Racial Disparities of Survival in Lobular Breast Cancer: A SEER Analysis

Simran Sandhu BSc, Vasily Giannakeas PhD, David W. Lim MD MEd PhD

LAY ABSTRACT

Purpose: Our study aimed to uncover how survival rates in lobular breast cancer differ among racial groups. **Methods**: Using the SEER database, we examined data from 22,656 women diagnosed with invasive lobular breast cancer from 1998-2019. We looked at demographic factors, clinical factors such as race, age, cancer characteristics, and treatment. We compared these factors between different racial groups using chi-square analyses and plotted survival curves. We performed a Cox regression model to determine predictors of survival. **Results**: Among all patients, Black women had higher rates of advanced cancer stages. Comparatively, Asian women were younger, and had higher rates of receiving chemotherapy. Notably, Black patients had worse 5-year survival rates. Radiation was associated with improved survival and interestingly, chemotherapy showed no significant impact. **Conclusion**: Our data provides important insights into the complex interactions of race, clinical characteristics, and survival outcomes in lobular breast cancer.

INTRODUCTION

Invasive lobular carcinoma (ILC) is the 2nd most common type of invasive breast cancer, accounting for approximately 10-15% of all invasive breast cancer cases. ILC originates in the lobules of the mammary glands and has the propensity to metastasize to unusual sites. Its unique growth pattern, due to the loss of the E-cadherin cell adhesion protein, presents distinct clinical management challenges.

There is limited research on racial disparities and survival in women diagnosed with ILC. Racial disparities in breast cancer outcomes remains a public health concern with the unequal burden it imposes across different racial and ethnic groups, highlighting the importance of further investigations.

OBJECTIVE

The **primary research objective** was to examine and identify the **racial/ethnic determinants** of **survival** in women with **lobular** breast cancer.

METHODS

Using the SEER database, we performed a retrospective cohort study of women diagnosed with ILC between 1998 and 2019.

We collected demographic data on race, age at diagnosis, year of diagnosis, marital status, and income. Clinical data included tumour grade, size, laterality, clinical stage, T and N stage, ER/PR/HER2 receptor status, surgery type, chemotherapy, radiation, and cause of death.

Differences between racial groups were assessed using Chi-square tests or one-way ANOVA. Breast cancer specific survival was compared between the racial groups using the Kaplan-Meier method. To identify predictors of survival, Cox-proportional hazard models were constructed.

Statistical analyses were performed using SAS® and P values <0.05 were considered significant.

RESULTS

Total number of individuals in cohort: **22,656**

Table 1.0 Mean Age of Diagnosis By Race

	n (%)	Mean Age of Diagnosis (SD)
Asian	1476 (6.51)	59.3 (10.81)
Black	1400 (6.18)	59.9 (10.49)
White	19081 (84.22)	58.4 (10.66)
Other/Unknown	699 (3.09)	61.5 (10.40)

RESULTS

Table 2.0 Demographic and Clinical Data

	White	Black	Asian	Other	P value
Age of diagnosis					
30-39	272 (1.43)	31 (2.21)	34 (2.30)	22 (3.15)	
40-49	2620 (13.73)	238 (17.00)	298 (20.19)	139 (19.89)	<0.0001
50-59	4897 (25.66)	393 (28.07)	406 (27.51)	204 (29.18)	
60-69	6217 (32.58)	427 (30.50)	413 (27.98)	217 (31.04)	
70-79	5075 (26.60)	311 (22.21)	325 (22.02)	117 (16.74)	
Marital status					
Divorced	2241 (11.74)	261 (18.64)	123 (8.33)	78 (11.16)	
Married	11818 (61.94)	522 (37.29)	1019 (69.04)	410 (58.66)	<0.0001
Never Married	2360 (12.37)	366 (26.14)	157 (10.64)	85 (12.16)	
Unknown	650 (3.41)	63 (4.50)	46 (3.12)	49 (7.01)	
Widowed	2012 (10.54)	188 (13.43)	131 (8.88)	77 (11.02)	
Cancer grade					
1	5185 (27.17)	373 (26.64)	374 (25.34)	169 (24.18)	
2	10002 (52.42)	733 (52.36)	837 (56.71)	408 (58.37)	<0.0001
3	1554 (8.14)	151 (10.79)	129 (8.74)	66 (9.44)	
Unknown	2340 (12.26)	143 (10.21)	136 (9.21)	56 (8.01)	
Cancer laterality					
Left	9693 (50.80)	721 (51.50)	741 (50.20)	369 (52.79)	0.6700
Right	9388 (49.20)	679 (48.50)	735 (49.80)	330 (47.21)	
Cancer size					
1 – 1.9cm	7035 (36.87)	531 (37.93)	500 (33.88)	244 (34.91)	
2 – 2.9 cm	3978 (20.85)	296 (21.14)	357 (24.19)	150 (21.46)	
3 – 4.9 cm	2818 (14.77)	223 (15.93)	243 (15.79)	133 (19.03)	0.0006
5 – 9.9 cm	2084 (10.92)	154 (11.00)	143 (9.69)	82 (11.73)	
<1cm	3166 (16.59)	196 (14.00)	243 (16.46)	90 (12.88)	
Cancer Stage					
Stage I	9974 (52.27)	704 (50.29)	740 (50.14)	336 (48.07)	
Stage II	7204 (37.75)	537 (38.36)	602 (40.79)	286 (40.92)	0.0361
Stage III	1903 (9.97)	159 (11.36)	134 (9.08)	77 (11.02)	

	White	Black	Asian	Other	P value
Income					
35,000 – 39,999	63 (0.33)	2 (0.14)	0 (0.00)	4 (0.57)	
40,000 – 44,999	192 (1.01)	9 (0.64)	1 (0.07)	5 (0.72)	
45,000 – 49,999	356 (1.87)	24 (1.71)	0 (0.00)	4 (0.57)	<0.0001
50,000 – 54,999	908 (4.76)	25 (1.79)	4 (0.27)	16 (2.29)	
55,000 – 59,999	1143 (5.99)	72 (5.14)	18 (1.22)	18 (2.58)	
60,000 – 64,999	3734 (19.57)	432 (30.86)	296 (20.05)	118 (16.88)	
65,000 – 69,999	3117 (16.34)	282 (20.14)	176 (11.92)	84 (12.02)	
70,000 – 74,999	1991 (10.43)	100 (7.14)	30 (2.03)	41 (5.87)	
75,000+	7522 (39.42)	447 (31.93)	950 (64.36)	405 (57.94)	
<35,000	50 (0.26)	7 (0.50)	1 (0.07)	4 (0.57)	
Unknown	5 (0.03)	0 (0.00)	0 (0.00)	0 (0.00)	
ER/PR Status					
ER+/PR+	15110 (83.64)	1071 (81.01)	1125 (79.51)	557 (82.27)	
ER+/PR-	2502 (13.85)	211 (15.96)	233 (16.47)	98 (14.48)	0.0003
ER-/PR+	84 (0.46)	5 (0.38)	6 (0.42)	5 (0.74)	
ER-/PR-	369 (2.04)	35 (2.65)	51 (3.60)	17 (2.51)	
HER2					
Positive	407 (2.13)	32 (2.29)	40 (2.71)	20 (2.86)	
Negative	8525 (44.68)	735 (52.50)	775 (52.51)	400 (57.22)	<0.0001
Unknown	222 (1.16)	25 (1.79)	19 (1.29)	14 (2.00)	
NA	9927 (52.03)	608 (43.43)	642 (43.50)	265 (37.91)	
Surgery					
Lumpectomy	12178 (63.82)	940 (67.14)	835 (56.57)	414 (59.23)	
Unilateral mast	5259 (27.56)	371 (26.50)	553 (37.47)	228 (32.62)	<0.0001
Bilateral mast	1644 (8.62)	89 (6.36)	88 (5.96)	57 (8.15)	
Chemotherapy					
Yes	6099 (31.96)	469 (33.50)	527 (35.70)	247 (35.34)	0.0057
No/Unknown	12982 (68.04)	931 (66.50)	949 (64.30)	452 (64.66)	
Radiation					
Yes	12046 (63.13)	856 (61.14)	886 (60.03)	412 (58.94)	
No	6673 (34.97)	497 (35.50)	568 (38.48)	271 (38.77)	0.0001
Unknown	362 (1.90)	47 (3.36)	22 (1.49)	16 (2.29)	

Table 3.0 Multivariable Analysis Results

Variables	Final Multivariate Analyses	
	HR (95% CI)	P Value
Age		
50-59	1.00	
30-39	1.363 (1.005 – 1.848)	0.0463
40-49	0.984 (0.839 – 1.155)	0.8468
60-69	1.147 (0.999 – 1.316)	0.0520
70-79	1.477 (1.267 – 1.721)	<0.0001
Race		
White	1.00	
Asian	1.001 (0.804 – 1.246)	0.9928
Black	1.361 (1.122 – 1.650)	0.0018
Other/ Unknown	1.087 (0.805 – 1.469)	0.5849

Variables	Final Multivariate Analyses	
	HR (95% CI)	P Value
Cancer Grade		
Grade 1	1.00	
Grade 2	1.370 (1.187 – 1.580)	<0.0001
Grade 3	1.728 (1.443 – 2.068)	<0.0001
Unknown	1.362 (1.147 – 1.616)	0.0004
Cancer Size		
<1cm	1.00	
1 – 1.9 cm	1.808 (1.382 – 2.365)	<0.0001
2 – 2.9 cm	2.735 (2.083 – 3.591)	<0.0001
3 – 4.9 cm	3.809 (2.890 – 5.020)	<0.0001
5 – 9.9 cm	3.798 (2.847 – 5.067)	<0.0001
ER/PR Status		
ER+/PR+	1.00	
ER+/PR-	1.630 (1.428 – 1.860)	<0.0001
ER-/PR+	1.191 (0.700 – 2.025)	0.5186
ER-/PR-	2.196 (1.756 – 2.747)	<0.0001
NA	1.082 (0.892 – 1.311)	0.4230

Variables	Final Multivariate Analyses	
	HR (95% CI)	P Value
Cancer Surgery		
Lumpectomy	1.00	
Bilateral mastectomy	0.881 (0.718 – 1.081)	0.2239
Unilateral Mastectomy	1.042 (0.915 – 1.186)	0.5321
Chemotherapy		
No	1.00	
Yes	0.998 (0.879 – 1.132)	0.9733
Radiation		
No	1.00	
Unknown	0.725 (0.495 – 1.064)	0.1001
Yes	0.842 (0.749 – 0.948)	0.0043

RESULTS
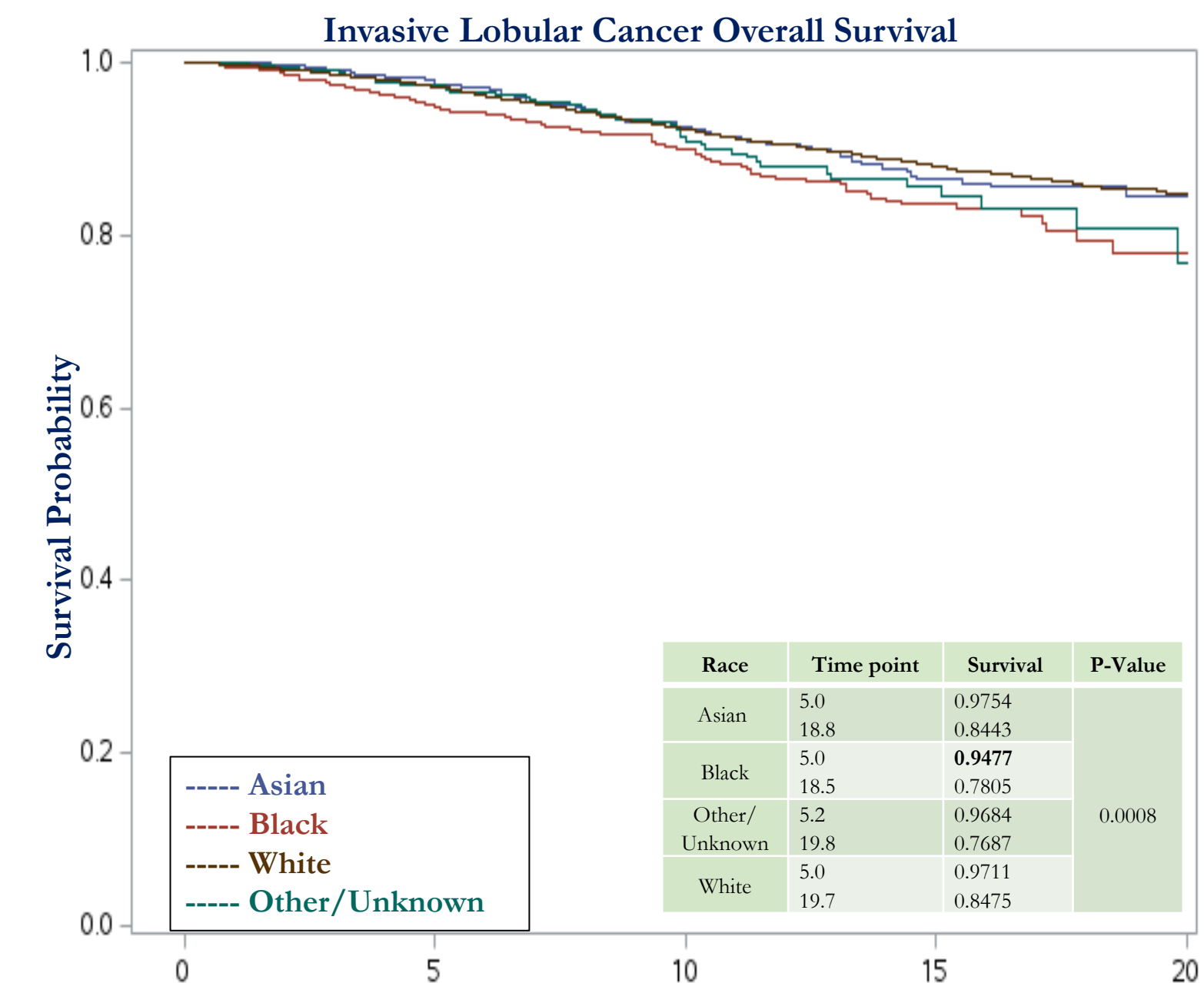
Figure 1.0 Kaplan-Meier Survival Curve for Invasive Lobular Cancer Mortality

Race	Time point	Survival	P-Value
Asian	5.0	0.9754	
	18.8	0.8443	
Black	5.0	**0.9477**	
	18.5	0.7805	0.0008
Other/Unknown	5.2	0.9684	
	19.8	0.7687	
White	5.0	0.9711	
	19.7	0.8475	

CONCLUSIONS

There are differences in clinical presentation of invasive lobular breast cancer according to race. Black women presented with more high-grade, advanced clinical stage, T/N stage, ER+ disease, and had lower rates of unilateral mastectomy than women of other race. Asian women were comparatively younger, had more ER-/PR- ILC, and more likely to receive chemotherapy. Radiation receipt was associated with improved survival while receiving chemotherapy did not affect survival. In women with invasive lobular carcinoma, overall survival for Black woman was significantly lower compared to other racial groups.

Our data provides insight into the complex interactions of race, clinical characteristics, and survival outcomes in lobular breast cancer.

Contact: s.sandhu1217@gmail.com