KASTAMONU MEDICAL JOURNAL

Original Article

DOI: 10.51271/KMJ-0153

Kastamonu Med J. 2024;4(3):105-110.

Cancer screening in people aged between 30-69 in a town: a cross-sectional study in Turkiye

İrem Medeni[1], Volkan Medeni[2], Asiye Sezer Olgun[3]

[1]*Department of Employee Health, General Directorate of Public Health, Ministry of Health, Ankara, Turkiye*
[2]*Department of Public Health, Faculty of Medicine, Gazi University, Ankara, Turkiye*
[3]*Department of Family Medicine, Faculty of Medicine, Kastamonu University, Kastamonu, Turkiye*

Received: 31/05/2024 ◆ **Accepted**: 30/07/2024 ◆ **Published**: 01/09/2024

ABSTRACT

Aims: Breast, cervical, and colorectal cancer screening programs are available in Turkiye. This study aimed to assess people's knowledge and behaviors regarding these cancer screening tests.

Methods: This population-based, cross-sectional study involved individuals aged between 30 and 69 living in Kastamonu, Turkiye. A total of 201 participants were included. The study examined participants' sociodemographic characteristics, the presence of chronic diseases and cancer diagnoses, knowledge of cancer screening tests conducted in Turkiye, their status regarding cancer screening, and the reasons for not undergoing such screenings.

Results: Among the participants, 63.7% were women, and 29.4% had a family history of cancer. Additionally, 49.8% stated they had no information about cancer screening tests in Turkiye. Of those informed about cancer screening tests in Turkiye, 63.8% had undergone at least one cancer screening test. The two most common reasons for not having a cancer screening test were believing they were healthy (50.0%) and lacking information (32.1%). There were significant differences in the rates of cancer screening tests based on age ($p<0.001$), gender ($p<0.001$), employment status ($p<0.001$), educational level ($p<0.001$), and knowledge about screening ($p=0.009$).

Conclusion: Lack of knowledge and beliefs about health were effective in not having a cancer screening test. Health education is necessary for individuals to obtain accurate information and gain awareness.

Keywords: Cervical cancer, colonic neoplasms, breast cancer, early diagnosis, cancer screening

INTRODUCTION

Cancers constitute a significant health burden worldwide, with an estimated 19.3 million new cases and 10 million deaths annually. Common cancers include lung, prostate, and colorectal in men and breast, colorectal, and lung in women. In terms of mortality, lung, liver, and colorectal cancers are the most fatal for men, while breast, lung, and colorectal cancers are the most fatal for women.[1,2] In Turkiye, the most common cancers are lung, prostate, colorectal, bladder, and stomach in men, and breast, thyroid, colorectal, uterine, and lung in women.[3]

In addition to causing physical ailments, cancer also creates significant financial and emotional burdens for individuals.[4] For this reason, cancer prevention should be a public health priority. With the rising incidence of cancer in middle- and low-income countries like Turkiye, implementing screening programs as a secondary prevention method has become essential.[5] Globally, cancer remains one of the leading causes of death. Screening tests aim to improve quality of life and life expectancy through early diagnosis and treatment. Early detection of cancer is cost-effective when identified in its initial stages.[6] The World Health Organization (WHO) defines screening tests as "tests that can be quickly and easily administered to a target population for the detection of disease that is unrecognized through examinations or other procedures in a healthy, asymptomatic population."[7]

Cancer screening programs are widely implemented in high-income countries with more available resources. However, countries have significant differences regarding screening methods, initiation and discontinuation ages, and screening intervals.[8] For colorectal cancer screening in the United

Corresponding Author: Volkan Medeni, volkanmedeni@gazi.edu.tr

Cite this article as: Medeni İ, Medeni V, Sezer Olgun A. Cancer screening in people aged between 30-69 in a town: a cross-sectional study in Turkiye. *Kastamonu Med J.* 2024;4(3):105-110.

States, adults aged 50-75 years are advised to undergo one or a combination of seven tests, including colonoscopy. In contrast, Canada does not recommend colonoscopy as a screening test.[9,10] Although there are variations among European countries regarding the tests recommended for cervical cancer screening, screening starting ages, and screening intervals, most countries recommend starting screening between ages 18 and 29 and discontinuing between ages 60 and 70. Breast cancer screening practices in Europe are more consistent, with mammography recommended for women aged 50-69. Screening for prostate, skin, and lung cancers is generally not recommended, except in some developed countries.[11]

Cancer early diagnosis, screening, and training centers (KETEM) provide cancer screening services in Turkiye. With around 200 centers nationwide, each staffed by doctors, nurses, midwives, X-ray technicians, and medical technologists, KETEMs offer screenings for three types of cancer based on WHO guidelines. For breast cancer, women aged 40-69 are advised to perform monthly breast self-exams, have an annual clinical breast examination, and undergo a mammogram every two years. Cervical cancer screening includes a smear and HPV-DNA test every five years for women aged 30-65. Colorectal cancer screening involves a stool occult blood test every two years for those aged 50-70 and a colonoscopy every ten years for the same age group.[12]

Early cancer detection through screening tests improves prognosis and reduces mortality. Understanding people's knowledge and behaviors regarding these tests can highlight gaps in awareness, which could inform health interventions aimed at promoting education and early screening. It could enhance cancer outcomes. This study aims to assess the knowledge and behaviors of individuals aged between 30-69 concerning cancer screening tests, identify associated factors, and raise awareness on this critical subject.

METHODS

Study Design

The study was carried out with the permission of the Gazi University Ethics Committee (Date: 13.10.2021, Decision No: 2021/79). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. The ethical considerations ensured the confidentiality and voluntary participation of all study subjects.

This population-based, cross-sectional study was conducted in the Kuzeykent neighborhood of Kastamonu province, Turkiye. Located in the Western Black Sea Region, Kastamonu makes up 1.7% of Turkiye's total surface area. The city center has a population of 152,541, with Kuzeykent being its largest neighborhood. The local family health center provides primary health care services in Kuzeykent.

Sample Selection Criteria

The study population consisted of people aged between 30 and 69 years who are registered with Kuzeykent Family Health Center, 11,776 people. At 80% statistical power, 0.2 effect size, α=0.05 significance level, the smallest required sample size was calculated as 196 using a one-degree-of-freedom Chi-square test. Individuals excluded from the study were those under 30 years old, over 70 years old, mentally incapable of communication, or residing outside the city for various reasons despite indicating Kastamonu as their residence. After obtaining the ethics committee's approval, a list of people aged between 30 and 69 years registered in the family health center was obtained, and the appropriate sample size was determined by weighting. Since it was aimed to reach 196 people, the interpersonal interval was 11776/196=60.0. A lot was drawn to determine the starting point, and the following people were determined by adding 60 to the number obtained. We excluded people under 30 years old, over 69 years old, and who were mentally incapable of communication. People who indicated Kastamonu as their residence address but were outside the city for different reasons and who did not volunteer to participate in the research were also excluded. The remaining people were included in the study.

Data Collection

The data collection phase was concluded in 2022. Completing the survey took approximately 8 to 10 minutes. Participants were invited to the family health center, where the surveys were administered through face-to-face interviews. In total, 201 individuals participated.

Survey Instrument

The survey form included 29 questions designed to assess various research variables. The dependent variables were age, gender, marital status, number of children, employment status, educational background, smoking habits, income level, presence of chronic diseases, family history of cancer, knowledge of screening tests, and awareness of KETEM (Cancer Early Diagnosis, Screening, and Training Centers). The independent variable was whether participants had undergone at least one cancer screening test. The survey also collected information on participants' sociodemographic characteristics, chronic disease status, family history of cancer, knowledge of cancer screening tests available in Turkiye, and awareness of KETEM. Participation in cancer screening programs was verified through health records, which included data on fecal occult blood tests, colonoscopies, Pap smears, HPV-DNA tests, breast self-exams, clinical breast exams, and mammograms for female participants. Participants were categorized into four age groups: 30-39, 40-49, 50-59, and 60-69, reflecting the typical age range for starting cancer screening in Turkiye.

Statistical Analysis

Statistical analysis was conducted using SPSS (Statistical Package for the Social Sciences) version 22.0. Categorical variables are reported as counts and percentages, while continuous variables are presented as means, standard deviations, and medians. Categorical variables were compared using Pearson's Chi-square test and Yates' correction for continuity. A p-value of less than 0.05 was considered statistically significant.

RESULTS

In our study, 201 people who were confirmed to be eligible after the sample calculation from 11,776 potentially eligible people were included. The mean age of the participants was 49.16±11.31 years, and the median age was 48 (min: 30; max: 76) years.

Of all participants, 27.9% (n=56) were aged 40-49 years, 63.7% (n=128) were women, 88.6% (n=178) were married, 38.8% (n=78) were homemakers, and 52.3% (n=105) were middle school graduates or below. Smokers made up 28.9% (n=58) of the sample. A majority, 67.2% (n=135), were in the middle-

income level, while 48.8% (n=56) reported having a chronic disease, and 29.4% (n=56) had a family history of cancer (Table 1).

Table 1. Distribution of some descriptive characteristics of the participants, Kastamonu, 2021

	Number (n)	Percentage (%)
Age (n=201)		
30-39	50	24.9
40-49	56	27.8
50-59	52	25.9
60-69	43	21.4
Gender (n=201)		
Female	128	63.7
Male	73	36.3
Marital status (n=201)		
Married	178	88.6
Single	12	6.0
Widow/divorced	11	5.4
Number of children (n=201)		
0	22	10.9
1	37	18.4
2	96	47.8
3 and more	46	22.9
Occupation (n=201)		
Housewife	78	38.8
Worker	45	22.4
Clerk	30	14.9
Retired	25	12.4
Tradesman	12	6.0
Other	11	5.5
Educational status (n=201)		
Not completed any school	11	5.5
Primary school graduate	47	23.4
Middle school graduate	47	23.4
High school graduate	51	25.3
University graduate	33	16.4
Master's/PhD	12	6.0
Smoking (n=201)		
No	143	71.1
Yes	58	28.9
Alcohol consumption (n=201)		
No	190	94.5
Yes	11	5.5
Income level (n=201)		
Low-income	41	20.4
Middle-income	135	67.2
High-income	25	12.4
Chronic disease (n=201)		
No	103	51.2
Yes	98	48.8
Cancer (n=201)		
No	196	97.5
Yes	5	2.5
Presence of cancer in the family (n=201)		
No	142	70.6
Yes	59	29.4

Nearly half of the participants, 49.8% (n=100), were unaware of cancer screening tests in Turkiye, and 14.9% (n=30) knew about KETEM. Information about screening was received by 61.4% (n=62) from their family physician. A total of 64.2% (n=105) had undergone at least one screening test. The main reasons for not screening were feeling healthy (50.0%, n=48) and lack of knowledge (32.3%, n=31). Among those eligible for screening, 26.3% (n=25) had fecal occult blood tests and 21.1% (n=20) had colonoscopies. Participation in a colorectal cancer screening program was 33.7% (n=32) (Table 2).

Table 2. Distribution of participants' characteristics about cancer screening tests, Kastamonu, 2021

	Number (n)	Percentage (%)
Knowledge of screening tests (n=201)		
Yes	101	50.2
No	100	49.8
Information resource about screening tests (n=101)*		
Family physician	62	61.4
Television	35	34.6
Internet	25	24.8
Other physicians	21	20.8
Non-doctor healthcare staff	18	17.8
Family/acquaintances	16	15.8
Brochure/book	7	6.9
Knowledge of KETEM (n=201)		
Yes	171	85.1
No	30	14.9
Cancer screening test status (n=201)		
Yes	105	64.2
No	96	35.8
Reason for not having cancer screening test (n=96)		
Thinking they are healthy	48	50.0
Lack of knowledge	31	32.3
Fear	9	9.4
Embarrassment	7	7.3
Thinking it won't work	1	1.0
Knowledge of fecal occult blood test (n=201)		
Yes	72	35.8
No	129	64.2
Having a fecal occult blood test (n=95)		
No	70	73.7
Yes	25	26.3
Knowledge of colonoscopy (n=201)		
Yes	131	65.2
No	70	34.8
Having colonoscopy (n=95)		
No	75	78.9
Yes	20	21.1
Participation in colorectal cancer screening program (n=95)		
No	63	66.3
Yes	32	33.7

*More than one option was answered, KETEM: Cancer early diagnosis, screening and education center

For female participants, 69.5% (n=89) had a smear test, 20.3% (n=26) had an HPV-DNA test, 73.4% (n=94) performed breast self-examinations, and 57.0% (n=73) had a breast examination at a health institution. Among women in the screening age group, 71.1% (n=69) had mammography. Participation in breast cancer screening was 73.4% (n=94), and 19.5% (n=25) participated in cervical cancer screening (Table 3).

Screening rates varied significantly across demographic factors. Among those aged 30-39 years, 28.0% (n=14) were screened, while 87.5% (n=31) of those aged 60-69 years had undergone

Table 3. Knowledge and behaviors of female participants about cervical and breast cancer screening tests, Kastamonu, 2021

	Number (n)	Percentage (%)
Knowledge of smear test (n=128)		
Yes	110	85.9
No	18	14.1
Having smear test (n=128)		
Yes	89	69.5
No	39	30.5
Knowledge of HPV-DNA test (n=128)		
Yes	35	27.3
No	93	72.7
Having HPV-DNA test (n=128)		
Yes	26	20.3
No	102	79.7
Participation in cervical cancer screening program (n=128)		
Yes	25	19.5
No	103	80.5
Knowledge of breast self-exam (n=128)		
Yes	99	77.3
No	29	22.7
Having breast self-exam (n=128)		
Yes	94	73.4
No	34	26.6
Knowledge of breast exam in a health institution (n=128)		
Yes	93	72.7
No	35	27.3
Having breast exam in a health institution (n=128)		
Yes	73	57.0
No	55	43.0
Knowledge of mammography (n=128)		
Yes	108	84.4
No	20	15.6
Having mammography (n=97)		
Yes	69	71.1
No	28	28.9
Participation in breast cancer screening program (n=128)		
Yes	94	73.4
No	34	26.6

HPV: Human papillomavirus, DNA: Deoxyribonucleic acid

screening. For men, 6.8% (n=5) were screened compared to 78.1% (n=100) of women. Employees had a screening rate of 32.0% (n=31), whereas 71.2% (n=74) of the unemployed were screened. Education also influenced screening rates, with 66.7% (n=70) of those with middle school or below education and 36.5% (n=35) of those with higher education having been screened. Among smokers, 41.4% (n=24) were screened compared to 56.6% (n=81) of non-smokers. Additionally, 69.4% (n=26) of low-income participants were screened, compared to 32.0% (n=8) of high-income participants. Screening rates were 42.7% (n=44) for those without chronic disease and 62.2% (n=61) for those with chronic disease. Those with a family history of cancer had a screening rate of 66.1% (n=39), compared to 46.5% (n=66) of those without such a history. Among those unaware of cancer screening tests, 43.0% (n=43) were screened, while 61.4% (n=62) of those knowledgeable about the tests were screened. Lastly, 30.0% (n=9) of those unfamiliar with KETEM and 56.1% (n=96) of those who knew about KETEM had undergone screening. Statistically significant differences were observed across these variables (p<0.05) (Table 4).

Table 4. Having a cancer screening test according to characteristics of the participants, Kastamonu, 2021

	Not having (n=96)		Having (n=105)	
	Number (n)	Percentage (%)	Number (n)	Percentage (%)
Age (n=201)				
30-39 (n=50)	36	72.0	14	28.0
40-49 (n=56)	26	46.4	30	53.6
50-59 (n=52)	22	42.3	30	57.7
60-69 (n=43)	12	12.5	31	87.5
p<0.001*				
Gender (n=201)				
Male (n=73)	68	93.2	5	6.8
Female (n=128)	28	21.9	100	78.1
p<0.001**				
Marital status (n=201)				
Married (n=178)	85	47.8	93	52.2
Unmarried (n=23)	11	47.8	12	52.2
p=0.995**				
Number of children (n=201)				
0 (n=22)	14	63.6	8	36.4
1 (n=37)	21	56.8	16	43.2
2 (n=96)	39	40.6	57	59.4
3 and more (n=46)	22	47.8	24	52.2
p=0.146*				
Working status (n=201)				
Employed (n=97)	66	68.0	31	32.0
Not employed (n=104)	30	28.8	74	71.2
p<0.001*				
Educational status (n=201)				
Middle school and below	35	33.3	70	66,7
High school and above	61	63.5	35	36.5
p<0.001*				
Smoking (n=201)				
Yes (n=58)	34	58,6	24	41.4
No (n=143)	62	43.4	81	56.6
p=0.049**				
Income level (n=201)				
Low-income	15	30,6	26	69,4
Middle-income	64	47.4	71	52.6
High-income	17	68.0	8	32.0
p=0.046*				
Chronic disease presence (n=201)				
No (n=103)	59	57.3	44	42.7
Yes (n=98)	37	37.8	61	62.2
p=0.006*				
Cancer presence in the family (n=201)				
No (n=142)	76	53.5	66	46.5
Yes (n=59)	20	33.9	39	66.1
p=0.011**				
Knowledge of screening tests (n=201)				
No (n=100)	57	57.0	43	43.0
Yes (n=101)	39	38.6	62	61.4
p=0.009*				
Knowledge of KETEM (n=201)				
No (n=30)	21	70.0	9	30.0
Yes (n=171)	75	43.9	96	56.1
p=0.008**				

*Pearson's Chi-square test, **Chi-square test with Yates' correction for continuity, KETEM: Cancer early diagnosis, screening and education center

DISCUSSION

In this study, we collected data on participants' descriptive characteristics, their knowledge about cancer screening tests, their screening test history, and related factors. Half of the participants had not undergone any cancer screening tests. Analysis of the reasons for not participating in screening revealed that a lack of knowledge and personal health beliefs were significant factors. Additionally, factors such as age, gender, employment status, education level, smoking habits, income level, presence of chronic diseases, family history of cancer, general knowledge of screening tests, and awareness of KETEM significantly influenced the likelihood of undergoing cancer screening tests.

In our study, three-quarters of the subjects participated in breast cancer screening, one-third in colorectal cancer screening, and one-fifth in cervical cancer screening programs. According to European Union data, participation rates in cancer screening programs were 60.2% for breast cancer, 50.7% for cervical cancer, and 38.2% for colorectal cancer.[13] In Australia, the reported participation rates were 50.0% for breast cancer, 68.0% for cervical cancer, and 40.9% for colon cancer.[14] In South Korea, participation was 54.3% for breast cancer, 46.9% for cervical cancer, and 28.6% for colon cancer.[15] The variation in screening participation rates may be attributed to differences in the age at which countries begin screening, the types of screening tests used, and health policies. Participation rates are often linked to public awareness and knowledge about cancer, as well as the accessibility of health systems. In some societies, low participation may result from cultural beliefs, feelings of shame, traditions, or misconceptions about medical examinations. Overall, our results indicate that participation in screening programs, particularly for cervical cancer, is insufficient.

In our study, half of the participants indicated that they did not undergo cancer screening because they felt healthy, while one-third lacked knowledge about screening. A study conducted in the Philippines found that 62% of respondents cited economic concerns as the primary barrier to accessing costly screening methods like mammography. Additionally, 15% of participants felt they were healthy and did not see the need for screening. Psychological factors, such as fear and perceived pain, also contribute to reluctance to screen.[16] In Saudi Arabia, a study showed that one-fourth of participants avoided screening due to fear of the results, while the second most common reason was a lack of time.[17] In India, psychosocial factors like fear of the screening process and the potential cancer diagnosis are significant barriers. Other issues include financial difficulties, healthcare system inefficiencies, lack of awareness, and cultural beliefs.[18] In Turkiye, where cost is not a significant barrier, our findings suggest that many respondents avoid screening due to a sense of good health or insufficient information. Cultural beliefs and mistrust of the healthcare system may also affect participation. Our study highlights a general lack of awareness about cancer and cancer screening among participants.

Our study found that the frequency of cancer screening tests increases with age. Individuals with chronic diseases tend to have a more positive attitude towards these tests, which may also be related to their age. Increased maturity and chronic conditions can heighten health awareness, encouraging individuals to pay more attention to their health and resulting in more frequent cancer screenings. Additionally, the awareness that aging and chronic diseases can raise cancer risk may motivate individuals to undergo regular screenings. Expanding cancer screening programs available to older individuals might also influence participation rates.

In our study, 78.1% of women underwent at least one cancer screening test, compared to 6.8% of men. Kim et al.[19] reported that 74.2% of women and 64.1% of men were screened for cancer in the past two years. Davis et al.[20] found that 95.0% of women and 59.0% of men had undergone cancer screening at some point. Gender is a significant factor influencing cancer screening in the United Kingdom.[21] This disparity can be attributed to several factors. Women generally have better access to routine screening opportunities and use primary health care services more frequently. Additionally, certain cancers that are more common in women, such as breast or cervical cancer, lead to more regular screening. In contrast, there is less consensus on the necessity of prostate cancer screening for men, which may contribute to the lower screening rates observed.

In our study, one-third of employed individuals and seven out of ten unemployed individuals have previously undergone cancer screening. This prevalence is similar across different income levels, which can be interpreted as related to employment status. Thus, unemployed individuals who need financial support are more likely to participate in cancer screening programs compared to those who are employed and saving money. These results are statistically significant. This finding contrasts with previous studies,[22-24] which often show that unemployment leads to loss of health insurance. However, universal health insurance covers all citizens in Turkiye, and screening tests are free. Consequently, unemployed individuals may have more free time and greater flexibility in accessing healthcare. They might also be more focused on their health and attentive to regular health checks.

In our study, 41.4% of smokers and 56.6% of non-smokers had at least one cancer screening test. A cohort study by Eng et al.[25] found that active smoking was strongly associated with reduced use of cancer screening services and more advanced cancer stages at diagnosis. According to national health data from the United States, current smokers are less likely to participate in guidelines-compliant screening studies for breast, prostate, and colorectal cancer compared to never-smokers.[26] Byrne et al.[27] also found that smokers were less likely to screen for cancer than non-smokers and that those with higher nicotine dependence had lower adherence to some screening tests. Our findings match existing literature, likely because smokers may be overly optimistic about their health or underestimate their cancer risk. Alternatively, those recognizing their high risk might feel less motivated to get screened. Further research is needed to see if smoking affects participation in cancer screening programs.

Our study found that individuals with a family history of cancer and those informed about screening tests and early diagnosis centers were more likely to participate in cancer screenings. This difference was statistically significant. Personal experience and increased awareness among those with a family history likely drive higher participation. Informative activities by early diagnosis centers, like campaigns and educational materials, can boost public participation in screenings. Raising awareness about early diagnosis can further improve participation rates.

Limitations

Our cross-sectional study has limitations in establishing causality and generalizing results beyond the town where it

was conducted. Self-reported data may affect accuracy, though we mitigated this by using health databases for screening information. Unlike previous research, which often focuses on specific cancer types, our population-based analysis evaluates all cancers in the national screening program.

CONCLUSION

The study reveals significant gender disparities in cancer screening rates, with women participating more than men. Variations in screening rates suggest the need for targeted interventions to address knowledge gaps and psychosocial factors influencing screening behaviors. While the findings align with existing literature, the cross-sectional nature and self-reported data warrant caution in generalizing results. Further research is needed to explore the nuanced factors affecting screening uptake and develop strategies for diverse populations. Health education is crucial to correct misconceptions, improve health behaviors, and increase awareness. Training by primary care professionals, supported by educational materials, can enhance knowledge and attitudes towards cancer screening. Additionally, considering sociodemographic factors such as age, gender, employment, education, and income when designing screening programs can improve their effectiveness.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of Gazi University Ethics Committee (Date: 13.10.2021, Decision No: 2021/79).

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Mattiuzzi C, Lippi G. Current cancer epidemiology. *J Epidemiol Glob Health*. 2019;9(4):217-222.
2. Sung H, Ferlay J, Siegel RL, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin*. 2021;71(3):209-249.
3. Donar GB. The relationship between cancer incidence and awareness activities and google online search volume in Turkiye: a retrospective research. *Acibadem Univ Saglik Bilim Derg*. 2021;12(2):353-360.
4. Otuzoğlu M. Investigation of the scales studies on the evaluation of the spiritual needs of cancer patients. *J Contemp Med*. 2020;10(1):126-133.
5. Erdem SS, Yılmaz M, Yıldırım H, et al. Information level on cancer and cancer risk factors living in Duzce. *DU Sağlık Bil Enst Derg*. 2017;7(1):1-10.
6. Ersoy E, Saatçi E. Cancer screening: controversies. *Turk Aile Hek Derg*. 2017;21(3):118-122.
7. Sagan A, McDaid D, Rajan S, Farrington J, McKee M. Screening: when is it appropriate and how can we get it right? European observatory on health systems and policies. Copenhagen, 2020.
8. Schreuders EH, Ruco A, Rabeneck L, et al. Colorectal cancer screening: a global overview of existing programmes. *Gut*. 2015;64(10):1637-1649.
9. Davidson KW, Barry MJ, Mangione CM, et al. Screening for colorectal cancer: US preventive services task force recommendation statement. *JAMA*. 2016;315(23):2564-2575.
10. Canadian task force on preventive health care. Recommendations on screening for colorectal cancer in primary care. *CMAJ*. 2016;188(5):340-348.
11. Ebell MH, Thai TN, Royalty KJ. Cancer screening recommendations: an international comparison of high income countries. *Public Health Rev*. 2018;39:7.
12. Cancer screenings. Republic of Türkıye Ministry of Health, General Directorate of Public Health.
13. Access date:12/20/2023 https://hsgm.saglik.gov.tr/tr/kanser-taramalari
14. Kim HJ, Yim HW, Kim NC. Factors affecting cancer screening intention and behavior of the Korean elderly. *Asian Pac J Cancer Prev*. 2014;15(19):8461-8467.
15. Davis JL, Buchanan KL, Katz RV, Green BL. Gender differences in cancer screening beliefs, behaviors, and willingness to participate: implications for health promotion. *Am J Men Health*. 2012;6(3):211-217.
16. Weller DP, Campbell C. Uptake in cancer screening programmes: a priority in cancer control. *Br J Cancer*. 2009;101(Suppl 2):S55-S59.
17. Ponti A, Anttila A, Ronco G, et al. Cancer screening in the European Union. Report on the implementation of the Council Recommendation on cancer screening (second report). Brussels, 2017.
18. Australian Institute of Health and Welfare. Cancer screening programs: quarterly data.
19. Access date:12/20/2023 https://www.aihw.gov.au/reports/cancer-screening/national-cancer-screening-programs-participation/contents/summary
20. Yun EH, Hong S, Her EY, et al. Trends in participation rates of the national cancer screening program among cancer survivors in Korea. *Cancers (Basel)*. 2020;13(1):81.
21. Wu TY, Lee J. Promoting breast cancer awareness and screening practices for early detection in low-resource settings. *Eur J Breast Health*. 2018;15(1):18-25.
22. Farooqi WA, Alayed MI, Alkhuraisi FY, Alsinan ZA, Alghadeer HA, Aldajam MA. Knowledge, attitude, and perceived barriers regarding cancer screening in Saudi Arabia. *Int J Surg Med*. 2021;7(2):34-44.
23. Mahalakshmi S, Suresh S. Barriers to cancer screening uptake in women: a qualitative study from Tamil Nadu, India. *Asian Pac J Cancer Prev*. 2020;21(4):1081-1087.
24. Fedewa SA, Yabroff KR, Bandi P, et al. Unemployment and cancer screening: Baseline estimates to inform health care delivery in the context of COVID-19 economic distress. *Cancer*. 2022;128(4):737-745.
25. Naing C, Jun YK, Yee WM, et al. Willingness to take a screening test for colorectal cancer: a community-based survey in Malaysia. *Eur J Cancer Prev*. 2014;23(2):71-75.
26. Bozhar H, McKee M, Spadea T, et al. Socio-economic inequality of utilization of cancer testing in Europe: a cross-sectional study. *Prev Med Rep*. 2022;26:101733.
27. Eng VA, David SP, Li S, Ally MS, Stefanick M, Tang JY. The association between cigarette smoking, cancer screening, and cancer stage: a prospective study of the women's health initiative observational cohort. *BMJ Open*. 2020;10:e037945.
28. Sanford NN, Sher DJ, Butler S, et al. Cancer screening patterns among current, former, and never smokers in the United States, 2010-2015. *JAMA Netw Open*. 2019,2(5):e193759.
29. Byrne MM, Davila EP, Zhao W, et al. Cancer screening behaviors among smokers and non-smokers. *Cancer Epidemiol*. 2010;34(5):611-617.