Trends in breast cancer incidence in Thrace, Greece: an epidemiological assessment

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Summary

Purpose: In the present study we describe the epidemiologic characteristics of breast cancer in relation to certain risk factors affecting the two major ethnic groups (Christian Orthodox and Muslims) in the area of Thrace, Greece.

Method: We performed a cross-sectional study of 196 consecutive patients, aged 28-85 years, with breast cancer, who were referred to our clinic for treatment from January 1986 to June 1998. All patients were submitted to clinical, laboratory and mammographic control. Ultrasound examination and aspiration cytology were performed on cystic-like lesions. Epidemiologic characteristics of the patients were abstracted from medical charts. To evaluate the results, we used the direct standardization method (1995 Eur. Population) and x^2 test.

Results: Breast cancer incidence for the two study populations (Christian Orthodox and Muslims) was 20.9 and 2.3/100,000, respectively. We did not notice statistically significant differences in most epidemiologic characteristics between the two subject groups.

Conclusions: Although the cumulative breast cancer incidence in Thrace, Greece is comparatively low, the discrepancy observed in the incidence of Christian Orthodox and Muslims suggests that differences in lifestyle between these two ethnic groups might be determinant factors influencing the prevalence of the disease.

The appearance of the disease in a considerable number of young and elderly women, make the extention of modern screening methods in the above-mentioned age groups necessary for the improvement of breast cancer prevention and incidence rates.

Key words: Breast cancer incidence; Christian Orthodox; Muslims.

Introduction

Breast cancer is the second most common cancer in women worldwide. In developed countries, it is the most common female malignancy, both in terms of incidence and mortality [1]. Breast cancer incidence shows wide intercountry variations throughout the world, both in developed and developing countries due to differences in population profiles.

It is the most frequent female cancer in western Europe and the USA, while in Asian populations of Japan, China and India, as well as some South American areas, the prevalence is lower [2, 3].

Several risk factors have been suggested to increase breast cancer incidence rates, such as: family history (first degree relatives, especially bilateral or premenopausal), previous medical history (endometrial cancer, some forms of mammary dysplasia, cancer in the opposite breast), menstrual history (early menarche <12 years, late menopause >50 years), pregnancy (nulliparity, late first full-term pregnancy) [4, 5].

The association between oral contraceptives and breast cancer has not been confirmed in all studies and remains a controversial issue [6]. Moreover, the large number of young women who used oral contraceptives beginning in the late 60s are now entering the age of breast cancer risk [7].

Large epidemiologic studies have identified various potential demographic risk factors for breast cancer, the most common being age, race, geography, diet, religion, socioeconomic class, education, poverty index and occupation [4, 7-9].

Breast cancer is rare in females younger than 20 years, and very uncommon in women in their early 20s, but risk then steadily increases. Countries with younger populations have relatively less breast cancer incidence cases overall, but this changes as populations age [1].

The discrepancy in incidence rates between black and white women probably exists because black women have tumors that are more advanced at the time of diagnosis and because tumor biology in black women is different from that in white women [4].

Women from minority groups and those from a lower socioeconomic background are more likely to have less knowledge regarding screening procedures, resulting in higher incidence of the disease among these groups [10, 11].

Breast cancer incidence is reported to be higher in affluent societies and in urban than in rural areas [12].

Moreover, breast cancer is a common female cancer site in a large number of Muslims (Egypt, Tunisia, Sudan, Iran, Kuwait, Pakistan) not necessarily implying that the incidence in these groups of women is high [13].

Screening programs involving periodic physical examination and mammography in asymptomatic and high risk women increase the detection rate of breast cancer and may improve the survival rate. Unfortunately most women who develop breast cancer do not have identifiable risk factors and analysis of epidemiologic data has failed to identify women who are not at significant risk and would not benefit from screening.

New, less expensive screening techniques such as two-

Revised manuscript accepted for publication August 23, 1999

view mammography are being investigated in an attempt to reduce the cost of widespread screening [14].

In this presentation we will try to describe the incidence rates of breast cancer in the rural area of Thrace, to compare the incidence between Muslims and Christian Orthodox as well as between younger and older women and finally to discuss certain risk factors correlated with the above-mentioned populations. We would like to point out that our results are only preliminary, but indicative of breast cancer incidence rates in Thrace due to a lack of a National Cancer Registry in Greece. In addition, our clinic is the only University Gynecologic Department in Thrace to which the majority of the female cancer patients are referred.

Materials and Methods

We performed a cross-sectional study of 196 consecutive patients aged 28-85 years, who were referred to our center from January 1986 to June 1998 with breast pathology (clinical or mammographic) that proved to be cancer by frozen section of the lesion.

Our study population was comprised of both Muslims and Christian Orthodox women. These women were detected among 38,000 outpatients who visited our department with or without palpable lesions of the breast. Data from medical charts were reviewed.

The total 196 patients were submitted to clinical, laboratory and mammographic examination. Additionally, ultrasonography and aspiration cytology were performed on cystic-like lesions. The majority of women presented predominantly with palpable breast lesions detected by personal physical examination (128 out of 196, 65.3%); the rest were asymptomatic and detected by mammographic findings.

All women found with benign lesions were excluded from the study population. Breast cancer was documented by frozen section and imprint cytology in the operating room during surgical treatment. The major operation was performed afterwards according to the clinical findings and the patient's personal choice that had been previously expressed. The type of operation ranged from simple tumor excision to total mastectomy. All patients were submitted to axillary lymph-node clearance. Lymph node and mastectomy specimens were sent for histopathologic examination to the same pathologist.

Factors characterizing stage at diagnosis, histopathologic features and grading of the tumors, lymph node involvement as well as sociodemographic factors were included in the analysis. Stage was assigned according to the criteria of the American Joint Committee on Cancer [15]. Determinations of grades were made by the same pathologist. Survival, adjuvant chemotherapy, radiotherapy or antiestrogen therapy were not included in the analysis.

Sociodemographic data were abstracted from the medical records.

Estrogen replacement therapy and oral contraceptive use, though commonly accepted risk factors for breast cancer, were too uncommon to allow meaningful study. Health care assessment was based upon the patients description of the usual source of care and type of health insurance. Menopausal status was determined by the patients' personal information.

Associations between religion and independent variables were examined using frequency tables and x^2-test. For the estimation of age-adjusted rates and specific age-adjusted rates we performed the direct standardization method and the 1995 European female population was considered as standard population.

Results

Distribution of selected characteristics stratified by religion are displayed in Table 1. A comparison of histologic types between Christian Orthodox and Muslims suggests that there are statistically significant differences in the two population groups. Both subject groups were more likely to have of ductal origin, but Muslim patients presented with a considerably higher proportion of lobular tumors (20%). In all 196 women grading was able to be adequately assessed. There was no statistically significant differences in grade for both subjects groups. Data based on staging of the disease indicate that 20% of Muslim patients were detected with in situ carcinomas. The majority of Christian Orthodox patients (78.4%) presented with stage I and II disease, while the majority of Muslim patients were found with stage II and III disease (75%).

Regarding localization of the tumors and lymph node involvement no statistically significant differences were recorded. Bilaterality was an exclusive characteristics of Christian Orthodox patients, in contrast with young age at first full-term pregnancy which characterized all Muslim patients. We did not observe statistically significant differences in most sociodemographic factors (family history, menopausal status, years of education and usual source of health care) except for occupation where only the Christian Orthodox group had a serious number of skilled women (22.1% vs 0%).

The average annual age-adjusted incidence rates (European 1995 population standard) are shown in Table 2. Rates are presented as number per 100,000 women. Specifically, the age-adjusted rate for Christian Orthodox is 20.9/100,000 and for Muslims is 2.3/100,000. The cumulative incidence is 23.3/100,000. The annual age-adjusted incidence rate for Christian Orthodox is lower than in the USA, most North American countries, Australia and most Western and Northern European countries. The annual age-adjusted incidence rate for Muslims is compared only to the lowest reported rates worldwide, which are observed mainly in Muslim populations.

Figure 1 displays the distribution of patients with breast cancer according to different age-groups. We notice that the majority of Christian Orthodox patients appears at the age of 50-59 years, while Muslim patients are equally distributed in the three age-groups between 40-69 years. It is important to note that 20 women (19 Christian Orthodox and 1 Muslim) were less than 40 years of age.

The specific age-adjusted incidence rates for both Christian Orthodox and Muslim populations are shown in Figure 2.

The specific age-adjusted incidence rates for both Christian Orthodox and Muslims peak at the age of 60-69 years which is 1.8 times and 1.6 times, respectively, the rate reported at 40-49 years. The specific age-adjusted incidence rates show a rapid increase up to the age of 69 for Christian Orthodox and a rapid decrease thereafter. The same variable gradually increases up to the age of 69 for Muslim patients and then gradually decreases.

Breast cancer incidence diagnosed in women under the age of 40 years was 2.1/100,000 for Christian Orthodox which is 21 times higher than the corresponding incidence for Muslims (0.1/100,000). For Christian Orthodox

Table 1. — *Distribution of characteristics according to religion.*

	Christian Orthodox (n=176)		Muslims (n=20)		p (x^2)
	n	%	n	%	
Histologic type					
Ductal	146	82.9	13	65	
Lobular	19	10.7	4	20	p<0.05
Others	11	6.2	3	15	
Grading					
G1	12	6.8	3	15	
G2	31	17.6	2	10	p<0.75
G3	133	75.5	15	75	
Staging					
In situ	14	7.9	4	20	
I	36	20.4	1	5	
II	102	57.9	7	35	p<0.01
III	22	12.5	8	40	
IV	2	10	0	0	
Tumor localization					
Upper outer	98	55.6	13	65	
Down outer	27	15.3	3	15	
Upper inner	34	19.3	3	15	p<0.8
Down inner	17	9.6	1	5	
Lymph-node involvement					
<4	84	47.7	12	60	
>4	71	40.3	3	15	p<0.1
none	21	11.9	5	25	
Bilaterality	12	6.8	0	0	p<0.001
Age at first full-term pregnancy					
<20	63	35.7	20	100	p<0.001
>20	113	64.2	0	0	
Family history					
Positive	11	6.2	0	0	p<0.3
Negative	165	93.7	20	100	
Menopausal status					
Premenopausal	38	21.5	6	30	p<0.3
Postmenopausal	138	78.4	14	70	
Occupation					
Skilled	39	22.1	0	0	p<0.02
Unskilled	137	77.8	20	100	
Years of education					
<6	145	82.3	20	100	
6-12	24	13.6	0	0	p<0.2
>12	7	3.9	0	0	
Usual source of health care					
Public	163	92.6	20	100	
Private	9	5.1	0	0	p<0.7
None	2	1.1	0	0	

Table 2. — *Age-standardized incidence rates of breast cancer in selected countries*.*

Country	Incidence rates of breast cancer (n/100,000)
USA, Bay Area (White)	104.2
USA, Connecticut (White)	88.9
Switzerland, Geneva	72.2
Canada	66.4
Denmark	63.1
Israel: All Jews	61.3
Sweden	60.7
Italy, Varese	59.6
UK, England & Wales	54.0
Australia, NSW	53.1
Norway	51.8
Poland, Cracow City	39.6
Spain, Navara	38.7
Puerto Rico	35.1
Costa Rica	30.7
Hong Kong	28.7
Singapore, Chinese	27.1
India, Bombay	24.1
Greece, Thrace**	23.32
Hungary, Szabolcs	22.9
Thrace, Christian Orthodox**	20.95
China, Shanghai	19.1
Japan, Yamagata	17.6
Kuwait (Kuwaitis)	17.2
Israel (non-Jews)	17.0
Thailand, Chiang Mai	13.7
China, Qidong	9.5
Algeria, Setif	6.4
Gambia	3.4
Thrace, Muslims**	2.36

*Parkin M.D. *Eur. J. Cancer Clin. Oncol.*, 1989, *25*, 1917.
**Data obtained from our study.

women over 40 years of age breast cancer incidence was 18.8/100,000 while for the Muslims it was 2.2/100,000. The relative risk of breast cancer remained elevated, yet declined for Christian Orthodox women over 40 years of age (8.3 tissues that reported for Muslims).

The overall breast cancer incidence rate for the first of the two half-study periods was 20.7/100,000 while for the second one 22.6/100,000. We noticed a slight but not statistically significant increasing trend in breast cancer incidence with advancing years.

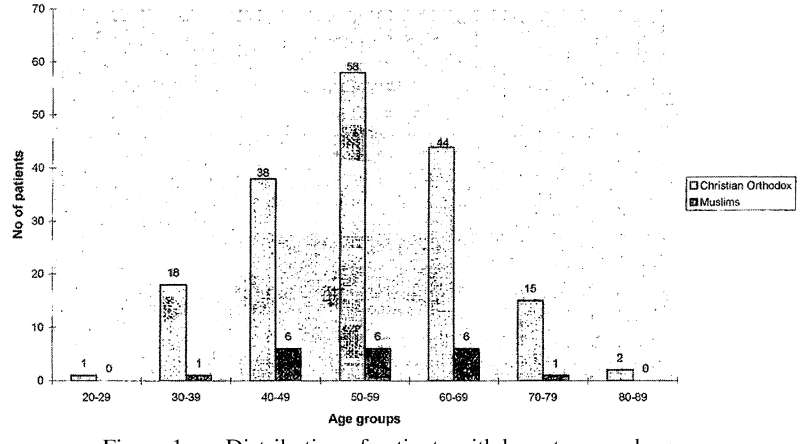

Figure 1. — Distribution of patients with breast cancer by age.

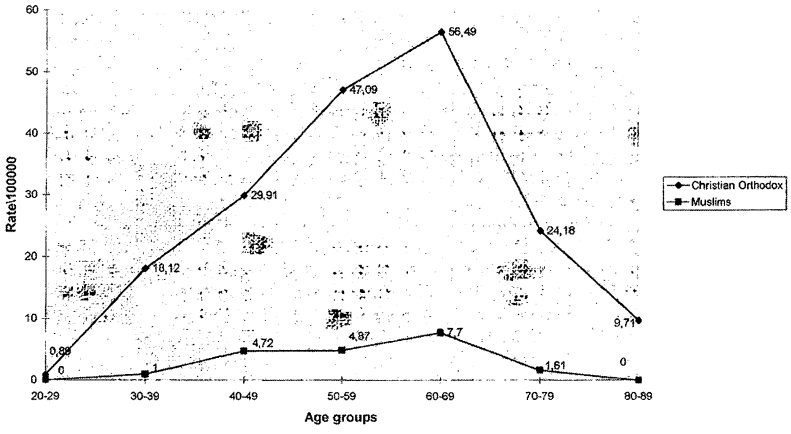

Figure 2. — Specific age-adjusted incidence rates of breast cancer.

From the total 176 Christian Orthodox patients found with breast cancer only 7 reported oral contraceptive use and 3 estrogen replacement therapy, while for Muslim patients the corresponding numbers were none and one. Due to that reason oral contraceptives and estrogen replacement therapy were not considered as variables correlated with breast cancer that would allow meaningful study.

Discussion

Breast cancer is a major health problem. The worldwide incidence of the disease is increasing by 1.5% per annum [16]. Despite many detailed epidemiological studies, including a large number with biological measurements, the aetiology of breast cancer remains unclear. Over 700,000 new breast cancers are diagnosed worldwide each year [16, 17].

Breast cancer incidence in urban population groups is approximately 30% higher than that in rural groups [13]. This observation, together with the international patterns of both geographical and temporal variation and findings of alterations to incidence and mortality rates in migrant groups, lead us to believe that a large proportion of breast cancer is related to environmental or life-style factors and therefore is theoretically avoidable [18].

To clarify the role of the variety of demographic factors correlated with the modus vivendi of the Thrace population, we undertook a comparative study between the major different ethnic groups (Christian Orthodox and Muslims) regarding breast cancer incidence.

The estimated age-adjusted incidence rate for Christian Orthodox women was 20.9/100,000 while for Muslims 2.3/100,000. We noticed that despite the higher relative risk for breast cancer detected among Christian Orthodox women, breast cancer incidence rates for both study populations are comparable only to the ones of Asian countries and especially to those with Muslim populations. In other words, our findings contribute to the controversy about the independence of certain socio-demographic risk factors for breast cancer. The above-mentioned opinion becomes more obvious from the observation that there is no statistically significant difference in the two population groups regarding family history, menopausal status, years of education and usual source of health care. On the other hand, it becomes clear that Muslim patients seek treatment in more advanced stages of the disease, an observation accepted also for other racial-ethnic populations [4, 19, 20-22].

We also did not notice statistically significant differences in histologic type and tumor grade between the two subject groups. Badwe *et al.* [22] also report that they did not find remarkable differences in histological tumor type or grade between Christian Orthodox and Muslims. On the contrary, Redkar *et al.* [23] recorded significant differences regarding tumor grading (Muslim patients had more aggressive cancer types than Christian Orthodox).

The peak incidence rates for both our study groups presented at the age of 60-69 years. In contrast with this observation, Hussain *et al.* [24] reported that the peak incidence of breast cancer was found between the age of 41 and 50 years.

We noticed an upward trend in breast cancer incidence rates, though the increase during the second study period was not statistically significant. That is in agreement with similar previous studies which describe a steadily increasing inclination in breast cancer incidence [5, 25, 26].

According to our results a considerable number of young women <40 years of age are affected by the disease (2.1/100,000 for Christian Orthodox and 0.1/100,000 for Muslim patients) but the most important observation is the sharp increase in specific age-adjusted incidence rates between 20 to 40 years of age, which has been pointed out in previous studies as well [6, 7]. Forbes [1] reports that the risk increases sharply after the second decade of life and relative to this decade the risk is approximately 10 fold for 30-39 years of age. In contrast with some investigators who suggest that screening should be performed in women over 50 years [14], we believe that extending the modern diagnostic methods such as ultrasonography, two-view mammography [27] and Doppler sonography [28] to younger women <40 years of age would essentially help in early detection of the disease and the reduction of breast cancer incidence and mortality [29].

We should also not ignore that the prevalence of the disease in women over 69 years of age, though declining, is similar to the one in women under 40 years of age. Considering today's female longevity, we agree with other investigators [30, 31] who suggest that new interventions are needed by health care providers and the public health community to increase older women's use of effective cancer screening techniques. Mass screening for breast cancer in some developed communities like the USA has been much more promoted in elderly women. Mettlin [32] reported that in the USA breast cancer incidence increased by 41.8% in women over 65 years of age. Much of this increase has been attributed to the effects of increased mammographic screening leading to increased diagnosis of cancers that otherwise would have had delayed appearance.

Conclusions

In spite of the discrepancy perceived in breast cancer incidence, no statistically significant differences were observed in most epidemiologic factors between the two major ethnic groups (Christian Orthodox and Muslims) in Thrace, Greece. This is consistent with previously reported studies where the epidemiology of breast cancer indicates that no single risk factor is common to a large proportion of disease and many patients with breast cancer have none of the recognized risk factors [32]. The considerable number of young as well as older women affected by the disease makes the extention of modern screening methods essential in all age groups for successful breast cancer prevention.

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