. A simple random sampling method was used to determine the first individual to be sampled, and the systematic sampling method was used to select the others.

An approval was obtained from the Karadeniz Technical University Ethics Committee to conduct the research, and written permission was received from the Governorship of Trabzon for the application of the survey form. A verbal approval was also obtained from the individuals who agreed to participate voluntarily in the research.

For the research, after reviewing the literature [7-16] and receiving expert opinions about the subject, a survey form was developed by the researcher. Survey questions were prepared to determine the socio-demographic characteristics of the individuals, their early detection/screening behaviors, its influencing factors regarding the cancer types (breast, cervix) for which early diagnosis/screening programs are recommended

by the WHO, and the cancer types for which early detection programs are recommended but screening programs are not (oral cavity, stomach, colorectal, skin, ovaries, and prostate).

The data were collected by eight trained interviewers. They visited the individuals at their addresses, and they excluded the individuals with psychiatric and neurological disorders that impeded communication and those who had previously been diagnosed with cancer. Instead, they selected the next individual from the same gender and age groups from the list. At the beginning of the interview, the individuals were informed about the survey, and it was stated that the response time was 20–25 minutes. The individuals who could not be found at their address on the first visit were visited for the second time. The next individual from the same gender and age groups on the list was visited instead of the unreachable one on the third visit.

In the evaluation of research data, a computer package program was used. The results were presented with numbers, percentages, and averages as descriptive statistics. A chi-squared test and logistic regression were used in the analysis of the data, and a p-value <0.05 was considered to be statistically significant. In the logistic regression analysis, the independent variables that might affect the breast self exam (BSE), clinical breast examination (CBE), a mammogram, a Pap smear, a fecal occult blood test (FOB), a colonoscopy, and a prostate-specific antigen (PSA) test were included in the model.

The independent variables were accepted as the gender, age, marital status, educational status, health insurance, income status, monthly income, the place where the individual lived the longest, cancer history in first-degree relatives (parents, siblings), cancer death among first-degree relatives, and the dependent variables were accepted as early cancer detection/screening behaviors.

The fact that the results obtained from this study could be generalized only to the individuals living in the center of Trabzon and that the individuals aged ≥40 years were included in the research were considered to be the research limitations.

Results

50.0% of the individuals in the study group were male and 50.0% were female, the average age was 54.90±11.16 years, 54.9% had the elementary and lower education level, 86.0% were married, and 96.9% had health insurance.

It was found that 45.3% of the women had BSE, 22.7% had CBE, 14.3% had a mammogram, and 29.2% had a Pap smear. It was determined that 16.1% and 15.2% of the whole group had an FOB test and colonoscopy, respectively, and 15.8% of men had a PSA test (Table 1).

In the logistic analysis, BSE was performed in the age group of 40–54 years at the rate 2.1 (1/0.49) and 2.3 times (1/0.43) greater than in the age groups of 55–64 and ≥65, respectively; those with health insurance had it at the rate 3.2 greater than those without health insurance; those with secondary/high school and university education had it at the rate 1.4 and 3.7 times greater, respectively, than those who were illiterate/literate/primary school graduates; those who had cancer history in first-degree relatives had it at the rate 1.6 times greater than those who did not (Table 2).

According to the logistic analysis, individuals with a good income had CBE at the rate 2.4 greater than those with a low/middle income; those with the 1000–1999TL, 2000–2999TL, and ≥3000TL monthly income had CBEs at a rate 1.6 (1/0.63), 2.7 (1/0.37), and 2 (1/0.50) times greater than those with ≤999 TL

Table 1 Early diagnosis/screening test/examinations performed in the research group

Test/examination	Self-directed		Doctor's order	
	n	%	n	%
BSE (n=600)	272	45.3	17	6.3
CBE (n=600)	136	22.7	129	94.9
Mammogram (n=600)	172	14.3	158	94.0
Pap-smear (n=600)	175	29.2	165	95.4
FOB (n=1200)	193	16.1	180	92.8
Colonoscopy (n=1200)	182	15.2	175	97.8
PSA (n=600)	95	15.8	83	95.4

BSE: Breast self-exam; CBE: Clinical breast exam; FOB: Fecal occult blood; PSA: Prostate-specific antigen

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monthly income, respectively. It was determined that the individuals who had cancer history in first-degree relatives had CBE at a rate 2.8 times greater than those who did not (Table 2).

The logistic analysis demonstrated that the individuals who had health insurance had a mammogram 7.1 times more frequently than those who did not have health insurance, and those who had cancer death history among the first-degree relatives had a mammogram 2.4 times more frequently than those who did not have the history (Table 2).

In the logistic analysis, the age group of 40–54 had a Pap smear 1.2 (1/0.86) and 2.7 times (1/0.37) more frequently than the age groups of 55–64 and the ≥65, respectively; those who had cancer history in first-degree relatives had it 1.8 times more frequently than those who did not (Table 3).

According to the logistic analysis, a FOB test was performed by the age groups of 55–64 and ≥65, and these groups had it at a rate 1.6 and 1.9 times greater, respectively, than the age group of 40–54; men had it 1.8 (1/0.55) times more frequently than women (1/0.55); those with a good income had it 2.5 times more frequently than those with a low/middle income (Table 4).

According to the logistic analysis, the age groups of 55–64 and ≥65 had colonoscopy at a rate 1.3 and 2.4 times greater than the age group of 40–54, re-

Table 2 The logistic regression analysis of the independent variables that could affect having a BSE, a CBE, or a mammogram

Independent variables	O.R.	95% Confidence interval	p
BSE			
Age			
40-54	Ref.		
55-64	0.49	0.32-0.77	0.002
≥65	0.43	0.27-0.69	0.001
Health insurance			
No	Ref.		
Yes	3.17	1.02-9.87	0.046
Educational status			
Illiterate/Literate/Primary	Ref.		
Secondary/Highschool	1.36	0.90-2.04	0.137
University	3.69	1.60-8.51	0.002
Cancer history in first-degree relatives			
No	Ref.		
Yes	1.60	1.12-2.29	0.009
CBE			
Income			
Low/Middle	Ref.		
Good	2.38	1.27-4.47	0.007
Monthly income (TL)			
≤999	Ref.		
1000-1999	0.63	0.39-1.007	0.053
2000-2999	0.37	0.17-0.81	0.012
≥3000	0.50	0.20-1.22	0.130
Cancer death history among first-degree relatives			
No	Ref.		
Yes	2.79	1.83-4.26	0.01
Mammogram			
Health insurance			
No	Ref.		
Yes	7.13	0.93-5.43	0.058
Cancer death history among first-degree relatives			
No	Ref.		
Yes	2.38	1.19-2.58	0.001

BSE: Breast self-exam; CBE: Clinical breast exam

Table 3 The logistic regression analysis of the independent variables that may have effect on a Pap smear test

Independent variables	O.R.	95% Confidence interval	p
Age			
40-54	Ref.		
55-64	0.86	0.55-1.36	0.538
≥65	0.37	0.21-0.65	0.002
Cancer in first-degree relatives			
No	Ref.		
Yes	1.83	1.25-2.67	0.002

Table 4 The logistic regression analysis of the independent variables that may have an effect on colonoscopy and FOB tests

Independent variables	O.R.	95% Confidence interval	p
FOB			
Age			
40-54	Ref.		
55-64	1.55	1.04-2.31	0.030
≥65	1.87	1.26-2.78	0.002
Gender			
Male	Ref.		
Female	0.55	0.40-0.77	0.001
Income			
Low/Middle	Ref.		
Good	2.50	1.67-3.75	0.001
Colonoscopy			
Age			
40-54	Ref.		
55-64	1.25	0.81-1.93	0.309
≥65	2.38	1.54-3.39	0.001
Income			
Low/Middle	Ref.		
Good	2.69	1.78-4.06	0.001
The place where the individual lived the longest			
Rural	Ref.		
Urban	0.58	0.37-0.89	0.015
Cancer death history among first degree relatives			
No	Ref.		
Yes	1.49	1.05-2.12	0.024

FOB: Fecal occult blood

spectively; those with a good income level had it 2.7 times more frequently than those with a low-/middle income level; those who lived in rural areas the longest had it 1.7 times (1/0.58) more frequently than those who lived in urban areas the longest; those with cancer death history among first-degree relatives had colonoscopy 1.5 times more frequently than those who did not (Table 4).

In the logistic analysis, the individuals who did not have cancer history in first-degree relatives had PSA 4.8 (1/0.21) times more often than those who did not have the history; and those who had cancer death history among first-degree relatives had 6.6 times more PSA than those who did not (Table 5).

Discussion

Like in the rest of the world, an increasing importance of cancer highlights its costs, early detection, and di-

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Table 5 The logistic regression analysis of the independent variables that may have an effect on PSA tests

Independent variables	O.R.	95% Confidence interval	p
Cancer history in first-degree relatives			
No	Ref.		
Yes	0.21	0.05-0.78	0.021
Cancer death history among first-degree relatives			
No	Ref.		
Yes	6.56	1.79-23.99	0.004

PSA: Prostate-specific antigen

agnosis in our country as well.[3] The cheapest way to prevent cancer is to train individuals and apply screening methods to individuals from the risk groups.[5]

In the studies conducted in Turkey, it was found that the rate of a BSE application was low.[17] In our country and abroad, the studies show that the incidence of BSE varies greatly, and the frequency of breast self-examination in Turkey varies between 4.3% and 42.0%.[18] While the rate of the women who performed a BSE ranged from 37.4% to 59.8%, the rate of the women who performed a regular BSE was determined as minimum 5.9% and maximum 17.9%.[19] The rate of women performing BSE regularly is quite different in other countries, too. The rate of those who regularly conduct BSE on a monthly basis was 2.9% in a study conducted in South Korea, 7.3% in Nigeria, and 32% in African Americans.[20] In our study, 45.3% of women were found to have performed a BSE. The BSE frequency was found to be 5.5% in a study by Seçginli and 48.1% in a study of by Rizalar and Altay.[21] In a study carried out in Çorum, it was found that there were 27.2% of women who performed a regular BSE.[22] A study conducted in Singapore reported that 93.0% of nurses performed a BSE.[23] Gürsoy et al. stated that the women who were 41 years or older, married, and had cancer, but not breast cancer in their family, performed a BSE at a higher level, and the rate of performing a BSE increased as the level of education increased. In the same study, those whose mothers or sisters had cancer and those who had any breast disease had performed BSE more than those who did not.[24] Dişcigil et al. argued that the rate of performing a BSE increased as the level of education and the status of having a family history of breast cancer increased.[25] Similar to the results from the other studies, the level of education and the presence of a family history of cancer in the first-degree relatives were also found as the variables that increased the rate of performing a BSE in our study. It can be said that compared to screening tests, women's awareness that a BSE enables them to recognize the changes in their breasts was quite good. However, it is also necessary to target performing a BSE correctly and regularly every month.

The ratio of women who had a CBE varied from 21.1% to 42.7% in the studies carried out in our country.[24] In our study, it was determined that 22.7% of women had a CBE. The rate of the women who had a CBE was found at 42.7% by Dişcigil et al.[25], and 19.8% by Gürsoy et al.[24] In the same study, the age, marital status, and family history of cancer and breast cancer were found to be significant variables affecting CBE. The women aged 41 and over, who were married, and with a family history of cancer and breast cancer had a CBE higher rate.[24] In a study conducted in Singapore, the rate of nurses who had a BSE was 53.6%.[23] Odunsaya and Tayo reported that 30% of nurses had a CBE in the past 3 years [26], and Chang et al. reported that 53.6% of nurses had a CBE.[27] In our study, the presence of family history of cancer in first-degree relatives was found to be an effective factor for CBE, similar to the results of a previous study conducted in our city.

In our study, 14.3% of women had mammography. Şeker et al. reported that 45.4% of those over 40 had mammography.[28] 20.9% of participants in a study by Özer et al.[29], 7.3% of nurses in a study by Özdemir et al.[30], 12.5% of women in a study by Canbulat and Uzun [31], and 15.0% of women in a study by Gürsoy et al. were found to have had a mammogram.[32] In addition, significant variables affecting having a mammogram in the same study were found to be the age, marital status, health insurance, and a family history of cancer and breast cancer. Women who were aged 41 and over, married, had health insurance, and had a family history of cancer and breast cancer were found to have a higher mammogram rate as well.[24] Dişcigil et al. pointed out that a higher education level in

women was not related to the mammogram rate, but the women with the family history of breast cancer were more sensitive to a mammogram, and the women who were informed about breast health by physicians used more screening methods than other women.[25] In a study conducted by Açıkgöz et al., the women in the age group of 50–59 were found to have a mammogram more frequently than those who were younger or older, and those who had health insurance had a mammogram more frequently than those who did not.[33] The rate of having mammography in different countries in the past 2 years varies between 43.0% and 78.0%.[20] Chang et al. and Odunsaya and Tayo, respectively, found that 68.1% [27] and 8.0% of nurses had mammography in the past 3 years.[26] In a study conducted in Singapore, the rate of having mammography in nurses aged ≥50 years was found to be 64.8%, and 31.1% in those <50.[23] In the studies conducted in Turkey, whether a woman had mammography or not was examined rather than how frequently she had it. Very few studies investigated the frequency of having mammography.[20] In our study, the rate of having a mammogram was similar to the results from a previously reported study by Gürsoy et al. The presence of health insurance and having a family history of cancer in the first-degree relatives in our study was also found to be consistent with the literature.

In our study, it was determined that 29.2% of women had a Pap smear. Türkol et al. and Özdemir et al.[30] found that 23.5% and 23.7% of women, respectively, had a Pap smear.[34] Şeker et al. reported that 20.7% of patients aged >30 years had a Pap smear.[28] Tarwireyi et al. stated that 18.3% of health workers had a Pap smear, and in another study in Hongkong, 45.0% had it.[35] In a study conducted in the United States, it was found that the variables that motivated women to have a Pap smear were the socioeconomic status and cultural level. In the same study, according to the logistic analysis, the women who knew that the Pap smear test was the best diagnostic method for the early detection of cervical cancer were found to have a test five times more likely than other women.[36] In a study conducted in Botswana, the most important reasons that prevented the Pap smear test to be applied were found to be the lack of adequate information about the Pap smear, negative attitudes of health care providers, and the limited access to physicians.[37] In a study conducted in the United States, it was found that the first and second most effective factors to have a Pap smear test was a doctor's recommendation and having health insurance, respectively.[38] Açıkgöz et al. found that being married, and having high school and higher education in the age group 40–49 years were the main determinants to have a Pap smear.[33] In a study conducted in Kayseri, while a significant difference was found in having a Pap smear with regard to having knowledge about cervical cancer, age, working status, the level of education, and income, the status of having a Pap smear test in the past 3 years showed a significant difference based on age and the income level.[39] Similar to the results from related studies, women in our study also had a low screening rate for the early detection of cervical cancer.

It is recommended that individuals aged 50–80 years who are not in the risk groups should have an FOB test every 1 to 2 years.[1] In our study, it was found that 16.1% of the individuals had a FOBT. Çakmak et al. found that only two women had a FOB test in their study that involved female health workers.[40] The high rate in our study is thought to be due to the fact that it was conducted in individuals aged ≥40 years.

Colorectal cancer is a type of cancer which incidence has increased in recent years and ranks third in both genders in our country. According to the national cancer screening standards, for the early diagnosis of this type of cancer, individuals aged ≥50 years are included in the scope of the FOB test and colonoscopy routine screening services.[40] The national standards for colorectal cancer screening in our country are the fecal occult blood test (FOBT) and biopsy colonoscopy every 10 years.[41] 15.2% participants had a colonoscopy in our study. In a study conducted by Açıkgöz et al., it was found that 90.1% of women had no colonoscopy procedures, and there was not any difference between the socioeconomic and health characteristics of the women and their colonoscopy behavior.[33] Pirinçci et al. determined that the rate of colorectal cancer screening was 18.3%. Of these patients, 77.6% had a FOB test, and 21.6% had rectosigmoidoscopy/colonoscopy.[41] The rate of having a colonoscopy in our study was found to be low, in compliance with the literature. The fact that nearly all of the examination was ordered by doctor reveals that the individuals used the screening test for the early detection at a very low level.

15.8% of men had PSA in our study. In a study conducted by Bilgili and Kitiş in Ankara, the rate of PSA test was found as 20.9%.[42] Kaya et al. determined that the rate of cancer screening on regular basis was statistically significant in those who had a cancer diagnosis or who had someone in her/his family or around him/her with a cancer diagnosis ($p<0.001$).[6] In our

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study, the PSA test was found to be used as low as other screening tests/ examinations.

As a result, we found that the rates of early diagnosis/screening tests/examinations for cancer were very low in our study. The effective variables on screening behaviors were determined as the age, education level, health insurance, cancer history in first-degree relatives for BSE; income, monthly income, first-degree death from cancer for CBE; health assurance, first-degree relative death from cancer for mammography; age, cancer history in first-degree relatives for the Pap smear; age, gender, income for FOBT; age, income, the place where the individuals lived the longest, first-degree relative death from cancer for colonoscopy; cancer history in first-degree relatives, and first-degree relative death from cancer for PSA.

Programs should be developed to raise the public awareness on early detection/screening tests/examinations to reduce cancer morbidity and mortality, and strategies should be developed to increase the use of early detection/screening tests. Taking the results of this research into consideration, it is thought that it can help to make the right planning in the fight against cancer in Trabzon.

Conclusion

The results of this study reveal that individuals perform cancer early detection/screening tests at very low levels, and gender, age, educational status, the place of residence where individuals live the longest, health insurance, income level, family history of cancer in first degree relatives and cancer diagnosis in first-degree relatives are the variables that affect early diagnosis/ screening tests.

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