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A Comparison of Risk Factors in Women with and without a Diagnosis of Breast Cancer: A Cross-Sectional Analysis from the West of Türkiye

Meme Kanseri Tanısı Alan ve Almayan Kadınlarda Risk Faktörlerinin Karşılaştırılması: Türkiye'nin Batısından Kesitsel Bir Analiz

Berna Dizer[1], Arzu Tuna[2], Ulaş Urgancı[3], Nilüfer Özgürbüz[4]

[1] Izmir Tınaztepe University, Vocational School of Health Services, Operating Room Services Program, Izmir, Turkey.

[2] Department of Surgical Nursing, Faculty of Health Sciences, Balıkesir University, Balıkesir, Turkey.

[3] Department of General Surgery, Menderes State Hospital, Izmir, Turkey.

[4] Private Nursing, İzmir, Turkey.

***Correspondence:**
Berna Dizer

E-mail: berna_kizilkaya@yahoo.com

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ABSTRACT

Introduction: To compare breast cancer (BC) risk factors in women with a BC diagnosis and in socio-demographically similar women without malignancy in western Turkey.

Methods: Descriptive, retrospective, cross-sectional study in a private hospital's surgical outpatient clinic. Cases were women diagnosed between 1 January–31 December 2020 (n=58); controls were age- and socio-demographically matched clinic attendees without malignancy (n=58) chosen by simple random sampling.

Data were abstracted from records and completed via telephone interviews conducted after ethics approval (29 December 2021) using a 38-item questionnaire. Normality (Shapiro–Wilk) and variance homogeneity (Levene) were assessed; appropriate parametric or non-parametric tests were applied. Exact two-sided p-values are reported.

Results: Groups were comparable for marital status, education, income, occupational chemical exposure, and employment ($p>0.05$). A first-degree family history of specified cancers (breast/ovarian/fallopian/prostate/melanoma) and a history of benign breast mass/cyst were more frequent in the BC group ($p=0.030$ and $p<0.001$, respectively). Menopausal status, breastfeeding and duration, age at menarche, parity, BMI, estrogen therapy, smoking, alcohol use, sports activity, diet pattern, and long-term residence near pollution sources showed no significant differences (all $p>0.05$). The number of prior mammograms correlated weakly and non-significantly with diagnosis ($r=0.03$, $p=0.73$).

Discussion and Conclusion: Family cancer history and benign breast disease distinguished women with BC, whereas many lifestyle and environmental factors did not. These markers may help target risk-based screening and follow-up in similar clinical settings.

Keywords: Breast Neoplasms, Risk Factors, Family History, Breast Diseases, Cross-sectional Studies

ÖZET

Amaç: Türkiye'nin Batı'sında, meme kanseri (MK) tanısı olan kadınlarla malignitesi olmayan ve sosyo demografik açıdan benzer kadınlar arasında MK risk faktörlerini karşılaştırmak**.**

Yöntem: Özel bir hastanenin cerrahi polikliniğinde yürütülen tanımlayıcı, retrospektif ve karşılaştırmalı çalışma. Olgular, 1 Ocak–31 Aralık 2020 arasında tanı alan kadınlardan oluştu (n=58); kontroller, malignite öyküsü olmayan ve yaş/sosyodemografik açıdan benzer poliklinik başvurucularından basit rastgele örnekleme ile seçildi (n=58). Veriler hasta dosyaları ve Hastane Bilgi Yönetim Sistemi kayıtlarından elde edilip, 38 maddelik anketle telefon görüşmeleriyle tamamlandı. İstatistikler: betimleyici ölçüler; grup karşılaştırmaları için χ^2 ve bağımsız örneklem t; ilişkiler için Pearson r (α=0,05).

Bulgular: Gruplar medeni durum, eğitim, gelir, mesleki kimyasal maruziyet ve çalışma durumu açısından karşılaştırılabilir bulundu ($p>0,05$). Birinci derece akrabalarda belirli kanserler (meme/over/tuba/prostat/melanom) ve benign meme kitle/kist öyküsü MK grubunda daha sıktı (her ikisi $p<0,05$). Menopoz durumu, emzirme ve süresi, menarş yaşı, parite, BKİ, östrojen tedavisi, sigara, alkol, spor etkinliği, beslenme biçimi ve uzun süre kirletici kaynaklara yakın yaşama açısından anlamlı fark yoktu (tümü $p>0,05$). Önceki mamografi sayısı ile tanı arasında zayıf ve anlamsız bir ilişki saptandı.

Tartışma ve Sonuç: Aile kanser öyküsü ve benign meme hastalığı MK'li kadınları ayırt ederken, birçok yaşam tarzı ve çevresel etmen ayırt edici değildi. Bu göstergelerin risk temelli tarama ve izlemde hedeflenmesi benzer klinik ortamlarda yararlı olabilir.

Anahtar Kelimeler: Meme Neoplazileri, Risk Faktörleri, Aile Öyküsü, Meme Hastalıkları, Kesitsel Çalışma

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1. INTRODUCTION

Cancer as a cause of death in Turkey comes second to diseases of the circulatory system. The Republic of Turkey Ministry of Health Database (2020), which determines the age-standardized rates of the ten most common cancers by gender, has reported that the world standard population rate of breast cancer in Turkish women is 43.4 per 100 000 persons (1).

Breast cancer represents the most prevalent malignancy among women, accounting for a significant proportion (around 25%) of all female cancer diagnoses. Data indicate that about 45.5% of breast cancer cases are identified while the disease remains localized (1).

Globally, female breast cancer is the most frequently diagnosed cancer in women. In 2020, an estimated 2.3 million new cases and 685,000 deaths were recorded worldwide, underscoring its substantial public-health burden (2).

Reducing mortality and disease burden largely depends on early detection and risk-adapted prevention. Evaluating women's susceptibility can enable earlier intervention strategies. Reducing mortality and disease burden from breast cancer largely depends on early detection. Evaluating women's susceptibility to the disease can significantly enhance early intervention strategies. Multiple domains contribute to breast cancer susceptibility, including demographic and familial/genetic factors, reproductive history, environmental characteristics, and lifestyle. Modifiable exposures such as excess body weight, physical inactivity, exogenous hormone use, and alcohol intake are consistently associated with higher risk, particularly after menopause (3,4,5,6).

Several of these factors extend cumulative hormonal exposure (e.g., early menarche, late menopause, certain hormone therapies), which is biologically plausibly linked to carcinogenesis via increased mitogenic signaling (4,7).

Risk stratification tools support targeted screening and counseling. The Gail model also referred to as the NCI Breast Cancer Risk Assessment Tool (BCRAT) estimates 5-year and lifetime risk by incorporating seven inputs: current age, age at menarche, age at first full-term birth (or nulliparity), first-degree family history of BC, prior breast biopsy, presence of atypical hyperplasia, and race/ethnicity (8).

More recently, polygenic risk score (PRS) approaches have been developed and validated across diverse ancestry compositions to provide more individualized risk predictions (9).

The present study aimed to compare breast-cancer–related risk factors between women already diagnosed with BC and age and sociodemographically similar women without a malignancy diagnosis in a clinical setting in western Turkey.

2. MATERIALS AND METHODS

2.1. Research Design

This research is a retrospective cross sectional study planned to determine breast cancer risk factors. In this study, data from patients with a breast cancer diagnosis were compared with those from healthy women who attended the same clinic but had no history of malignancy.

2.2. Place and Time of Research

The research was conducted on cases diagnosed between 1 January and 31 December 2020 at the surgical outpatient department of a private hospital where the researcher worked.

Individuals diagnosed with breast cancer were identified from among patients who had attended this clinic and had been diagnosed within the previous year. All data extraction from records and the telephone questionnaire were conducted after ethics approval, between January and March 2022.

2.3. Population and Sample

In the study, data relating to women diagnosed with breast cancer was obtained between 1 January and 31 December 2020 from patients attending the surgery outpatients' department of a private hospital where the researcher worked. At this time there was a drop in the rates of attendance at health institutions because of the worldwide COVID-19 pandemic, and this caused a restriction in the potential population. In particular, delays in diagnosis processes or disruptions in access to healthcare made it difficult to reach all individuals diagnosed with breast cancer. Therefore, the number of cases reflecting the sample may be limited.

The research population consisted of all of the women who attended this department. The individuals who constituted Group 1 of the study (women diagnosed with breast cancer) were selected from the 58 women diagnosed between these dates.

Group 2, the control group, was formed from individuals who attended the department over the same period who had similar age and socio-demographic characteristics but who had no history of malignity. These individuals were determined by a simple random sampling method: they were selected by simple random numbering and then contacted by telephone. The control group consisted of 58 healthy women who agreed to participate, and in this way, the total sample of the research consisted of 116 participants.

Sample size was determined using the G*Power 3.1 software. For the comparison of two independent groups, calculations were based on a 95% confidence interval ($\alpha = 0.05$), and statistical power of 80% ($1–\beta = 0.80$) and a moderate effect size (Cohen's d=0.55). It was found from the power analysis that the adequate number of participants for each group was 51. Since there were 58 participants in each group in the study, it was accepted that the sample size was sufficient and that this provided statistical power.

Group 1 participants were required to have a pathology-confirmed diagnosis of breast cancer as an inclusion criterion, and for Group 2 not having a history of malignancy, file information being complete, and participating voluntarily in the study.

Individuals were excluded if they refused to participate in the study, if they filled in the questionnaire form incompletely, or if they could not be contacted.

2.4. Data Collection Instrument

The data collection instrument used in the research was a questionnaire form consisting of 38 questions, developed according to a scan of the literature and in line with expert views. This form covered the participants' socio-demographic characteristics, their health histories, their reproductive histories, environmental exposure, and lifestyle habits. Demographic information of the participants age, marital status, education level and occupation as well as the anthropometric and medical characteristics of weight, height and the presence of chronic diseases were queried. Also, the reproductive and hormonal factors of a history of cancer in the individual or their family, breastfeeding, the use of birth control pills or cortisone, menarche age and menopause status were evaluated. In addition, information on environmentalconditions

such as the place of longest residence, the presence of coal-fired power plants in the vicinity, and lifestyle information such as nutritional habits, smoking and alcohol use and bra use were also obtained through the form.

Data on these variables were obtained retrospectively from patients' files and hospital information management system records. Missing information was completed through telephone conversations with the participants. The full 38-item questionnaire was added to the Journal as Supplementary Material.

2.5. Data Evaluation

Analysis of data was performed using the program SPSS 26 (IBM Corp., Armonk, NY, USA). Descriptive statistics were summarized as n (%), mean ± standard deviation, or median (IQR), as appropriate. Prior to hypothesis testing we assessed normality (Shapiro–Wilk) and homogeneity of variances (Levene). In the examination of differences between groups, the chi-square test and the independent groups t-test were used, and in analyzing the relations between variables, the Pearson correlation coefficient was used. The level of statistical significance was taken as $p < 0.05$. Analyses followed STROBE guidance for observational studies.

Standards of Ethical Conduct

This research was conducted following the decision issued by Tınaztepe University Health Sciences Ethics Committee dated 29 December 2021 and numbered 32. Permission to access patient files and the hospital information management system (HBYS) was obtained from the relevant hospital management in order to conduct the study.

Participants were informed by telephone, and they made a verbal informed statement that they agreed to participate voluntarily in the study. All data obtained in the research were anonymized, stored in accordance with the principles of confidentiality and made accessible only to the research team.

In conducting the study, the researchers followed the ethical provisions included by the World Medical Association Declaration of Helsinki, which defines ethical standards in human research. Participants' health, rights, privacy and personal data security were preserved, and participation throughout the research was entirely on a voluntary basis.

Limitations of the Research

This study has a number of methodological limitations. First, the sample of individuals diagnosed with breast cancer included only patients who were diagnosed between 1 January and 31 December 2020, which was during the worldwide COVID-19 pandemic. Under the pandemic conditions, there may have been a decrease in patient visits to healthcare institutions, and routine screening and diagnosis processes may have been interrupted. This may have reduced the number of diagnosed patients, narrowing the population of the study and limiting the representative power of the sample.

Secondly, the data collection method used in the study depended on telephone interviews and online questionnaires. This may have created recall bias and social desirability bias in the participants' responses. In particular, objectivity may be limited, because claims regarding lifestyle, environmental factors, and health behaviors are based on individual perception and recall.

Thirdly, the study was limited to individuals who attended a single center, the surgical outpatients' department of a private hospital. This reduced the generalizability of the findings and limited its applicability to a wider sample of society. Also, there is a risk of limitation to individuals of the socio-economic level who were able to attend this hospital.
Finally, due to the nature of the retrospective design, it was necessary to rely on incomplete or inaccurate records for some variables, and although attempts were made to complete such deficiencies through telephone interviews, the accuracy of the data cannot be fully guaranteed.

3. RESULTS

The socio-demographic characteristics of participants with and without a breast cancer diagnosis in this study, conducted in western Turkey, are presented below. A total of 116 women were evaluated, comprising 58 individuals diagnosed with breast cancer and 58 without such a diagnosis. The two groups were statistically homogeneous regarding marital status, educational attainment, income level, occupational exposure to chemicals or agricultural pesticides, and employment status ($p > 0.05$). The mean age of participants in both groups was 55.60 ± 12.48 years (range: 27-82). There was no significant between-group difference in age ($p>0.05$) (Table 1).

Tablo 1. Comparison of sociodemographic characteristics by breast cancer diagnosis. (n=116)

Socio-Demographic Data					
	Min	Max	$\bar{X}$ +SD	r	p value
Age	27	82	55.60±12.48	0.26	.779
			Breast cancer diagnosis		
Marital status			**Yes**	**No**	**X^2 value**	**P value**
Married			51	48	0.62	0.30
Single			7	10		
Education						
Primary school			27	25	2.82	0.59
High school			15	14		
University			16	19		
Income status						
Income less than expenditure			46	50	1.26	0.53
Income equal to expenditure			6	3		
Income more than expenditure			6	5		
Use of agricultural or other chemical products at work						
Using			11	47	0.65	0.41
Not using			13	45		
Work status						
Working			15	22	1.94	0.16
Not working			43	36		

n: Count; **%:** Column percentage**;** $\bar{X}$**:** Mean**; SD:** Standard deviation**; r:** Pearson correlation**;** χ^2**:** Chi-square
p<0.05*: significant**.**

A significant difference was observed between healthy women and those diagnosed with breast cancer regarding the presence of a first-degree relative with breast or ovarian cancer, as well as a history of benign breast masses or cysts ($p < 0.05$). Benign breast masses/cystic formations were more frequent among cases than controls ($p<0.05$).

However, age at menarche showed no significant association with diagnosis, and menopausal status did not differ between groups (both p>0.05). There was no between-group difference in breastfeeding status or duration; across all participants, the mean cumulative breastfeeding duration was 12.16 ± 9.14 months (n=116). Parity also showed no significant association with diagnosis. The mean number of prior mammograms for all women was 2.43 ± 1.63 (minimum 0, maximum 6), and the number of mammograms was not significantly associated with diagnosis (Table 2).

Tablo 2. Comparison of the women's breast cancer status and risk status (n=116)

Risk factors	**Breast cancer diagnosis**		**X^2 value**	**P value**
	Breast cancer diagnosis	**No breast cancer diagnosis**		
First-degree relative with breast, ovarian, fallopian, prostate, or melanoma cancer				
Yes (breast, ovarian, fallopian, prostate)	19	39	5.84	**0.03***
No	8	50		
History of benign mass or cyst in the breast				
Yes	37	21	18.51	0.00*
No	14	44		
Breastfeeding				
Yes	47	45	0.21	0.65
No	11	13		
Entering menopause				
Yes	38	20		
No	39	19	0.39	1.00
Receipt of hormone treatment containing estrogen				
Yes	17	41	0.16	0.42
No	19	49		
Smoking				
Yes	14	44	1.00	0.59
No	44	14		
Alcohol consumption				
Yes	8	50	0.07	0.79
No	9	49		
Working night shifts				
Yes	9	5	1.30	0.20
No	49	53		
Body mass index				
Underweight	0	1	2.10	0.35
Normal	30	35		
Obese	28	22		
Sports activity				
Yes	22	36	0.15	0.42
No	20	38		
Nutrition				
High-fat diet	13	12	0.02	0.54
Mediterranean type diet	45	44		
Living close to a coal-fired power station, factories or with air pollution in the past 25 years				
Yes	8	9	0.07	0.50
No	50	49		
Risk factors	Those with a breast cancer diagnosis	Those without a breast cancer diagnosis	r	P value
Mammograms				
Never	2	6		

3-5 times	19	14	0.32	
6-7 times	2	1		
Age (years)				
55.60±12.48 (min. 27-max. 82)	55.27±12.23 (min. 27- max. 82)	55.93±12.82 (min. 30,-max. 79)	1.00	0.78
Age at first menstruation				
12.74±0.98 (min11- max.14)	12.77± 0.99	12.70± 0.99	0.03	0.71
Months breastfeeding baby				
12.16±9.14 months (n=116)	12.15±9.13	12.17±9.23	0.01	0.99
Number of children				
2.83 +0.81 (min. 1- max. 5)	2.93+0,81 (min. 1-max. 5)	2.74+0.8 (min. 1,-max. 5)	0.12	0.21

Consistently, benign breast masses/cystic formations were more frequent among cases than controls ($p<0.05$). However, the correlation between age at menarche and breast cancer diagnosis was found to be very weak and non-significant. Also, there was no significant difference between their menopause status and cancer diagnosis ($p>0.05$). There was no difference between the breastfeeding status of the women with and without a breast cancer diagnosis: each group had breastfed for a mean of 12.16 + 9.14 months (n=116), and the relation of breastfeeding to a cancer diagnosis was very weak (r 0.01, $p>0.05$). Additionally, no significant correlation was found between the number of children and breast cancer diagnosis among the women. The mean number of mammograms taken by all of the women was 2.43+1.63 (min.0, max.6), and there was a low and non-significant relation between number of mammograms and having a diagnosis of cancer (Table 2).

Across examining estrogen therapy use, smoking, alcohol consumption, regular sports/physical activity, diet pattern (Mediterranean vs. high-fat), night shift work, and the environment they had lived in for the last 25 years in terms of air pollution, coal-fired power plants, factories and waste materials, there was no statistically significant difference between the women with and without a breast cancer diagnosis ($p>0.05$) (Table 2).

4. DISCUSSION

In this clinic-based retrospective cross-sectional study, a first-degree family history of selected cancers and a history of benign breast mass or cyst were more frequently observed among women with breast cancer than among women without a malignancy diagnosis. In contrast, no statistically significant between-group differences were identified for the reproductive, breastfeeding, lifestyle, hormonal, and environmental variables examined. These findings suggest that, within this clinical sample, family history and previous benign breast conditions may be useful markers for identifying women who may benefit from more detailed risk assessment. However, because of the observational and retrospective design, these findings should be interpreted as associations rather than causal relationships (10,11,12).

From a nursing standpoint, incorporating a structured assessment at first contact including structured questions on breast/ovarian/fallopian tube/prostate/melanoma cancers in first-degree relatives and systematic documentation of prior benign breast lesions may help prioritize risk adapted counseling, screening reminders (e.g., age-appropriate mammography adherence), and referral to genetic counseling when indicated (13). This can be operationalized by embedding

a standardized family-history checklist and a "benign breast disease" alert in nursing intake documentation and the electronic chart to trigger follow-up pathways. In parallel, nurse-led education can focus on symptom awareness and the importance of prompt evaluation of new breast changes, especially for women with benign breast disease histories (14). Overall, these measures provide a clear clinical link between the statistically significant findings of the study and feasible nursing practices (14). Hereditary breast cancer accounts for approximately 5% to 10% of all breast cancer cases and a positive family history particularly in first-degree relatives is consistently associated with higher breast cancer risk. In this study, the significantly higher frequency of first-degree family history among women with breast cancer supports the clinical relevance of detailed familial risk assessment in routine practice**.** (15). BRCA1 (17q21) and BRCA2 (13q13) are well-established susceptibility genes involved in DNA repair via homologous recombination (15). In addition to BRCA1/2, other high-penetrance genes (e.g., PTEN, TP53, CDH1, STK11) and moderate-penetrance genes (e.g., CHEK2, BRIP1, ATM, PALB2) have also been implicated in inherited breast cancer susceptibility and are linked to DNA repair and cell-cycle regulation pathways (14,15). Although genetic testing was not performed in the present study, these established genetic mechanisms provide a biologically plausible context for the observed association between family history and breast cancer status. Different genetic mutations observed in patients are related to specific molecular sub-types of breast cancer (16). Although germline testing was not performed in this study, the statistically significant between-group difference observed for first-degree family history (breast/ovarian/fallopian/prostate/melanoma) may be interpreted as compatible with familial susceptibility patterns described in the literature (14,16,17). In clinical terms, this finding supports integrating a focused family-history assessment into routine nursing evaluation and considering referral to genetic counseling when established criteria are met. Another statistically significant finding of this research was the presence of benign masses and cysts on the breast. In the literature, according to Vogel (2008), the risk of breast cancer rises in women over the age of 50, particularly among those with benign breast conditions, and more specifically in cases of atypical ductal or lobular hyperplasia (18). Similarly, Özmen et al. (2009) demonstrated that breast cancer risk significantly increases at age 50 and above, as evidenced by both univariate and multivariate analyses (17). In this study, a history of benign breast mass/cyst was more frequent in women with breast cancer than in controls, supporting the view that benign breast disease may function as a clinically relevant risk marker (17,18). This finding should be interpreted as an association (not causation), particularly given the retrospective design and the absence of histologic sub-classification (e.g., atypia) for benign lesions. Both Vogel (2008) and Özmen et al. (2009) noted increasing risk with age; however, no statistically significant age difference was observed between groups in this study (17,18). From a clinical nursing workflow perspective, systematically documenting any prior benign breast disease and facilitating timely imaging/clinical follow-up may help translate this statistically significant "risk signal" into actionable care (11-12). In this study, no statistically significant differences were between the women with and without a diagnosis of breast cancer in terms of breastfeeding status, months of breastfeeding, entry into menopause, taking medication containing estrogen, smoking, body mass index, working night shifts, nutrition type, or living near a coal-fired power station, air pollution or factories (all $p>0.05$). The overall mean breastfeeding duration was 12.16 ± 9.14 months, and breastfeeding showed a weak, non-

significant correlation with diagnosis (r=0.01, p>0.05). Similarly, the correlations for the number of prior mammograms, age at menarche, and parity were low and did not reach statistical significance. These non-significant findings may reflect the clinic-based retrospective design and limited exposure detail for some variables (e.g., lifetime breastfeeding characteristics, intensity/duration of physical activity), which could reduce the ability to detect modest associations.

Estrogen, a steroid hormone, is crucial for the development of female sexual characteristics and plays a significant role in metabolic processes. However, both estrogen and its metabolites may exert carcinogenic effects by influencing cell proliferation and cell cycle progression through interactions with estrogen receptors or by inducing oxidative DNA damage. Consequently, abnormally elevated estrogen levels originating from both endogenous and exogenous sources can increase the risk of breast cancer development (20). In the present study, however, no statistically significant difference was observed between women with breast cancer and controls with respect to exogenous estrogen use, indicating that estrogen medication exposure did not distinguish the two groups in this clinical sample. The ages at menarche and menopause are significant risk factors due to their influence on the duration of estrogen exposure. Several case control studies and meta-analyses have demonstrated that later menarche is associated with lower risk compared with earlier menarche, and earlier menopause is associated with lower risk than later menopause (21). In this study, neither age at menarche nor menopausal status differed significantly between women with and without breast cancer (both p>0.05). This absence of between-group differences is considered to be related to the modest sample size and the retrospective assessment of reproductive history, which may have limited the ability to detect small effect sizes.

Breastfeeding is a recognized protective factor against breast cancer. A comprehensive study reported that each additional 12 months of breastfeeding is associated with a 4.3% reduction in breast cancer risk (19,22). In the present study, however, breastfeeding prevalence and cumulative duration were comparable between women with breast cancer and controls (overall mean 12.16 ± 9.14 months), and no statistically significant association with diagnosis was observed ($r = 0.01$; $p > 0.05$). This finding likely reflects limited between-group contrast, as breastfeeding patterns were broadly similar across groups, as well as the retrospective and relatively coarse assessment of cumulative breastfeeding duration. In this study, self-reported engagement in regular physical activity did not differ significantly between cases and controls ($p > 0.05$), and its association with breast cancer diagnosis was weak and non-significant. Because detailed information on frequency, duration, intensity of activity, and sedentary behavior was not collected, potential protective effects may have been attenuated by exposure misclassification, as previously noted in similar observational studies (23).

Obesity has been linked to a higher risk of breast cancer in postmenopausal women, particularly for estrogen receptor positive subtypes. In the current sample, the majority of participants had a normal body mass index (BMI), and no significant between-group difference in BMI was detected. Although obesity-related mechanisms such as chronic hyperinsulinemia, low-grade inflammation, and oxidative stress have been identified as independent contributors to breast cancer risk irrespective of estrogen exposure (24) these pathways could not be evaluated directly in this study because metabolic and inflammatory biomarkers (e.g., insulin resistance indices, C-reactive protein, oxidative stress markers) were not assessed.

Dietary patterns may further modify breast cancer risk. Adherence to a Mediterranean-style diet has been associated with reduced cancer risk, potentially through antioxidant and anti-inflammatory mechanisms (20). In this study, a greater proportion of participants reported following a Mediterranean-type dietary pattern rather than a high-fat diet. The absence of significant between-group differences may therefore reflect the combined effect of a relatively low prevalence of obesity and greater reported adherence to a Mediterranean-type diet in this cohort, alongside limitations inherent to retrospective self-report of dietary intake and physical activity.

Alcohol consumption is a well-established risk factor for breast cancer, with a clear dose–response relationship documented in the literature (25). Similarly, smoking has been shown to increase breast cancer risk in a linear manner with respect to both intensity and duration of exposure (6). In contrast, the present study did not identify significant differences between women with and without breast cancer in terms of alcohol consumption or smoking habits. The generally low levels of alcohol intake and smoking reported by participants may have reduced the ability to detect associations with breast cancer risk. With respect to environmental exposures, most women in this study reported living in areas without notable air pollution or proximity to factories or coal-fired power plants. The similarity in breast cancer risk profiles between cases and controls may therefore be partly explained by limited exposure to environmental chemicals and pollutants affecting air, water, or soil, as suggested in previous research (26). Prospective studies incorporating objective anthropometric measures and validated instruments for diet, physical activity, and environmental exposure assessment would be valuable in clarifying modest effects and potential interactions among these factors.

LIMITATIONS

This study has several limitations that should be considered when interpreting the findings. First, the sample size was relatively modest and was recruited from a single private hospital. Therefore, the findings may not be generalizable to women receiving care in other healthcare settings or to the wider population.

Second, the retrospective design required the use of medical records and participant self-reports obtained by telephone. Consequently, recall bias and exposure misclassification cannot be excluded, particularly for lifestyle, reproductive, and environmental variables.

Third, some exposures were assessed using relatively broad categories and objective or detailed measurements were not available. For example, physical activity, dietary patterns, and environmental exposures were not assessed using detailed validated measures. In addition, benign breast lesions were not classified histologically, limiting interpretation of their clinical significance.

Finally, the cases were identified during 2020, when the COVID-19 pandemic may have affected healthcare utilization, screening, and diagnosis. This may have influenced the composition of the study sample. Accordingly, the findings should be interpreted as associations observed within this specific clinical sample rather than as estimates of causal effects or population-level risk.

Implications For Practice And Research

These findings highlight the value of nursing-led, structured risk assessment in surgical

outpatient clinics, particularly systematic documentation of family cancer history and benign breast disease. Despite these constraints, the findings underscore the practical value of family history including breast, ovarian, fallopian tube, and prostate cancers among first-degree relatives and a history of benign breast disease as clinically relevant markers for prioritizing risk-adapted counseling, screening, and follow up in surgical outpatient settings.

Future research would benefit from larger, population-based designs, histologic verification of benign breast lesions, and the use of validated, detailed instruments to assess lifestyle and environmental exposures. Such approaches would allow for more precise estimation of effect sizes and a clearer evaluation of potential interactions among established and emerging risk factors.

5. CONCLUSION AND RECOMMENDATIONS

In this single-center outpatient surgical clinic study, a first-degree family history of selected cancers (breast, ovarian, fallopian tube, prostate, melanoma) and a history of benign breast mass or cyst were more common among women with breast cancer than among matched controls. In contrast, no significant between-group differences were observed for reproductive factors, breastfeeding, body mass index, lifestyle behaviors, diet, exogenous estrogen use, smoking, alcohol consumption, or environmental exposures.

Given the modest sample size and retrospective design, small or interacting effects may not have been detected. Within these limitations, the findings underscore the importance of systematically documenting family cancer history and prior benign breast disease as practical markers for risk-adapted counseling, screening, and follow-up in outpatient surgical settings. Future studies should include larger and more diverse populations and prospective designs, together with validated and more detailed assessments of lifestyle, environmental exposures, and histologically classified benign breast lesions. Such studies may provide more precise estimates of associations and help clarify the contribution of individual and combined risk factors.

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Ethical Approval and Consent: Ethical approval for this study was obtained from Izmir Tınaztepe University Health Sciences Scientific Research and Publication Ethics Committee (29/12/2021, Decision No: 32). Institutional permission was obtained from the hospital management for access to the data. The participants were contacted by phone and the purpose, scope and confidentiality principles of the research were explained in the standard information text; verbal informed consent was obtained. No audio recordings were taken, personally identifiable information was anonymized.

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