

Socioeconomic Status and Breast Cancer Survival in Pakistani Women

Z. Aziz (Department of Medical Oncology, Allama Iqbal Medical College, Lahore.)

S. Sana (Department of Medical Oncology, Allama Iqbal Medical College, Lahore.)

M. Akram (Department of Medical Oncology, Allama Iqbal Medical College, Lahore.)

A.Saeed (Department of Medical Oncology, Allama Iqbal Medical College, Lahore)

Introduction

It is well known that social class disparities result in inequalities in effectiveness of health care treatments and health care facilities even in developed countries.^{1,2} Socio economic factors such as lower income, level of education³, cultural beliefs⁴⁻⁷, lower insurance states^{8,9} and screening practices^{10,11} appear to affect disease stage on presentation and thus presumably affect survival.^{12,13} No information is available from developing countries where socio economic factors may have a major impact on disease stage, treatment strategies and survival in female breast cancer patients.

The incidence of breast cancer in Pakistan is one of the highest reported from Asia, accounting for one third of all female cancers.¹⁴ As in other developing countries, the majority of patients with breast cancer present with advanced disease¹⁵ and have inferior survival. Pakistan is a developing country in which 0.7% of GNP is allocated to health care according to the Economic Survey of Government of Pakistan, 2001.¹⁶ Cancer treatment is confined to major cities only; consequently, patients from rural areas have to travel an average of 300 kilometers for treatment. Free hospitalization is available for all patients within Government hospitals. However all treatment expenses are borne by the patients. Due to the quality of service available, this facility is only being availed by patients from low SES. Women from the affluent class prefer to undergo treatment in private hospitals and clinics where services are much better.

The Department of Oncology at Jinnah Hospital, Lahore, caters to both private patients and also has a free of charge structure for patients of poor SES. We reviewed our database of all breast cancer patients presenting to our department between April 1996 to May 1998. The purpose of our study was to determine the association of SES with standard

prognostic factors, which included tumor size, number of involved lymph nodes, estrogen receptor status, disease stage on presentation and ability to access and receive appropriate treatment for disease stage. Finally, the relationship of different socioeconomic strata and above prognostic variables was explored and the effect on overall and disease free survival was determined.

Material and Methods

Two hundred and eighty six patients undergoing treatment or on follow up presenting to the Department of Oncology between April 1996 to May 1998 were analyzed. Tumor size, lymph node status, disease stage, time elapsed between the start of symptoms until the diagnosis, minimal expected treatment, literacy rate and socioeconomic status (SES) were determined. The relationship between SES and above prognostic variables was explored and the effect on survival was determined. Telephone calls and letters followed all patients or their relatives. In case no contact could be made with patients our staff visited their place of residence.

Socioeconomic Status and Education

Socioeconomic status is defined by key demographic and economic characteristics (reported in Government of Pakistan Economic Survey of Pakistan-2001-2, Islamabad, Ministry of Finance, June (2002).¹⁶

The most important variable describing and classifying SES was annual house hold income (US\$<500 = Low, US\$500-1000 = Middle, US\$>1000=High).

The Government of Pakistan as an individual's ability to write his /her name has defined literacy. The overall literacy rate is estimated at 50.5% (male 63%, female 38%) with rural and urban literacy rate

standing at 30% and 70%, respectively.

Time elapsed before diagnosis

This was the time between the onset of symptoms until the pathological diagnosis of breast cancer was confirmed.

Minimum Expected Treatment (MET)

Minimum expected treatment was defined for each stage as the basic minimum course of treatment that incorporated current practice, state of the art knowledge, and recommendations advanced by NIH consensus conferences up to, and including the one held in 2000.¹⁷ Log regression techniques were used to compare those who received minimal expected therapy to those who did not.

In order to provide MET to patients from low SES with early stage disease monetary donations were arranged whenever possible. Donors were more reluctant to provide funds for second line treatment or advanced disease on presentation where chances of cure were minimal.

Survivals

DFS was defined as the time from complete response until relapse or death from disease specific causes. Overall survival was defined as the time from date of diagnosis of breast cancer until death from any cause

Statistical Analysis

Means and percentages of the prognostic variables were calculated for each social class. Differences among the SES group were tested using chi square statistics or ANOVA techniques where appropriate.

Results

A total of two hundred and eighty six patients were evaluated. Of these 61 (21%) belonged to high SES, 126 (44%) to middle SES and 99 (35%) to lower SES.

Table 1. Clinicopathological features of breast cancer patients (n=286)

Prognostic factors influencing survival	All Patients. No(%)
Size of the tumor	
71	24 (08)
72	139(48.6)
73	54 (18.8)
74	69 (24.1)
Stage at diagnosis	
I	16 (5.5)
II	145 (50.6)
III	91 (31.8)
IV	34 (11.8)
Minimal expected treatment	117 (64.8)
Mean number of lymph nodes positive	4
Estrogen receptor positivity	34 (32.8)
Literacy	125 (43.7)
Mean time elapsed before diagnosis	7.4 months
Mean age at diagnosis	46 years

Table 1 shows clinico-pathologic significant factors influencing survival of all breast cancer patients according to different socioeconomic groups. Mean age at diagnosis for patients from lower

socioeconomic group was 43yrs vs. 50yrs for higher socioeconomic group (P=0.003) as seen in Table 2. Similarly the mean time elapsed before diagnosis was significantly different (p<0.001) between the affluent (4.3 months) and the deprived strata (10.6 months). Large tumor size (T3 and T4) was present in 59.5% of patients of low SES compared to only 24.4% of the high SES patients. Advanced disease (stage III and IV) was also more common in the lower socioeconomic class as seen in Table 2. Estrogen and progesterone receptors were only performed in 99 patients. The majority of patients where receptor status was determined belonged to the upper strata. In the remaining patients, receptor status could not be determined, as patients from the lower strata were unwilling to pay for the laboratory tests. Overall literacy rate of our patients was 43.7%. Only 15% of patients from the lower income group were literate compared to 73.7% in the high-income group.

Minimal expected treatment was given to more patients coming from the high socioeconomic class (P=0.001). In the high socioeconomic subgroup there were very few patients who did not receive standard treatment.

Table.2 Clinicopathological features of breast cancer patients according to Socioeconomic Status

Prognostic factors influencing survival	Socioeconomic Status			P value (X2)
	High n=61 (21%) No. (%)	Intermediate n=126(44%) No. (%)	Low No. (%) No. (%)	
Size of the tumor	12 (19.6) 34 (55.7) 10 (16.3) 5 (8.1)	10 (7.9) 67 (53.1) 24 (19.0) 24 (19.0)	2 (2.0) 38 (38.3) 20 (20.2) 20 (20.0)	<001
Stage at diagnosis	10 (16.3) 33 (54.0) 14 (22.9) 4 (6.5)	5 (3.9) 72 (57.1) 38 (30.1) 11 (8.7)	1 (1.0) 40 (40.4) 39 (39.3) 19 (19.9)	<001
Minimal expected treatment	50 (89.2)	86 (69.3)	41 (43.6)<001	
Mean number of lymph nodes positive	2	4	3	194
Estrogen receptor positivity	20 (20.02)	13 (13.02)	1 (0.8)	<001
Literacy	45 (73.7)	65 (51.5)	15 (15.1)	<001
Mean time elapsed before diagnosis	4.31 months 99%CI (2.5,6.0)	6.4 months 95%CI (4.8,7.9)	10.6 months 95%CI 8.1,13.1)	<001
Mean age at diagnosis	50 years 95%CI (47, 53)	46 years 95%CI (44,48)	43 years 95%CI (41, 45)	

Survival Rates

Survival data is available for 258 patients. Patients belonging to the high, intermediate and lower strata show significant differences in OS and DFS. Table 3 shows the differences in five-year disease free survival (DFS) and overall survival (OS). In the high-income group, DFS and OS are 79% and 86%. For the middle-income group DFS and OS are 48% and 68% while the patients belonging to the lower strata have only 31% and 49% DFS and OS. These values are statistically significant (P=.0001 and P<.0001).

Discussion

Our cohorts of cases were based on consecutive patients presenting to the department either for treatment or for follow up. The patients were

categorized into three groups according to their socioeconomic status. For each subgroup, the association of socio economic status with already identified prognostic factors including age, tumor size, number of involved lymph nodes, stage of disease on initial presentation and receptor status were analyzed. Other variables evaluated included literacy, access to MET for disease stage and survival of patients belonging to different strata.

In our study, breast cancer patients from the lower strata were younger (43 years) compared to women from the affluent group (mean age 50 years). These results are substantiated by the SEER data¹⁸ and the Black/White Breast Cancer Survival Study Group¹⁹ where more than one third of black breast cancer patients were less than 50 years at the time of diagnosis compared to only one fourth of white women. It is hypothesized that breast cancer occurring at an earlier age maybe due to multiple pregnancies causing high estrogenic stimulation.²⁰ It seems to be a reasonable explanation for our cohort of patients belonging to the lower strata in which early marriages and large families are common. Another reason maybe that consanguinity is more prevalent in lower strata leading to higher incidence of early breast cancer.²¹⁻²³

The mean time elapsed between onset of symptoms and diagnosis was 7.4 months in our patients. Delay in diagnosis was more significant in patients from the low SES as seen in Table 1. Other investigators who noted significant association between SES have made similar observations and longer intervals between onset of symptoms and appropriate diagnosis.^{6,7} Ignorance, illiteracy, lack of resources, disease stigma, use of alternate medicines and poor access to health care facilities are some factors, which prevent our women from coming earlier to health care facility.

In developing countries advanced disease is more common with the majority of patients presenting with large T4 lesions^{15,24} however patients have not been categorized according to their SES In our study the probability of being

Abstract

Objective: No data is available from developing countries correlating socioeconomic status (SES) with survival in female breast cancer patients. We decided to test the hypotheses whether SES is an independent determinant for disease stage, access to minimal expected treatment (MET) and survival.

Methods: Two hundred eighty six patients diagnosed with breast cancer were recruited between April 1996 to May 1998. Patients were divided into three groups according to their SES. Prognostic factors analyzed were age, tumor size, nodal status; stage at presentation, estrogen receptor status, time elapsed before diagnosis and access to MET. Disease free survival (DFS) and overall survival (OS) were determined according to the SES of the patients.

Results: Patients were categorized into three socioeconomic groups, high (21%), middle (44%) and low (35%). Mean age of all patients was 46 years, in patients from lower SES mean age was 43 years compared to 50 years in high SES. Mean time elapsed before diagnosis for women from high-income group was 4.3 months versus 10.6 months in low-income group. Early breast cancer was more common in affluent strata, 70% versus 41% in the lower strata. Eighty-nine percent patients received MET from the affluent group compared to only 43% patients in the lower strata. Literacy rate of patients from high SES was 73.7% compared to 15% in the low SES. Five year DFS and OS are 79% and 86% for high income group, 48% and 68% for middle income group and 31%,49% for lower strata which were statistically significant ($P=.0001$ and $P<.0001$).

Conclusion: In our cohort of patients strong association was noted between low SES and advanced disease, delay in diagnosis, limited access to MET and inferior DFS and OS. The outcome of these patients may be improved by patient education and availability of better health care facilities (JPMA 54:448;2004).