Breast Cancer Among Different Ethnicities (A Single Institution Study)

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ABSTRACT

Objective: To study the socio-demographic factors, medical history, histological type, hormonal status with the different ethnic groups of Pakistani breast cancer patients.

Study Design: Cross-sectional analytical study.

Place and Duration of Study: Medical Oncology Department of Jinnah Postgraduate Medical Centre, Karachi Pakistan, from Aug -Nov 2019.

Methodology: Two hundred female patients aged 20-50 years with histopathologically confirmed breast cancer visited OPD for the treatment or were admitted to the ward. The information regarding socio-demographics was noted in the pre-designed proforma. Divisions such as Muhajir (Urdu speaking), Sindhi, Balochi, Punjabi and Pathan were created to analyse breast cancer frequency within different ethnic classes in Pakistan. SPSS version 23 was used to analyse the data.

Results: Out of 200 patients with breast carcinoma, 94 females were Urdu speaking (47%), 39 were Sindhi (19%), 25 were Punjabi (12%), 13 were Pathan (7%), seven were Baloch (4%), and 22 (11%) belonged to minority ethnic groups. The results showed a significant association of ethnicity with family history (p=0.053), residence (p=0.001) and employment status (p=0.010).

Conclusion: The results of this study demonstrated that there is difference in breast cancer occurrence among ethnic groups.

Keywords: Breast cancer, ethnic group, employment status and family history, residence.

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INTRODUCTION

Globally, almost one-half of the women are affected with breast malignancy. Breast cancer is now the second most commonly occurring cancer worldwide and is the primary reason for mortality every year.[1] In Pakistan, the breast cancer incidence is two times higher than in nearby countries. However, the Israeli population have the highest incidence of breast cancer, followed by the Indian and Iranian population.[2] The reported incidence of breast cancer in Pakistan is twenty-four percent.[3] According to Central Artificial Intelligence, World Factbook Pakistan, 14.1% of the Pakistani population is Sindhi, 44.7% is Punjabi, 3.6% is Balochi, and 15.4% is Pathan. The other ethnic groups are Mahajirs comprising 7.6% and 8.4% Saraikis and 6.3% others.[4] This ethnic variation has a tremendous impact on breast cancer in Pakistan.[5,6]

Breast carcinoma is the commonest malignancy found in women of Karachi. The incidence of breast cancer is very high in Sindh, especially in Karachi. Almost 1/3rd of the breast cancers develop in Sindhi females. Nevertheless, the incidence of breast cancer is found high globally in women of reproductive age.[7,8,9]

There have been many studies and surveys conducted to find out breast cancer prevalence; however, Pakistan lacks data regarding the incidence and prevalence of breast cancer among different ethnic groups and the contribution of genes. Therefore, this study aimed to study the socio-demographic factors, medical history, histological type, hormonal status with the different ethnic groups of Pakistani breast cancer patients. The different spectrum of frequency and mutation in genes will help us devise more accurate screening methods that will help decrease the mortality rate.

METHODOLOGY

This cross sectional analytical study was conducted at the Medical Oncology Department of Jinnah Postgraduate Medical Center Karachi, Pakistan, from Aug to Nov2019. The sample size of 197=200 was estimated using Open Epi online sample size calculator, by taking statistics for the incidence of breast cancer among Sindhi females as 9%,[10] the margin of error as 4% and 95% confidence level. Non-probability consecutive sampling technique was employed for sample collection.

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Inclusion Criteria: All the female patients aged 20-50 years with a histopathologically confirmed breast cancer diagnosis who were visiting OPD for treatment or admitted in the ward were include in the study.

Exclusion Criteria: Patients who could not speak Urdu /English or bedridden patients who could not converse were excluded from the study.

The study was conducted after the approval from the Ethical Review Committee (No. F.21-81-IRB/2019-GENL/32733/JPMC), and informed consent was taken from the patients before collecting the data.

The information regarding socio-demographics was noted in the pre-designed proforma. The classes such as Muhajir (Urdu speaking), Sindhi, Balochi, Punjabi and Pathan were created to analyse breast cancer frequency within different ethnic classes in Pakistan. Classes were based on the patient's province and mother tongue. Another group called 'other' was allocated for small ethnicity groups that did not fall into any sub-groups, including Bengali, Saraiki and Hindko. Statistical Package for Social Sciences (SPSS) version 23.0 was used for the data analysis. Quantitative variables were summarized as mean ± SD and qualitative variables were summarized as frequency and percentages. Chi-square test was applied to find out the association. One-way analysis of variance (ANOVA) was applied to find out the mean differences among the groups. The *p*-value of ≤0.05 was considered statistically significant

RESULTS

Out of 200 patients with breast carcinoma, 94 females were Urdu speaking (47%), 39 were Sindhi (19%), 25 were Punjabi (12%), 13 were Pathan (7%), seven were Baloch (4%), and 22 belonged from minority ethnic groups (11%) as shown in (Figure).

The mean age of the females at the time of presentation, age at menarche and age at first childbirth were reported as 46.41 ± 11.38 years, 12.66 ± 1.50 years and 21.69 ± 5.72 years, respectively. However, the age of the females at the time of presentation (*p*=0.330), age at menarche (*p*=0.697) and age at first childbirth (*p*=0.276) showed no statistical difference among different ethnic groups (Table-I).

Among all the ethnic groups majority of the females were illiterate, followed by primary, matric, graduate and intermediate; however, no statistically significant difference was found between educational status and ethnicity (*p*=0.563) as shown in Table-II.

Table-I: Comparison of age at presentation, age at menarche and age at first childbirth among different ethnic groups.

Parameters	Sindhi		Urdu		Punjabi		Pathan		Baloch		Others		*p*-value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Age (years)	49.87	15.18	45.83	10.58	47.04	8.32	44.69	7.97	42.86	5.61	44.14	12.45	0.330
Age at menarche (years)	12.31	0.569	12.70	1.39	12.84	1.91	12.85	1.95	12.57	0.53	12.82	2.34	0.697
Age at first childbirth (years)	21.13	6.910	21.71	5.40	22.12	4.68	23.31	5.17	25.29	6.18	19.95	5.81	0.276

About 72.5% of the females had less than 15 thousand rupees monthly income. The majority of the Sindhi females had a monthly income of less than 15 thousand rupees (74.4%), and 25.6% of the females had an income of 15,000-30,000 rupees per month. No one belonged to high socio-economic status. Among Urdu speaking females, about 68.1% had a monthly income of less than 15 thousand rupees, 28.7% had an income of 15,000-30,000 rupees per month, and only 3.2% had a monthly income of more than 30,000 rupees. Whereas in Punjabi, Balochi, Pathan and other ethnic groups, none females had a monthly income greater than 30,000 rupees. Hence, the relationship between the monthly income and ethnicity was statistically insignificant (*p*=0.684).

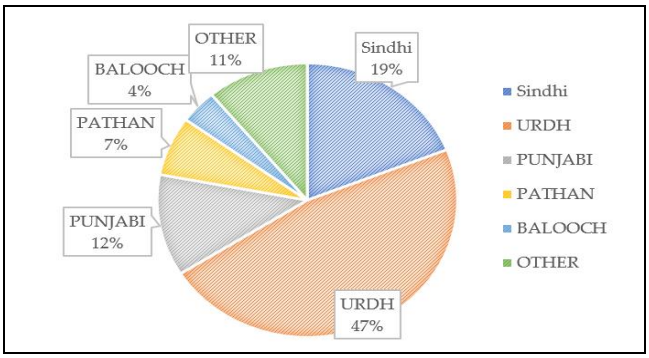

Figure: Ethnicities of the affected females (n=200).

The majority of the females were from urban areas (70.5%), and 29.5% belonged to rural areas. The majority of the Sindhi lived in rural areas (64.1%), whereas most of the Urdu-speaking, Punjabi, Pathan, Balochi, and other ethnic groups lived in urban areas. Hence, the relationship between the residence and ethnicity was statistically significant (*p*=0.001). Only 4.5% of the females were employed, whereas 95.5%

Table-II: Comparison of socio-demographic factors, medical history among different ethinicity.

		Sindhi	Urdu	Punjabi	Pathan	Baloch	Other	*p*-value
Educational Status								
Primary	n	14	27	6	2	1	6	
	%	35.9%	28.7%	24%	15.4%	14.3%	27.3%	
Graduate	n	4	6	2	1	2	0	
	%	10.3%	6.4%	8%	7.7%	28.6%	-	
Matric	n	6	20	4	4	1	6	0.563
	%	15.4%	21.3%	16%	30.8%	14.3%	27.3%	
Illiterate	n	14	31	13	5	3	9	
	%	35.9%	33.0%	52.0%	38.5%	42.9%	40.9%	
Intermediate	n	1	10	0	1	0	1	
	%	2.6%	10.6%	0.0%	7.7%	-	4.5%	
Monthly Income (PKR)								
<15,000	n	29	64	20	10	7	15	
	%	74.4%	68.1%	80.0%	76.9%	100%	68.2%	
15,000-30,000	n	10	27	5	3	0	7	0.684
	%	25.6%	28.7%	20%	23.1%	-	31.8%	
>30,000	n	0	3	0	0	0	0	
	%	-	3.2%	-	-	-	-	
Residence								
Urban	n	14	78	21	8	6	14	
	%	35.9%	83%	84%	61.5%	85.7%	63.6%	0.001
Rural	n	25	16	4	5	1	8	
	%	64.1%	17%	16.0%	38.5%	14.3%	36.4%	
Employment Status								
Unemployed	n	33	93	25	12	7	21	
	%	84.6%	98.9%	100.0%	92.3%	100.0%	95.5%	0.010
Employed	n	6	1	0	1	0	1	
	%	15.4%	1.1%	-	7.7%	-	4.5%	
Family History of Breast Cancer								
Yes	n	0	12	6	2	2	2	
	%	-	12.8%	24%	15.4%	28.6%	9.1%	0.053
No	n	39	82	19	11	5	20	
	%	100%	87.2%	76.0%	84.6%	71.4%	90.9%	
Family History of Any Other Cancer								
Yes	n	8	12	3	3	0	3	
	%	20.5%	12.8%	12%	23.1%	-	13.6%	0.629
No	n	31	82	22	10	7	19	
	%	79.5%	87.2%	88%	76.9%	100%	86.4%	
No of Children								
≤3	n	19	42	12	8	5	10	
	%	48.7%	44.7%	48%	61.5%	71.4%	45.5%	0.704
>3	n	20	52	13	5	2	12	
	%	51.3%	55.3%	52%	38.5%	28.6%	54.5%	
Hypertension								
Yes	n	11	20	6	0	2	5	
	%	28.2%	21.3%	24.0%	-	28.6%	22.7%	0.439
No	n	28	74	19	13	5	17	
	%	71.8%	78.7%	76.0%	100%	71.4%	77.3%	
Hepatitis C								
Yes	n	2	0	0	0	0	1	
	%	5.1%	-	-	-	-	4.5%	0.223
No	n	37	94	25	13	7	21	
	%	94.9%	100%	100%	100%	100%	95.5%	
Diabetes								
Yes	n	1	2	3	0	0	0	
	%	2.6%	2.1%	12.0%	-	-	-	0.129
No	n	38	92	22	13	7	22	
	%	97.4%	97.9%	88.0%	100%	100%	100%	

were unemployed. However, a statistically significant difference was observed between ethnicity and employment status (p=0.010). About 88% of the females with breast carcinoma showed a positive family

history of breast cancer. In Urdu speaking females, 12.8% of the females had a positive family history of breast cancer, in Punjabi 24%, in Pathan 15.4%, in Balochi 28.6% and other ethnic groups 9.1% respectively. The relationship between ethnicity and family history of breast cancer was statistically significant (p=0.053). Twenty-nine females showed a positive family history of other malignancies. In Sindhi 20.5%, in Urdu-speaking 12.8%, in Punjabi 12%, in Pathan 23.1%, in Balochi none and ethnic groups 13.6% of the females showed the positive family history of other malignancies respectively. However, no statistically significant association was found between ethnicity and family history of any other cancer (p=0.629). More than half of the females had more than three children (52%) at the presentation time. In Sindhi 51.3%, in Urdu speaking 55.3%, in Punjabi 52%, in Pathan 38.5%, in Balochi 28.6% and other ethnic groups 54.4% of the females had more than three children respectively. Hence the relationship between the number of children and ethnicity showed no statistical difference (p= 0.439). About 22% of the females had hypertension, 1.5% had Hepatitis C, and 3% had diabetes mellitus. Hypertension was most frequent among Urdu speaking females (21.3%), hepatitis C was most frequent among Sindhi females (5.1%), and diabetes was most frequent among Punjabi females (12%). However, the relationship between co-morbidities and ethnicity showed no statistical difference (p>0.05).

About 91.5% of the females had infiltrating ductal carcinoma (IDC), and 8.5% had invasive lobular cancer (ILC). Among all the ethnicities, the proportion of IDC histological type was high compared to ILC. Hence, the histological type and ethnicity relationship were statistically insignificant (p=0.733). The majority of the females had ER +ve, PR +ve and Her 2 –ve (39%). However, the relationship between hormonal receptors and ethnicity was statistically insignificant (p=0.288) as shown in the Table-III.

Table-III: Comparison of histological subtype and hormonal status among different ethinicity.

		Ethnicity						*p*-value
Histological Type		**Sindhi**	**Urdu**	**Punjabi**	**Pushto**	**Baloch**	**Other**	
IDC	n	36	85	23	13	7	19	0.733
	%	92.3%	90.4%	92.0%	100.0%	100.0%	86.4%	
ILC	n	3	9	2	0	0	3	
	%	7.7%	9.6%	8.0%	0.0%	0.0%	13.6%	
Hormonal Receptors								
ER and/or PR +ve, Her 2 +ve	n	9	20	2	2	4	6	0.288
	%	23.1%	21.3%	8.0%	15.4%	57.1%	27.3%	
ER and/or PR -ve, Her 2 -ve	n	8	21	9	4	1	5	
	%	20.5%	22.3%	36.0%	30.8%	14.3%	22.7%	
ER and/or PR +ve, Her 2 -ve	n	17	38	11	2	2	8	
	%	43.6%	40.4%	44.0%	15.4%	28.6%	36.4%	
ER and/or PR -ve, Her 2 +ve	n	5	15	3	5	0	3	
	%	12.8%	16.0%	12.0%	38.5%	0.0%	13.6%	

DISCUSSION

The results reflect the significance of ethnicity as a factor leading to breast cancer. The ethnic variation impacts the overall occurrence and prognosis of breast cancer. Previous studies have been conducted in this regard in the Western population and reported a less likely significant association found between age and minority ethnic group compared to white women. However, there are reported rates of breast cancer among different ethnicities.[11] The highest rate of the incident was found in African-American women with 122/100000 cases followed by Asian or Pacific Islanders than Hispanics and lastly American Indians.[12]

Not only ethnic variation is related to affect the prognosis and outcomes of breast cancer patients [worst in developing countries],[13] it is also somehow linked to late diagnosis. In a study, the patients diagnosed with breast cancer at an advanced stage belonged to African American ethnic group.[12] It is also reported that African American women are most likely diagnosed with ER–ve type of breast cancer and mortality rates are also higher than White women.[14, 15,16]

According to the present study, the most breast cancer patients belong to Urdu-speaking ethnic group. The ethnic variation could also be due to different

genetics.[17] A previous study reported differences in allele frequencies among different racial groups in Pakistan. It has been reported that there is a ninety percent of chance of 16-bp duplication allele being absent in the Hazara racial group.

Moreover, Msp-1 allele is higher in the Makrani population.[18] In another study that aimed to assess the risk of BRCA1 and BRCA 2 genes among breast and ovarian cancer patients, it was reported that in 9% of cases, there was an alteration in BRCA1 genes followed by 3% in BRCA2 genes.[19] However, the present study showed Urdu speaking preponderance due to dietary or familial reasons.

Jack *et al,* found that different ethnic groups in the USA are associated with triple-negative breast cancer, and the reported that Black women are 2.8 times more likely to develop breast cancer than white women. Similarly, South Asian women are 1.8 times more likely to develop breast cancer than white women, leading to a statistically significant association between ethnicity and incidence of breast cancer.[20] In the present study, the relationship between the residence, employment status and family history with ethnicity was statistically significant (p<0.05). The study conducted by Baloch *et al*, reported that the Pashto population has got highest patients suffering from invasive ductal cancer and +ve ER/PR hormonal status.[21] Similar findings have been reported in the present study wherein 91.5% of the females had Infiltrating ductal carcinoma, and the majority had ER +ve, PR +ve and Her 2 -ve (39%). Nevertheless, the relationship between the histological type and hormonal receptors with ethnicity was statistically insignificant (p>0.05).

Our study emphasises more in-depth studies, especially in a country like Pakistan, where there are different ethnic groups, and each one of them is the carrier of different genetic morphologies.

The results of this study showed that there is an existence of difference in breast cancer occurrence among ethnic groups. The results also significantly associate ethnicity with family history, residence, and employment status. However, it is also noteworthy that age does not impact the prevalence and incidence of breast cancers. We recommend studying and exploring the aetiology of incongruities among different ethnicities.

CONCLUSION

The results of this study demonstrated that there is difference in breast cancer occurrence among ethnic groups.

Conflict of Interest: None.

Authors' Contribution

MA: Concept and design, developed method, GH: Review, made important change, AT: Analysis,interpretation, KM: Literature review, BA: Data collection, SM: Collection and interpretation.

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