Submitted: 24 August, 2023 Accepted: 26 September, 2023 Published: 15 February, 2024 DOI:10.22514/ejgo.2024.015

ORIGINAL RESEARCH

European Journal of Gynaecological Oncology

Cancer screening behaviors and health literacy levels of women aged 30 and over in the northwest Turkey

Ülfiye Çelikkalp[1,*], Aylin Yalçın Irmak[2]

[1]Department of Public Health, Trakya University School of Medicine, 22030 Edirne, Turkey
[2]Department of Nursing, Health High School, Namık Kemal University, 59100 Tekirdağ, Turkey

***Correspondence**
ulfiyecelikkalp@trakya.edu.tr
(Ülfiye Çelikkalp)

Abstract

The aim of this study was to determine the cancer screening behaviors and the associated factors of women aged 30 years and older during the Covid-19 pandemic period. The study was carried out as a cross-sectional study with 301 women aged 30 years and older in Edirne, which is a border province in northwestern Turkiye. The data was collected *via* using the Personal Information Form and the and Turkiye Health Literacy Scale-32 (THL-32). In the statistical analysis, the number, percentage, mean, standard deviation, chi-square test, pearson correlation analysis and multivariate binary logistic regression analysis were used. The mean age of the participants is 43.66 $\pm$ 9.02 years. 74.8% of the women had not undergone any screening tests during the pandemic, and 80.7% of them displayed limited and inadequate health literacy levels. 21.9% of women aged 30 and over received Pap smear screening, 22.3% of women aged 40 and over underwent mammography, and 16.7% of women aged 50 and over had screening colonoscopy. Based on the results of multivariate regression analysis, those with adequate health literacy (Odds Ratio (OR): 4.421, 95% Confidence Interval (CI): 1.114–17.539), those who had undergone breast examination performed by a physician (OR: 22.761, 95% CI: 5.930–87.364), and those who participated in papsmear screening (OR: 4.509, 95% CI: 1.605–12.672) were more likely to participate in mammography screening. Women who had a breast examination performed by a physician were also more likely to participate in pap-smear screening (OR: 1.139, 95% CI: 1.074–1.965) and colonoscopy screening (OR: 7.924, 95% CI: 2.384–26.375). The research group showed low levels of participation in cancer screening tests and low levels of health literacy. It is necessary to conduct more awareness-raising campaigns for target groups to encourage them to participate in the screening programs and to improve their health literacy.

Keywords

Covid-19; Women; Cancer screening; Health literacy

1. Introduction

According to the World Health Organization-International Agency for Research on Cancer (IARC) 2020 data, the worldwide burden of cancer is estimated to increase when the rates reported as 19.3 million new cases and 10 million deaths are compared with the rates of 18.1 million new cases and 9.6 million deaths in 2018.

In the year 2020, the statistics revealed a notable shift in cancer diagnosis trends. Female breast cancer, with 2.3 million new cases (11.7%), overtook lung cancer (11.4%) to become the most commonly diagnosed cancer. After breast cancer, the most frequently diagnosed cancers in 2020 were lung cancer (11.4%), colorectal cancer (10.0%), prostate cancer (7.3%), and stomach cancer (5.6%) [1]. Breast cancer is the most commonly diagnosed cancer in females and is the leading cause of cancer-related deaths. In terms of mortality rates, breast cancer is followed by lung cancer and colorectal cancer. Moreover, it is predicted that cancer, currently the second most common cause of death worldwide, will increase rapidly and be the leading cause of death in the next decade [2].

Cancer is an immensely challenging disease to combat in every aspect. Nonetheless, it is an undeniable truth that the primary strategy in the battle against cancer is to minimize its occurrence through prevention and to diagnose those who are already affected by cancer at an early stage [3]. Well-planned, multidisciplinary, scientific and cost-effective protection programs should be developed to control the disease Treating and recovery of the people with the disease when it's caught at an early stage through screening is less complicated and less costly than those with an advanced disease stage [2]. In Turkiye, cancer screening is implemented through two distinct approaches: opportunistic screening and community-based screening. Community-based cancer screenings are conducted by Cancer Early Diagnosis Screening and Education Centers (KETEM). Opportunistic screenings are provided to individu-

als who seek medical care at 2nd and 3rd level hospitals. Based on the principle of "Early diagnosis saves lives!". KETEMs conduct screening programs for breast, cervical and colorectal cancers with the goal of early detection to save patients' lives [4].

Since 2008, Turkiye has incorporated breast, cervical and colorectal cancer screenings into its National Cancer Control Program, focusing on the early detection. It is recommended to perform mammography every two years for women aged 40–69 for breast cancer screening, pap-smear and Human Palpilloma Virus (HPV)-DNA test every five years for women aged 30–65 for cervical cancer screening, fecal occult blood test every two years for men and women aged 50–70 for colon cancer screening and colonoscopy every ten years [4]. The program has been expanded in the following years, particularly to cover a wider range of breast cancer screenings. In addition to mammograms, Clinical Breast Examination (performed by a physician) is recommended once a year. However, this examination is not yet mandatory, and routine follow-up has not yet begun. In Turkey, healthcare services are a combination of publicly funded (79%) and privately operated (21%) services Furthermore, all cancer screenings offered as part of preventive healthcare services are provided to citizens free of charge through KETEM.

One of the essential factors affecting individuals' participation in cancer screening programs is their health literacy levels. Health literacy is defined as the individual's personal, cognitive and social skills that determine an individual's ability to access, understand and use the information to improve and protect their health. Although health literacy can differ based on cultural and environmental factors, inadequate education, learning difficulties and cognitive decline associated with aging are among the reasons for inadequate health literacy. This situation negatively affects individuals' participation in disease prevention activities. Many studies have shown a positive relationship between low health literacy level and limited knowledge about cancer and low cancer screening rates [5, 6].

In the last two years, the Covid-19 pandemic has spread rapidly and had a negative impact on the health system, therefore, non-urgent health services have been reduced or halted in order to reduce the risk of infection and lessen the burden on health services. In addition, individuals also postponed visiting health institutions due to the fear of infection [7]. Therefore, one of the health services most severely affected by Covid-19 has been cancer screening programs. Decline in cancer screening have been of particular concern, since routine screening of asymptomatic people has been shown to reduce morbidity and mortality related to breast, cervical, colorectal and lung cancers [8, 9].

This study aimed to determine the cancer screening behaviors of women aged 30 and over during the Covid-19 pandemic and to evaluate whether the screening behaviors displayed variations based on factors such as women's sociodemographic characteristics and health literacy levels. Specifically, we sought answers to the following questions:

- What is the participation rate of women in cancer screening tests during the Covid-19 pandemic period?
- What are the screening tests that women attend the most and what are the associated features?
- What is the health literacy level of women?
- What are the defining characteristics associated with women's health literacy level?

2. Materials and methods

2.1 Study design and participants

The cross-sectional study was conducted in the Edirne Central District in northwestern Turkey during the period of July to September 2021, involving women aged 30 years and above. The province of Edirne is situated in an urban region adjacent to both Greece and Bulgaria. In the context of the study's sample size determination, it was concluded that a minimum of 265 samples, with a statistical power of 95%, a margin of error of 5%, and an effect size of $d = 0.20$, would be adequate based on a power analysis conducted using the G*Power v3.1.9.7 (Heinrich-Heine-Universität Düsseldorf, Düsseldorf, Germany), software (N = 285). Due to convenient access to the cases and in order to enhance the study's statistical power, the final sample size was set to be 301.

The study group consisted of women who did not have any mental disability, were able to speak Turkish, resided in the provincial center of Edirne, were 30 years of age and older, volunteered to participate and complete the online questionnaire.

2.2 Data collection tools

2.2.1 Personal information form

The form, created by the researchers in alignment with relevant literature, consists of two parts. The first part consists of questions regarding health and sociodemographic characteristics (age, marital status, educational status, financial status, social security, employment status, chronic disease, physical exercise), and the second part includes questions about cancer history in first-degree family members, self-breast examination, breast examination by a physician, mammography, pap smear, colonoscopy, fecal occult blood test (FOBT) and undergoing any screening test during the pandemic period.

2.2.2 Turkish health literacy scale (THL-32)

The Turkish Health Literacy Scale (THL-32), is developed on the basis of the conceptual framework developed by the European Health Literacy Research Consortium, was launched in 2016 by the Ministry of Health after conducting reliability and validity studies. It was developed as a 4-point Likert scale consisting of 32 items. It consists of a total of six components: two aspects (treatment and service and disease prevention/health promotion) and four process (accessing health-related information, understanding health-related information, evaluating health-related information, using/implementing health-related information). Each of the items in the scale is evaluated using a scale of 0 to 4 (1 = very difficult, 2 = difficult, 3 = easy, 4 = very easy, 0 = no idea). The score range is 0 to 128. To simplify the calculation, the total score obtained from the THLS-32 scale was standardized using the formula "Index = (mean − 1) × (50/3)", resulting in a standardized score falling within the range of 0–50. Following the calculation, in order to identify

vulnerable groups, health literacy is categorized as "Inadequate and Problematic" for scores ranging from 0 to 33 points, and as "Adequate and Excellent" for scores exceeding 33 to 50 points [10]. The overall internal consistency coefficient of the THL-32 scale for the sample group of this study was found to be 0.79. The Cronbach alpha value of the scale for this study was 0.93.

2.3 Data collection procedure

The study data was collected through an online survey conducted on a web-based platform. The survey was carried out on the 16th month of the implementation of COVID-19 control measures in Turkey. Data was collected by snowball sampling method and using google survey. Women residing in the province center of Edirne were invited to take part in the study *via* social networks such as Facebook, Twitter, Instagram and WhatsApp groups. Furthermore, the women who were accessed were requested to forward the questionnaire to the women in their circle who met the inclusion criteria for the study. Individuals who met the inclusion criteria of the survey and consented to participate in the study were sent the link of the online survey and the data were received online. In order to prevent the same people from responding to the survey and the same people not responding again, the feature that can send the survey form only once from a device (phone, e-mail, *etc.*) has been selected in the settings section of Google Forms. Participants completed the survey in a maximum of 20 minutes.

2.4 Data analysis

In the study, IBM SPSS Statistics Version 23 (IBM, Armonk, NY, USA) program was used for the statistical analysis of the acquired data. Descriptive statistics for continuous variables in the study are expressed as mean, standard deviation, minimum and maximum values, while categorical variables are expressed as number and percentage.

The screening test participation rate is calculated based on the age at which the test is recommended by the Ministry of Health. For the study, calculations were made on women aged 40 years and over (n = 184) for mammography participation and 50 years and over (n = 108) for colonoscopy participation. As pap smear screening, self-breast examination and clinical breast examination are recommended for individuals aged 30 and older, the calculation for these measures encompassed the entire sample group (n = 301). Chi-square test was used to determine the correlations between the categorical variables. The association between some of the characteristics of the participants and their smear, mammography and colonoscopy screening behaviors was analyzed using multivariate binary logistic regression analysis. The Hosmer-Lemeshow goodness-of-fit test was used to evaluate how well the model fit the data. The explanatory power of the model was evaluated with Nagelkerke R-squared. Pearson correlation analysis was used to determine the relationship between the continuous variable age and THL-32 score. The statistical significance level for the calculations was set at 5%. The results were assessed within a 95% confidence interval, and statistical significance was determined with a threshold of $p < 0.05$.

3. Results

Table 1 presents the key findings related to the 301 participants' sociodemographic attributes, health status, cancer screening history and behavioral characteristics. The participants had a mean age of 43.66 ± 9.02 years, with a majority (65.1%, n: 196) falling within the 30–49 age range. Furthermore, 85% (n: 256) of the participants were married, 52.8% (n: 159) had attained a university-level education or higher, and 58.1% (n: 175) described their economic status as maintaining a balance between income and expenditure. A significant portion (89.4%, n: 269) of the participants possessed social security, while 51.2% (n: 154) were currently unemployed.

In terms of health, 65.1% (n: 196) of the participants reported not having any chronic illnesses. Physical activity levels were notably low, with 82.4% (n: 248) engaging in rare or no regular exercise. Lastly, 54.5% (n: 164) of the participants indicated that none of their first-degree relatives had a history of cancer.

Among the women who took part in the study, the findings revealed that Self-breast examinations were performed irregularly by 67.8% (n: 204) of the participants. Regular pap smear tests were reported by 21.9% (n: 66) of the women. In the group of 184 women aged 40 and above who should ideally receive mammography screening, 77.7% (n: 144) had never undergone a mammogram. In the 50–69 age group consisting of 108 women, 71.3% (n: 107) had never undergone FOBT examination, and 83.3% (n: 90) had never participated in colonoscopy screening. Only 25.2% of individuals had received at least one screening test from the start of the Covid-19 pandemic in Turkey, which began in March 2020. According to the THL-32 scale, 80.7% (n: 243) of the participants fell into the "Inadequate-Limited Health Literacy" category. These findings provide insights into the screening behaviors and health literacy levels of the study participants (Table 1).

When we analyzed the socio-demographic and health characteristics of the participants and their behavioral traits regarding cancer screening tests, we uncovered noteworthy disparities. Specifically, we observed statistically significant distinctions in favor of individuals with higher income compared to their expenditure (χ^2: 10.985; p: 0.004), those possessing health insurance (χ^2: 5.141; p: 0.023), those who were employed (χ^2: 8.132; p: 0.004), individuals diagnosed with chronic illnesses (χ^2: 5.119; p: 0.024), and those who had undergone cervical cancer screening.

As shown in **Supplementary Table 1**, women who exercised regularly were more likely to perform breast self-examination than those who did not, and the difference was statistically significant (χ^2: 6.455; p: 0.040). There was a significant difference in favor of those who had a clinical breast examination test, those who did regular physical exercise (χ^2: 3.911; p: 0.048) and those who had a history of cancer in first-degree relatives (χ^2: 5.952; p: 0.015).

There were significant differences among women aged 40–69 years who underwent mammography screening in favor of those with social security (χ^2: 4.011; p: 0.033), those who were unemployed (χ^2: 6.250; p: 0.010), those who performed regular physical exercise (χ^2: 8.597; p: 0.005) and those who

TABLE 1. Socio-demographic, health and behavioral characteristics related to cancer screening tests in women (n = 301).

Variables	% (n)/Mean ± SD
Age	43.66 ± 9.02
Age Category (yr)	
30–49	65.1 (196)
50–69	34.9 (105)
Marital status	
Married	85.0 (256)
Single	15.0 (45)
Educational Status	
High school or Less	47.2 (142)
University or More	52.8 (159)
Economic Status	
Income less than expenditure	20.3 (61)
Income equal to expenditure	58.1 (175)
Income more than expenditure	21.6 (65)
Social Security	
Present	89.4 (269)
Absent	10.6 (32)
Employment Status	
Employed	48.8 (147)
Unemployed	51.2 (154)
Chronic Disease	
Present	34.9 (105)
Absent	65.1 (196)
Regular physical activity	
Sometimes-never	82.4 (248)
Always	17.6 (53)
Family history of cancer	
Present	45.5 (137)
Absent	54.5 (164)
THL-32	
Inadequate/limited	80.7 (243)
Adequate/excellent	19.3 (58)
Pap smear	
Yes	21.9 (66)
No	78.1 (235)
BSE	
Never	24.6 (74)
Regularly	67.8 (204)
Irregularly	7.6 (23)
CBE	
No-never	67.8 (204)
Regularly	32.2 (97)

TABLE 1. Continued.

Variables	% (n)/Mean ± SD
Mammography (40–69 age) n = 184	
Yes	22.3 (41)
No-never	77.7 (143)
50–69 age colonoscopy (n = 108)	
Once-regularly	16.7 (18)
Never-never heard	83.3 (90)
50–69 age fecal occult blood test (n = 108)	
I've never heard of it	71.3 (107)
Regularly	28.7 (31)
Screening test during the pandemic period (n = 301) (March 2020 to present)	
Never	74.8 (225)
At least once	25.2 (76)

THL-32: Turkey Health Literacy Scale; BSE: Breast self-examination; CBE: Clinical breast examination; SD: Standard deviation.

had a history of cancer in first-degree relatives (χ^2: 2.184; p: 0.047).

For colorectal cancer screening among women aged 50–69, significant differences were observed in favor of those who underwent Fecal Occult Blood Testing (FOBT), those who engaged in regular physical exercise (χ^2: 4.558; p: 0.034) those who underwent colonoscopy testing (χ^2: 3.520; p: 0.049) and who were employed (**Supplementary Table 1**).

According to multivariate binary logistic regression analysis, women who underwent clinical breast examinations performed by a physician in particular, had a higher likelihood of participating in pap smear, mammography and colonoscopy screenings. Furthermore, women with sufficient health literacy were more likely to participate in cervical cancer (pap smear) and breast cancer (mammography) screenings. Additionally, women who had fecal occult blood tests (FOBT) had a significantly higher participation rate in colonoscopy screenings compared to those who did not (7.9 times higher), (Table 2, $p < 0.05$).

In particular, individuals with sufficient health literacy exhibited a substantially increased likelihood of engaging in mammography screening, with a 4.42-fold higher participation rate. Furthermore, women who practiced self-breast examinations, received clinical breast examinations, and underwent pap smear tests demonstrated a significantly increased inclination to participate in mammography screenings with participation rates being 4.42 times, 22.76 times and 4.50 times higher, respectively ($p < 0.05$) as illustrated in Fig. 1.

Upon investigating the connection between the age of the research group and their health literacy scale scores, a subtle yet meaningful negative correlation was detected ($r = -0.176$, $p < 0.05$). This implies that as participants' age advances, their health literacy scores tend to decrease (Table 3).

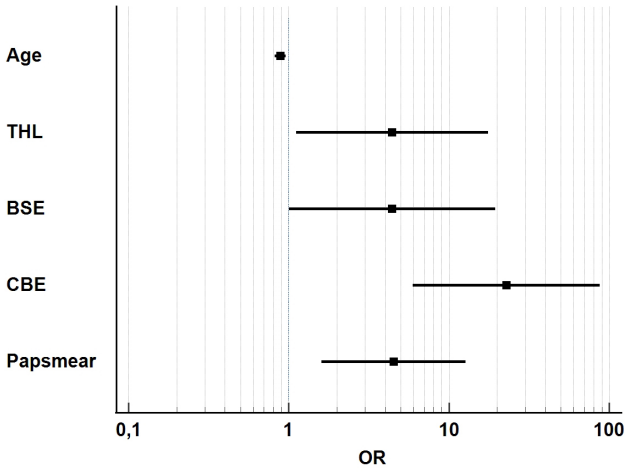

FIGURE 1. Odds ratios of independent predictors for mammography screening. OR: Odds Ratio; THL: Turkiye Health Literacy; BSE: Breast self-examination; CBE: Clinical breast examination.

4. Discussion

In Turkey, approximately 90% of the population has health coverage, with a remaining 10% opting for paid healthcare services. Nonetheless, certain healthcare initiatives within the country, such as KETEM screenings, are offered free of charge. Likewise, during the Covid-19 pandemic, healthcare services were provided without any cost. However, it is worth noting that the Covid-19 pandemic has had a profound impact on healthcare services, leading to the cancellation or rescheduling of numerous medical procedures, elective surgeries and non-urgent planned operations [11]. In many countries, there has been a reduction of over 90% in the availability of screening, diagnosis and treatment services [8], and

TABLE 2. The relationship between sociodemographic characteristics and screening behaviors of participants according to multivariate binary logistic regression analysis.

Variables	Pap smear (30 age up)		Mammography (40 age)		Colonoscopy (50 age up)	
	OR (%95 GA)	*p*	OR (%95 GA)	*p*	OR (%95 GA)	*p*
Age	1.011 (0.978–1.046)	0.518	0.885 (0.819–0.956)	0.002	1.025 (0.907–1.163)	0.700
THL	0.585 (0.279–1.230)	0.047	4.421 (1.114–17.539)	0.035	0.476 (0.079–2.966)	0.103
BSE	1.117 (0.398–3.140)	0.833	4.424 (1.003–19.510)	0.048	0.798 (0.108–5.857)	0.820
CBE	1.139 (1.074–1.965)	0.001	22.761 (5.930–87.364)	0.001	3.881 (1.083–18.076)	0.044
Papsmear	NA	NA	4.509 (1.605–12.672)	0.001	0.276 (0.054–1.293)	0.103
Mammography	NA	NA	NA	NA	1.715 (0.337–8.919)	0.521
FBOT	NA	NA	NA	NA	7.924 (2.384–26.375)	0.001
Colonoscopy	NA	NA	NA	NA	NA	NA

OR: Adjusted Odds Ratio; CI: Confidence Interval; NA: Not applicable; Pap smear: Hosmer and Lemeshow test: chi square = 4.897, p = 0.769, Nagelkerke R square = 0.233 Mammography: Hosmer and Lemeshow test: chi square = 8.683, p = 0.370, Nagelkerke R square = 0.609, Colonoscopy: Hosmer and Lemeshow test: chi square = 8.782, p = 0.365, Nagelkerke R square = 0.288.
THL: Turkiye Health Literacy; BSE: Breast self-examination; CBE: Clinical breast examination; FBOT: Fecal Occult Blood Test.

TABLE 3. The relationship between participants' health literacy scale score and their age.

Variable	THL-32
Age	
	$r = -0.176$
	$p = 0.002$

Note: r, correlation coefficient. THL-32: Turkiye Health Literacy Scale-32.

community-based cancer screening programs were suspended [11]. Comparing pandemic-era screening data to that of 2019, a significant decrease in cancer screening rates during the lockdown was evident [8, 9].

A study carried out by the International Agency for Cancer Research (IARC) to assess the impact of Covid-19 revealed that, in low- and middle-income countries, screening decreased by 61.1%, diagnosis by 44.4%, and treatment by 22.2% when compared to the period before the pandemic [12]. In a study involving approximately 11 million participants in the United States, it was demonstrated that engagement in breast cancer screenings plummeted by a staggering 96% [9]. In a separate study, participation in breast cancer screenings declined by 87% [13]. Since the beginning of the pandemic in the United Kingdom, there has been a striking 75% decrease in the number of applications for cancer screening services due to the suspension of all screening services. This situation has been reported to hinder the diagnosis of approximately 2300 cancers each week [14]. In a different study, cervical cancer screenings experienced a substantial decline, dropping to 78% in the 21–29 age group and to 82% in women aged 30–65 [9]. Yet another study reported a reduction to 84% [13]. In a retrospective study conducted in the United States by Patt *et al.* [15] (2020), it was discovered that breast cancer screenings experienced an 85% reduction in April 2020 compared to April 2019, while colon cancer screenings decreased by 74% [15]. According to data from the Turkish Ministry of Health, cancer screenings for nine million people were conducted in 2019, but this number dropped to three million in 2020 [16]. This study revealed that during the pandemic, three out of every four women did not undergo any screening tests. While the extent of these findings may vary from one country to another, it is evident that the Covid-19 pandemic had a substantial overall impact on reducing cancer screening tests. Engaging in cancer screening behaviors is recognized as a key factor in reducing cancer-related mortality [3]. Although the temporary suspension of cancer screening programs may offer immediate relief to the healthcare system, it is expected that this approach will result in significant long-term challenges. Our study's results indicate that the global decline in cancer screenings during the pandemic can be attributed to individuals delaying these screenings due to apprehensions and worries related to the virus, as well as public health measures like stay-at-home advisories, physical distancing protocols, and various restrictions such as curfews and travel bans, among other factors.

The study highlights that among women, breast cancer screenings are the most commonly attended. Although the frequency of self-breast examinations may not be consistently high, a significant number of women are reported to engage in them regularly, as indicated in several studies. However, it has been observed that the rates of breast self-examination (BSE), clinical breast examination (CBE), and mammography screenings are relatively low. In the literature, it has been noted that the percentages of women practicing BSE, undergoing clinical breast examination (CBE), and receiving mammography screenings in developing countries can vary, ranging from 17% to 64.7%, 20% to 63% and 20% to 69.1%, respectively [17–22]. Prior to the pandemic, studies conducted

at the local level in Turkey revealed that the percentages of women engaging in BSE, undergoing CBE and receiving mammography screenings ranged from 13% to 49%, 15% to 36% and 20% to 38%, respectively [23–27].

The study revealed that the strongest association was between mammography screening and health literacy, as well as CBE and pap smear tests. Women with adequate health literacy were 4.42 times more likely to undergo mammograms. Additionally, another study yielded similar results, demonstrating that individuals with high health literacy levels exhibited increased participation in breast cancer screenings and various other tests [6]. This scenario acts as a connecting link between knowledge and action. As emphasized in existing literature, heightened awareness of breast cancer plays a pivotal role in early detection, broadening treatment choices, decreasing cancer-related fatalities, prolonging survival rates and enhancing overall quality of life [5]. In this context, healthcare professionals wield significant influence in promoting engagement in screening tests. Notably, individuals who had CBE were 4.42 times more inclined to partake in mammography screenings. This finding underscores the positive aspect that individuals who undergo CBE are more likely to be recommended for mammography as a follow-up assessment. Similarly, individuals participating in one screening program tend to participate in others as well Research has indicated that women who undergo pap smear tests exhibit a heightened awareness of breast cancer [28]. Nonetheless, it is worth noting that these rates fall significantly below the national mammography target, given that the goal for community-based mammography screening in Turkey is presumed to be 70% [4]. Breast cancer stands as the most prevalent cancer and the foremost cause of death among women across the globe [1]. In 2020 alone, roughly 2,261,000 individuals received a diagnosis of breast cancer, and tragically, 684,996 patients succumbed to this disease [1]. The substantial decline in the utilization of breast cancer screenings, which are a primary preventative healthcare service for women's well-being, is a cause for concern regarding the future.

Based on the findings derived from the univariate analyses in this study, certain factors such as favorable economic status, employment status, regular physical activity and a family history of cancer were associated with increased engagement in screenings. Educational status, income level, employment status and having social insurance are recognized as social determinants of health and influential factors in driving behavioral changes. The reason for the higher number of screenings in the non-working group is thought to be related to the educational level of our research group. The proportion of female participants with a university degree (52.8%) in the study is approximately twice the average of university-educated women in Turkey (20.9%) [29]. These outcomes align with existing literature, underscoring that women with a strong health perception are more inclined to participate in screening initiatives [6]. Moreover, individuals who incorporate physical activity into their lifestyles may demonstrate a predisposition towards adopting health-protective behaviors. This discovery is in line with corroborating evidence from the literature and theoretical understanding [6].

In this study, it was found that only one out of every five women undergoes regular pap smear screening. Comparatively, before the pandemic in developing countries, this rate stood at 27.2% in Malaysia [30], 28.2% in Turkey [28], and 32% in Iran [31]. In contrast, developed countries exhibited significantly higher rates, with 70% of women in Finland [31], 89.1% in the USA [32], 83% in the UK [33], and a striking 94% in Greece [34] having undergone pap smear tests. However, it's worth noting that these figures experienced a notable decline during the pandemic, dropping to as low as 44.1% in the USA [35] and 52.2% in Korea [36]. By June 2020, it is reported that the average 5-year screening rate had fallen below 40% [13]. Furthermore, in Germany, around 46% of women aged 30–49 chose to delay their cancer screening [37]. While the pandemic undoubtedly contributed to the reduced screening rates, it is also believed that the lack of adequate information about pap smear tests in local studies may have played a role in this decline. It's essential to note that cervical cancer ranks as the fourth most frequently diagnosed cancer and the third leading cause of cancer-related fatalities among women [1]. Given these statistics, it becomes imperative to promptly implement a screening program targeting women within the at-risk age group.

However, the study found that women with lower incomes, those who were unemployed, and those lacking social security coverage were less likely to undergo pap smear screenings. These factors, known as social determinants of health, are fundamental factors influencing health preservation and advancement. It is anticipated that addressing these issues will require long-term efforts, including expanding the country's healthcare systems and educational opportunities.

In 2015, the United Nations established various sustainable development goals to be achieved globally by 2030. Goal 3.4 specifically aims to reduce premature deaths caused by non-communicable diseases, including cancer, by one-third. Similarly, the 2020 World Health Assembly Resolution established ambitious targets for eliminating cervical cancer as a public health concern [38]. To accomplish this, comprehensive screening programs, HPV vaccination initiatives and the inclusion of all eligible women have been advocated [39]. As a result of these global objectives, it is emphasized that vaccination and thorough screening with HPV tests have the potential to prevent 12.5–13.4 million cases of cervical cancer in the next half-century [40]. Urgent measures are imperative to address the decline in screenings during the pandemic and boost participation in these critical screenings.

Colorectal cancer ranks as the third most common cancer in terms of both incidence and mortality among men. Among women, it holds the second position in terms of the most frequently diagnosed cancers and ranks fourth in terms of cancer-related mortality rates [1]. In this study, it was revealed that approximately one in six individuals took part in colorectal cancer screening. In the period from 2013 to 2018, the Turkish Ministry of Health reported that the coverage rate for colorectal cancer (CRC) screenings in the National Control Program for CRC ranged from approximately 20% to 30% [4]. In a multicenter study encompassing the Asia-Pacific region, the average participation rate in colorectal cancer screenings was 27%, with the highest rate observed in the Philippines and the lowest in India [41]. Likewise, in several studies involving adults, it

was observed that the frequency of participation in fecal occult blood tests (FOBT) was twice as high as that in colonoscopy screenings [28]. There are various factors contributing to reduced participation in cancer screenings, and it is crucial to identify these factors to address the issue effectively.

The study revealed that approximately 80% of the participants had not heard about fecal occult blood testing and had not undergone the test. However, despite the low awareness of FOBT, it is encouraging to note that those who were aware of it had undergone this screening. There is evidence indicating an increase in community participation rates for fecal occult blood testing compared to previous years. For instance, participation in FOBT screening was reported to be 6.52% in a study conducted in 2015, while it reached 27% in another study conducted in 2021 [3, 6]. The observed increase in participation rates can be attributed to several factors, including heightened education and awareness about colorectal screenings, as well as enhanced accessibility to these tests. Notably, knowledge of and engagement in colorectal screening tests are notably higher among individuals in the 50–69 age group and those with a family history of cancer. Advanced age and a family history of cancer tend to amplify the perception of cancer risk, subsequently leading to a greater adoption of health-protective practices [42]. Furthermore, the greater awareness of screening among individuals who engage in regular exercise aligns with and reinforces this finding.

Based on the THL-32 survey score, a striking 80.7% of the study participants exhibited inadequate and problematic levels of health literacy. These figures contrast with findings from other studies. For instance, a study conducted by the Ministry of Health in Turkey reported rates of 68.9% and 86.5% for inadequate health literacy levels [6]. However, it's important to note that some studies have reported relatively better health literacy levels [43]. Nevertheless, when comparing the health literacy levels of participants in this study with data from the United States and Europe, it becomes apparent that our health literacy levels are lower. The European Health Literacy study, which included eight European Union member countries, revealed the following breakdown: 12.4% had insufficient health literacy, 35.2% had problematic health literacy, 36% had adequate health literacy, and 16.5% had excellent health literacy. In contrast, while low health literacy was observed in 29% of developed countries like the Netherlands, it was found in 62% of developing countries like Bulgaria [44]. It's evident that Turkey's results indicate insufficient health literacy compared to the European countries surveyed. In light of these findings, it is unlikely that participants with low health literacy, as well as those with excellent health literacy, will exhibit high levels of participation in cancer screening. Indeed, previous research has indicated that individuals with poor health literacy are less likely to adhere to colorectal screening, presenting a significant barrier to their participation in screening initiatives [6, 45].

Cancer screenings are pivotal for the early detection of cancer, making them a critical component of healthcare. In light of these compelling statistics, it is imperative to swiftly implement a comprehensive screening program for women in the age group at risk. The higher health literacy levels among young women may signify the potential for increased adoption of positive health behaviors in the years to come. Ensuring that this generation, with its heightened awareness, does not miss out on screenings will be essential in driving increased community participation in cancer screening programs.

This study has certain limitations that should be considered. Firstly, the data presented in the research pertain to a single province in Turkey. Given the substantial regional differences between the eastern and western parts of the country, as well as the presence of many migrants from the eastern regions, the findings may not be fully representative of the entire nation. Additionally, the study is cross-sectional in nature and relies on self-reported data. Consequently, it is not possible to establish a causal relationship among the variables examined in the study. Future research endeavors should aim for larger sample sizes specific to particular age groups to address these limitations.

However, it's worth noting the study's strengths. It places a critical focus on cancer screenings, which are vital healthcare services that were significantly disrupted during the pandemic, and are known to have a substantial impact on survival rates. Moreover, this research represents one of the few studies conducted in Turkey during the pandemic period that specifically addresses early cancer diagnosis, contributing to our understanding of this critical issue.

5. Conclusions

Women aged 30 and older exhibit limited engagement in cancer screening tests and demonstrate low levels of health literacy. This phenomenon can be primarily attributed to the adverse impact of the global response to the Covid-19 pandemic. The lessons learned from previous experiences were not effectively applied during the Covid-19 crisis. Research has shown that during pandemics like Covid-19, healthcare systems can rapidly deteriorate, highlighting the urgent need for strategic adjustments, preparedness measures and action plans in all countries to maintain preventive healthcare services. To achieve this objective, it is advisable to carry out more comprehensive sample studies, employ focus groups or conduct in-depth interviews. These methods will help elucidate the underlying factors that influence individuals' participation in cancer screening examinations.

The literature suggests that the most significant barrier to behavior change is lack of awareness and/or negative perception. This can be changed through education, counseling and interventions to increase access to health services. Primary healthcare institutions should organize education and counseling programs to improve health literacy and explain the benefits of screening programs. Moreover, In the context of cancer screening, we should improve our healthcare system to make it easier for people to access information and get involved in the community, which can lead to notable innovations and adaptations. Additionally, we propose evaluating screening behaviors through health facility records rather than relying on self-reported data.

ABBREVIATIONS

BSE, Breast self-examination; CBE, Clinical breast examination; THL-32, Turkey Health Literacy Scale; IARC, Interna-

tional Agency for Research on Cancer; FBOT, Fecal Occult Blood Test.

AVAILABILITY OF DATA AND MATERIALS

The study data is accessible through formal channels and by adhering to the university's procedures. However, due to specific limitations, we are unable to publicly release the data, in line with our research protocol.

AUTHOR CONTRIBUTIONS

ÜÇ—designed the research study. ÜÇ and AYI—performed the research. ÜÇ and AYI—analyzed the data. ÜÇ—wrote the manuscript. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The conduction of the study was approved by the Ministry of Health of the Republic of Turkey and the Non-Interventional Clinical Research Ethics Committee (TUTF-2021/281) of Trakya University Faculty of Medicine. An informed consent form has been integrated into the initial page of the online data collection form. Once participants had reviewed the consent form and freely consented to partake in the study, they proceeded to complete the data collection form.

ACKNOWLEDGMENT

The authors express their heartfelt gratitude to the women who wholeheartedly supported and participated in this study.

FUNDING

This research was conducted without any external funding. The authors received no financial support or resources from any public or private organizations. All the expenses were covered by the researchers.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

SUPPLEMENTARY MATERIAL

Supplementary material associated with this article can be found, in the online version, at https://oss.ejgo.net/files/article/1754757750013739008/attachment/Supplementary%20material.docx.

REFERENCES

[1] International Agency for Research on Cancer (IARC). World cancer report: cancer research for cancer prevention world cancer reports. 2020. Available at: https://www.iarc.who.int/cards_page/world-cancer-report/ (Accessed: 21 May 2022).

[2] Tuncez IH, Aksoy N, Koç M. National cancer screening program results; a city example. Phoenix Medical Journal. 2021; 3: 69–73.

[3] Yakşi N. How has the COVID-19 Pandemic affected cancer screening activities? International Research in Health Sciences. 2023; XIII: 77–94. (In Turkish)

[4] Turkey Ministry of Health. Turkey cancer control programme 2013–2018. 2021. Available at: https://www.iccp-portal.org/system/files/plans/Turkey%20NCCP%2018%20Apr%C4%B1l%202022.pdf (Accessed: 20 April 2022).

[5] Uslu-Sahan F, Mert-Karadas M, Yıldız T, Koc G. Effect of health literacy on the awareness of gynecological cancer among women in Turkey. Indian Journal of Gynecologic Oncology. 2023; 21: 15.

[6] Pancar N, Mercan Y. Association between health literacy and colorectal cancer screening behaviors in adults in northwestern Turkey. European Journal of Public Health. 2021; 31: 361–366.

[7] Basu P, Alhomoud S, Taghavi K, Carvalho AL, Lucas E, Baussano I. Cancer screening in the coronavirus pandemic era: adjusting to a new situation. JCO Global Oncology. 2021; 7: 416–424.

[8] Corley DA, Sedki M, Ritzwoller DP, Greenlee RT, Neslund-Dudas C, Rendle KA, *et al*. Cancer screening during the coronavirus disease-2019 pandemic: a perspective from the national cancer institute's PROSPR consortium. Gastroenterology. 2021; 160: 999–1002.

[9] Miller MJ, Xu L, Qin J, Hahn EE, Ngo-Metzger Q, Mittman B, *et al*. Impact of COVID-19 on cervical cancer screening rates among women aged 21–65 years in a large integrated health care system—Southern California, January 1–September 30, 2019, and January 1–September 30, 2020. Morbidity and Mortality Weekly Report. 2021; 70: 109–113.

[10] Okyay P, Abacigil F, Harlak H. Turkey health literacy scale reliability and validity study. In P Okyay (ed). Turkey Health Literacy Scale (TSOY)-32 (pp. 43–60). 1st edn. Anıl Press: Ankara, Turkey. 2016.

[11] Alkatout I, Biebl M, Momenimovahed Z, Giovannucci E, Hadavandsiri F, Salehiniya H, Allahqoli L. Has COVID-19 affected cancer screening programs? A systematic review. Frontiers in Oncology. 2021;11: 675038.

[12] Villain P, Carvalho AL, Lucas E, Mosquera I, Zhang L, Muwonge R, *et al*. Cross-sectional survey of the impact of the COVID-19 pandemic on cancer screening programs in selected low-and middle-income countries: study from the IARC COVID-19 impact study group. International Journal of Cancer. 2021; 149: 97–107.

[13] DeGroff A, Miller J, Sharma K, Sun J, Helsel W, Kammerer W, *et al*. COVID-19 impact on screening test volume through the National Breast and Cervical Cancer early detection program, January–June 2020, in the United States. Preventive Medicine. 2021; 151: 106559.

[14] Luu T. Reduced cancer screening due to lockdowns of the COVID-19 pandemic: reviewing impacts and ways to counteract the impacts. Frontiers in Oncology, 2022; 12: 955377.

[15] Patt D, Gordan L, Diaz M, Okon T, Grady L, Harmison M, *et al*. Impact of COVID-19 on cancer care: how the pandemic is delaying cancer diagnosis and treatment for American seniors. JCO Clinical Cancer Informatics. 2020; 26: 1059–1071.

[16] Türk Tabipleri Birliği. Aile hekimliği pandemi anketi Aralık 2020 sonuçları. 2020. Available at: https://www.ttb.org.tr/kollar/_ahek/haber_goster.php?Guid=dd35f1fc-446d-11eb-b786-a19f39419a42 (Accessed: 05 October 2021).

[17] Ismail SN, Nor Azman ND, Thomas Sudin AEL, Shamsuddin NS. Evaluation of knowledge, practice, and barriers towards breast self-examination (BSE). Malaysian Journal of Medicine & Health Sciences. 2022; 18: 190–196.

[18] Kwok C, Lee MJ, Lee CF. Breast cancer perceptions and screening behaviors among Korean women in Australia. Journal of Immigrant and Minority Health. 2020; 22: 126–133.

[19] Kwok C, Endrawes G, Lee CF. Breast cancer screening beliefs questionnaire: psychometric properties assessment of the Arabic version. European Journal of Oncology Nursing. 2016; 20: 42–48.

[20] Ngan TT, Jenkins C, Minh HV, Donnelly M, O'Neill C. Breast cancer screening practices among Vietnamese women and factors associated with clinical breast examination uptake. PLOS ONE. 2022; 17: e0269228.

[21] Othman A, Ahram M, Al-Tarawneh MR, Shahrouri M. Knowledge, attitudes and practices of breast cancer screening among women in Jordan. Health Care for Women International. 2015; 36: 578–592.

[22] National Health Service. Breast screening programme, England 2019–20. 2021. Available at: https://digital.nhs.uk/data-and-information/publications/statistical/breast-screening-programme/england---2019-20 (Accessed: 06 January 2023).
[23] Ceyhan B, Atakır K. Özevci G. Investigation of women's awareness of breast cancer screening methods in Turkey. Journal of Global Health & Natural Sciences. 2022; 5: 123–133. (In Turkish)
[24] Altu E, Çıtıl R, Okan İ. Women's breast cancer concerns and risk factors and their approaches to cancer early diagnosis methods. Medical Research Reports. 2023; 6: 32–46. (In Turkish)
[25] Ertem G, Donmez YC, Dolgun E. Determination of the health belief and attitude of women regarding breast cancer and breast self-exam. Journal of Breast Cancer. 2017; 13: 62–66.
[26] Hocaoglu M, Ersahin AA, Akdeniz E. Evaluation on the practice and behaviour of women applied for gynecology outpatient clinics about screening methods for early diagnosis of breast cancer. European Journal of Breast Health. 2017; 13: 150–155.
[27] Sohbet R, Karasu F. Investigation of the knowledge, behavior and applications of their women towards breast cancer. Gumushane University Journal of Health Science. 2017; 6: 113–121.
[28] Kurtgöz, A, Sonkaya Zİ, Keskin S. The effect of the COVID-19 pandemic on the use of cancer early diagnosis screening and training centers services. Balıkesir Journal of Health Sciences. 2023; 12: 195–200.
[29] Turkish Statistical Institute. Women in statistics. 2023. Available at: https://data.tuik.gov.tr/Bulten/Index?p=Istatistiklerle-Kadin-2022-49668 (Accessed: 14 September 2023).
[30] Nwabichie CC, Manaf RA, Ismail SB. Factors affecting uptake of cervical cancer screening among African women in Klang Valley, Malaysia. Asian Pacific Journal of Cancer Prevention. 2018; 27: 825–831.
[31] Karimy M, Azarpira H, Araban M. Using health belief model constructs to examine differences in adherence to pap test recommendations among Iranian women. Asian Pacific Journal of Cancer Prevention. 2017; 18: 1389–1394.
[32] Virtanen A, Anttila A, Luostarinen T, Malila N, Nieminen P. Improving cervical cancer screening attendance in Finland. International Journal of Cancer. 2015; 136: E677–84.
[33] Lo SH, Waller J, Wardle J, von Wagner C. Comparing barriers to colorectal cancer screening with barriers to breast and cervical screening: a population-based survey of screening-age women in Great Britain. Journal of Medical Screening. 2013; 20: 73–79.
[34] Simou E, Maniadakis N, Pallis A, Foundoulakis E, Kourlaba G. Factors associated with the use of pap smear testing in Greece. Journal of Women's Health. 2010; 19: 1577–1585.
[35] Amuta-Jimenez AO, Smith G, Brown KK. Patterns and correlates of cervical cancer prevention among black immigrant and African American women in the USA: the role of ethnicity and culture. Journal of Cancer Education. 2022; 37: 798–805.
[36] Park H, Seo SH, Park JH, Keam B, Yoo SH, Shin A. The impact of the COVID-19 on the screening of breast and cervical cancer in Korea. Cancer Research. 2022; 82: 441.
[37] Hajek A, De Bock F, Huebl L, Kretzler B, König HH. Determinants of postponed cancer screening during the COVID-19 pandemic: evidence from the nationally representative COVID-19 Snapshot Monitoring in Germany (COSMO). Risk Management and Healthcare Policy. 2021; 14: 3003.
[38] World Health Organization. Global strategy to accelerate the elimination of cervical cancer as a public health problem. 2020. Available at: https://www.who.int/publications/i/item/9789240014107 (Accessed: 24 September 2022).
[39] Ginsburg O, Basu P, Kapambwe S, Canfell K. Eliminating cervical cancer in the COVID-19 era. Nature Cancer. 2021; 2: 133–134.
[40] Simms KT, Steinberg J, Caruana M, Smith MA, Lew J, Soerjomataram I, *et al*. Impact of scaled up human papillomavirus vaccination and cervical screening and the potential for global elimination of cervical cancer in 181 countries, 2020–99: a modelling study. The Lancet Oncology. 2019; 20: 394–407.
[41] Koo JH, Leong RWL, Ching J, Yeoh K, Wu D, Murdani A, *et al*. Knowledge of, attitudes toward, and barriers to participation of colorectal cancer screening tests in the Asia-Pacific region: a multicenter study. Gastrointestinal Endoscopy. 2012; 76: 126–135.
[42] Şahin NŞ, Üner BA. Knowledge of, attitudes toward, and barriers to participation of colorectal cancer screening in Aydın central region. The Turkish Journal of Family Practice. 2015; 19: 37–48. (In Turkish)
[43] Özdemir S, Akça H. Health literacy in Turkey. SDU Medical Faculty Journal. 2021; 28: 535–536. (In Turkish)
[44] Sørensen K, Pelikan JM, Röthlin F, Ganahl K, Slonska Z, Doyle G, *et al*. Health literacy in Europe: comparative results of the European health literacy survey (HLS-EU). The European Journal of Public Health. 2015; 25: 1053–1058.
[45] Wittich AR, Shay LA, Flores B, De La Rosa EM, Mackay T, Valerio MA. Colorectal cancer screening: understanding the health literacy needs of Hispanic rural residents. AIMS Public Health. 2019; 6: 107–120.

How to cite this article: Ülfiye Çelikkalp, Aylin Yalçın Irmak. Cancer screening behaviors and health literacy levels of women aged 30 and over in the northwest Turkey. European Journal of Gynaecological Oncology. 2024; 45(1): 96-105. doi: 10.22514/ejgo.2024.015.