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The Effect of Socio-Economic-Cultural Factors on Breast Cancer

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ABSTRACT

Objective: Socioeconomic and cultural factors influence breast cancer prognosis. The effect of these factors on breast cancer was evaluated among women who live in Gaziantep and its surroundings.

Materials and Methods: female patients who were admitted to Gaziantep University Oncology Hospital with a diagnosis of breast cancer between October 2006-July 2013 were included in the study. The effects of socio-demographic characteristics on clinical-pathological features were evaluated.

Results: The mean age of 813 women was 48.8 years. The majority were premenopausal women. Advanced stage disease on diagnosis was detected more in our region. The rate of breast cancer with unfavorable prognostic features was higher among patients who were illiterate, with low economic income and residing in rural areas.

Conclusion: Socioeconomic-cultural factors influence the biology and clinical course of breast cancer among women who live in Gaziantep province.

Keywords: Breast cancer, socioeconomic status, hormone receptor status

Introduction

Breast cancer is one of the major health problems worldwide with increasing prevalence and accounts for approximately 30% of all cancers in women. The incidence of breast cancer may vary between different countries. Additionally, the incidence and prognosis of breast cancer may vary within the same society, and since a definite reason for breast cancer is yet unknown, these differences are linked to environmental factors, lifestyle and socioeconomic-cultural factors (SECF) (1).

It is estimated that the incidence of breast cancer between the eastern and western regions of our country may vary. Based on regional and SECFs, stage on diagnosis and therefore treatment may differ (2). For these reasons breast cancer prognosis may different between regions.

SECFs like patient education status, place of residence, household income level and health insurance can influence consulting a doctor and treatment options. In this study, the relationship between SECF and with clinical-pathological features of patients who reside in the city of Gaziantep and its surrounding provinces and were diagnosed with breast cancer in Gaziantep University Oncology Hospital.

Materials and Methods

A total of 813 female patients who were admitted to Gaziantep University Oncology Hospital with a diagnosis of breast cancer between October 2006-July 2013 were included in this study. Gaziantep University Ethics Committee approved the study, and verbal or written consent was obtained from all patients.

Patient age on diagnosis, place of residence (rural-urban), education level, household income level [(<500 TL), (500-1500 TL) and (>1500 TL)], and menopausal status, were obtained by one-to-one interview with the patient and were recorded by an author (AK). Patients over 40 years of age (after 40 years of age and at least 2 years before the diagnosis) were questioned whether they had a screening mammography or not, and their answers were recorded (AK). Other medical information related to histopathological diagnosis, and stages were extracted from patient files and were recorded by the authors (AK and MA).

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Statistical Analysis

SPSS (Statistical Package for Social Sciences) for Windows 19.0 software (IBM SPSS Statistics, New York, USA) was used for analysis. Data were analyzed using descriptive statistical methods (number, percent, mean). The impact of SECF on the clinical-pathological findings was evaluated by the chi-square test, and the effect of SECF on the time elapsed from first sign of the disease to diagnosis was analyzed using ANOVA test. p values <0.05 were considered statistically significant.

Results

The mean age at diagnosis of breast cancer patients included in the study was 48.8 (20-84) years. The majority of patients were postmenopausal as compared with premenopausal disease, 57.9% (n = 471) and 42.1% (n = 342), respectively. Demographic characteristics of the patients and tumor characteristics are shown in detail in Table 1.

Fifty-six % of patients consulted a doctor with complaints of a breast mass as the first symptom. This was followed by pain in 14%, swelling and stiffness in 13.8%, redness in 6.2%, and by other complaints in 10% of patients. The mean time elapse between first signs of disease and diagnosis was 6.5 (1-55) months. Screening mammography rate in patients over the age of 40 living in our area was quite low (5.2%).

Eighty-nine.six % of invasive breast cancers were invasive ductal carcinoma, 4.9% were invasive lobular, 1.5% were of mixed type and 4% were other subtypes. The median tumor size was 3.7 cm (0.5 to 7.2). The T stage of patients on diagnosis was T1 in 9.3% (n = 76), T2 in 54.6% (n = 444), T3 in 21% (n = 171) and T4 in 13.5% (n = 110). The rate of advanced stage disease (stage 3, 4) on diagnosis was 53%, and early stage disease (stage 1, 2) rate was 47%.

Estrogen receptor (ER) positive tumor rate was 71%, progesterone receptor (PR) positive tumors accounted for 71.3%, and Human epidermal growth factor receptor-2 (HER2) positive tumor rate was 31.9%. Histological grade 2 and 3 tumors had a higher rate; 42.9% and 44.3%, respectively.

Eighty.six % of patients (n = 655) were living in urban (city / county) areas, while 19.4% (n = 158) lived in rural (village / town) areas. Approximately half of the patients were illiterate (47.7%) and the proportion of household income under 500 TL was 22.9% (n = 186).

Although screening mammography rate was quite low in our study among women older than forty years of age, it was found that SECF may affect these rates. Screening mammography rates increased with a higher level of education (college graduates) and a higher economic income level (> 1500 TL). The rate of screening mammography was 2.5% in illiterate patients, was 10% in junior high graduates, and was 15% in university graduates (p <0.001). This rate was 2% in patients with a low economic income (< 500 TL), while this rate was found as 8% in patients with high income (>1500 TL) (p = 0.02). The effect of residence area on the rate of mammography imaging was close to statistical significance. This rate was 0, 5% among those living in urban areas, while it was found as 0.2% for those in rural areas (p = 0.09).

When time elapsed between the date of first disease symptom and diagnosis was evaluated in terms of residence area, economic income and educational status; patients living in rural areas in about 6 months, while this period was 9 months for patients living in urban areas (p

Table 1. Sociodemographic and clinical properties of patients

Variable	Patient n (%)
Age at diagnosis	
20–39	196 (24.1)
40–49	258 (31.7)
50–64	255 (31.4)
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Menopausal status	
Premenapausal	471 (57.9)
Postmenapausal	342 (42.1)
Histopathology	
Invasive ductal	729 (89.6)
Invasive lobular	40 (4.9)
Mucinous	12 (1.5)
Mixed type	12 (1.5)
Other	20 (2.5)
Histologic Grade	
I	43 (5.3)
II	349 (42.9)
III	360 (44.3)
Unknown	61 (7.5)
Disease stage	
I	32 (3.9)
II	350 (43.1)
III	362 (44.5)
IV	69 (8.5)
ER status	
ER+	577 (71)
ER–	227 (27.9)
Unknown	9 (1.1)
PR status	
PR+	580 (71.3)
PR–	221 (27.2)
Unknown	12 (1.5)
HER2 status	
HER2+	259 (31.9)
HER2–	544 (66.9)
Unknown	10 (1.2)
Education level	
None	388 (47.7)
Primary school	268 (33)
Junior-high school	48 (5.9)
High school	63 (7.7)
University	46 (5.7)
Residence	
Urban	655 (80.6)
Rural	158 (19.4)
Economy[a]	
<500 TL	186 (22.9)
500–1500 TL	309 (38)
>1500 TL	318 (39.1)
Treatment type	
Surgery	731 (89.7)
Chemotherapy	695 (85.4)
Radiotherapy	535 (65.8)
Hormonotherapy	516 (63.4)

[a]Monthly family income level
ER: Estrogene receptor, PR: Progesteron receptor
HER2: Human epidermal growth factor receptor-2
n: Patient number

Table 2. Effect of sociodemographic properties on HRS, tumor size, stage and tumor grade

		Education level, n (%)					Economic Income (TL), n (%)			Place of Residence,n (%)		
		None	Primary	Junior high	High school	Univesity	<500	500–1500	>1500	Urban	Rural	P*
Hormone receptor status	ER+	259 (67.6)	202 (76.2)	30 (63.8)	49 (77.7)	37 (80.4)	123 (66.5)	204 (67.5)	250 (78.9)	478 (73.5)	99 (64.2)	<0.03
	ER-	124 (32.4)	63 (23.8)	17 (36.2)	14 (22.3)	9 (19.6)	62 (33.5)	98 (32.5)	67 (21.1)	172 (26.5)	55 (35.8)	
	PR+	258 (67.5)	211 (80)	32 (68)	44 (71)	35 (76)	120 (64.8)	220 (73)	240 (76.2)	479 (73.9)	101 (66)	<0.04
	PR-	124 (32.5)	53 (20)	15 (32)	18 (29)	11 (24)	65 (35.2)	81 (27)	75 (23.8)	169 (26.1)	52 (34)	
	HER2+	128 (33.3)	87 (33)	15 (31.9)	22 (34.9)	7 (15.2)	65 (35.1)	97 (31)	97 (30.9)	201 (31)	58 (37.4)	>0.1
	HER2-	256 (66.7)	176 (67)	32 (68.1)	41 (65.1)	39 (84.8)	120 (64.9)	207 (69)	217 (69.1)	447 (69)	97 (62.6)	
Tumor size	<2 cm	21 (5.5)	29 (10.9)	4 (8.7)	13 (20.9)	9 (19.6)	9 (4.8)	20 (6.6)	47 (15)	66 (10.2)	10 (6.5)	<0.003[a]
	2–5 cm	206 (54)	147 (55.5)	30 (65.2)	36 (58.2)	25 (54.3)	81 (44.1)	186 (61.2)	177 (56.6)	361 (55.9)	83 (53.5)	
	>5 cm	155 (40.5)	89 (33.6)	12 (26.1)	13 (20.9)	12 (26.1)	94 (51.1)	98 (32.2)	89 (28.4)	219 (33.9)	62 (40)	
Disease stage	1	8 (2)	13 (4.9)	1 (2.1)	6 (9.5)	4 (8.7)	2 (1.1)	10 (3.2)	20 (6.3)	26 (4)	6 (3.9)	<0.02
	2	155 (39.9)	120 (44.7)	24 (50)	32 (50.8)	19 (41.3)	56 (30.1)	147 (47.6)	147 (46.3)	288 (44)	62 (39.2)	
	3	177 (45.6)	120 (44.7)	21 (43.8)	22 (34.9)	22 (47.8)	112 (60.2)	130 (42.1)	120 (37.7)	295 (45)	67 (42.4)	
	4	48 (12.5)	15 (5.7)	2 (4.1)	3 (4.8)	1 (2.2)	16 (8.6)	22 (7.1)	31 (9.7)	46 (7)	23 (14.5)	
Tumor grade	1	17 (4.8)	17 (6.8)	4 (8.7)	1 (1.6)	4 (9.3)	10 (5.7)	17 (5.9)	16 (5.6)	39 (6.4)	4 (2.8)	>0.2
	2	174 (49.2)	113 (45.4)	22 (47.8)	19 (31.7)	21 (48.9)	72 (41.1)	130 (44.7)	147 (51.4)	279 (45.9)	70 (48.6)	
	3	163 (46)	119 (47.8)	20 (43.5)	40 (66.7)	18 (41.8)	93 (53.2)	144 (49.4)	123 (43)	290 (47.7)	70 (48.6)	

[a]There was no statistically significant correlation between place of residence and tumor size (p:0,1), n: Patient number
HRS: Hormone receptor status, ER: Estrogene receptor, PR: Progesteron receptor, HER2: Human epidermal growth factor receptor–2
* Chi-square

<0.02). The elapse was 4.3 months in high economic income level (> 1500 TL) (p <0.001), and 3.7 months in university graduates (p = 0.01).

The effects of socio-demographic characteristics on histopathologic properties are shown in detail in Table 2. When tumor size and disease stage was evaluated in terms of residence area, economic income and educational status; advanced stage disease (stage 3, 4) was significantly higher in those with low economic income, who are illiterate and living in rural areas (p <0.003). There was no relationship between tumor size and residence area, while there was a relationship between economic status and education level (Table 2).

When hormone receptor status (HRS; ER, PR) and HER2 status were evaluated in terms of educational level, economic income and residence area; patients with low-education and low economic income had significantly higher rates of ER-negative and/or PR-negative tumors (p = 0.001). However, no difference was found between HER2 rates. In addition, residents in rural areas had a greater proportion of HR-negative tumors (p <0.004, Table 2).

Discussion and Conclusion

The incidence and prognosis of breast cancer can vary among different geographic regions of the same society. Despite advances in diagnosis and treatment of breast cancer, these differences remain constant (3, 4). Ethnicity, environmental and socioeconomic factors, lifestyle, treatment compliance and differences in treatment response are implicated as reasons for these differences (5-7). It is estimated that incidence and prognosis of breast cancer vary between eastern and western regions of our country due to different lifestyles, educational status and breast cancer awareness (2). The effect of such factors on breast cancer is well

known in western society; however, there is no known study in our country regarding this issue. In this study, it was found that SECF of patients diagnosed with breast cancer in Gaziantep province may be associated with clinic and pathological features of breast cancer, and that it may be associated with negative prognostic features in women with disadvantages.

Criteria determining socioeconomic-cultural factors may vary among countries. Generally, household income level, education level, health insurance status and residence area are indicated among SECF. Ethnicity is also an important parameter for determining SECF in western studies. However, this factor was not considered in our study due to insufficient data regarding ethnicity of the patients.

Socioeconomic-cultural factors that may have either positive or negative effects on breast cancer clinic and biology is a complex process. The incidence of breast cancer is low among women with low SECF, while their prognosis is worse (8). Studies have found that women with low SECF have more unfavorable prognostic features, and their prognosis was therefore adversely affected (9-13). For example, lifestyle habits such as smoking, alcohol use and physical activity may affect HRS that is an important prognostic factor. Smoking and alcohol use is reported to be associated with HR-negative breast cancer (14-15). Personal habits such as physical activity and dietary intake of fiber have been shown to reduce HR-negative breast cancer rate, and this situation has been associated with SECF (16-20). Increasing awareness on breast cancer is also associated with SECF, and participation in mammography screening programs has been reported to affect HRS. It was stated that slow progressive ER-positive breast cancer can be detected in higher rates in women with higher SECF, possibly due to higher compliance with screening mammography (21-23). Therefore, the rate of HR-negative tumors can be higher in women with low SECF. Since participation in screening programs is significantly lower among these individuals, they are diagnosed at more advanced stages and their chances of accessibility to standard treatment is limited (24). In addition, women with low SECF are more likely to be exposed to organochlorine that is used in agriculture fields and has been reported to be associated with ER-negative breast cancer (25-27). Disadvantaged women are diagnosed with disease at an earlier age, and prognosis is worse in this patient group (3). In addition, serious problems are observed among disadvantaged women in both access to treatment and treatment compliance (6, 28). As a result, the prognosis of breast cancer in these patients is worse as compared to patients with high SECF.

Ethnicity is accepted as an important SECF parameter for breast cancer in western studies, and African-American women usually represent lower SECF. In patients with low SECF, larger tumor diameter, more nodal metastases and ultimately more advanced stage disease are detected on diagnosis. McBride and colleagues (29) reported larger tumor size and more nodal spread in African-Americans as compared to Caucasians. In accordance with the literature, although ethnicity was not taken into account, larger tumor size and more advanced stage disease was detected on diagnosis in patients with low SECF in our study.

Twelves and colleagues (30), and Thomson and colleagues (31) evaluated the relationship between SECF and tumor histological grade and HRS among Caucasian European women with breast cancer, in two separate studies. They both reported a significantly higher rate of negative prognostic factors, ER-negative tumors and high-grade tumors, in women with lower SECF. Gapstur and colleagues (32) detected higher incidence of ER-negative and grade 3 tumors in African-American women as compared to Caucasian women. Recently, in a study conducted by Bhoomi-Pathy et al in Southeast Asia (Malaysia and Singapore) (33), it was stated that a higher rate of ER-negative and undifferentiated tumors were detected in Malaysian women with lower SECF than those with higher SECF. Similarly, in our study, the rate of ER-negative and/or PR-negative tumors was found higher in patients with SECF disadvantages. However, there was no difference in tumor grade.

In western studies, access to and compliance with treatment are also closely related to SECF. When patients were standardized according to tumor characteristics and age at diagnosis, African-American women with lower SCF had significantly lower chance of obtaining systemic and topical treatments as compared to Hispanic-American women (34). However, in our study, there was no difference between compliance and access to treatment among patients. Western studies indicate regional differences and religious factors to play a role, whereas in our study these factors did not have an impact.

In conclusion, more premenopausal and advanced stage disease was detected on diagnosis of breast cancer at our region. It was determined that SECF influences breast cancer clinics and biology. Further studies are required in this regard, and programs should be developed to increase the awareness of breast cancer in the society.

Ethis Committee Approval: The study is approved by Gaziantep Üniversity Local Ethical Committees.

Informed Consent: Written informed consent was obtained from patient who participated in this study.

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