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Socioeconomic Determinants of Survival in Laryngeal Squamous Cell Carcinoma Patients

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Socioeconomic Determinants of Survival in Laryngeal Squamous Cell Carcinoma Patients

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Background

- Laryngeal squamous cell carcinoma (SCC) causes an estimated 3660 deaths each year, and despite extensive research over the past several decades, survival outcomes have not improved.

- Certain populations, such as patients with Medicare and Medicaid, the uninsured, and African Americans have particularly poor outcomes

- Race is often associated with and considered a surrogate for lower socioeconomic status (SES). In our diverse patient population, it is prudent to consider race and SES independently.

Objectives

- Determine whether comorbidities, socioeconomic factors, and race affect median survival times and overall survival outcomes for patients with laryngeal cell carcinoma treated at a single institution with a large African American population

Methods

- Retrospective cohort study of 619 patients treated for laryngeal squamous cell carcinoma at Henry Ford Health System between 1999 and 2013.

- Kaplan-Meier survival curve analysis and Cox proportional hazard models were used.

Results – cohort characteristics

Variable	All patients (N=619)
Age, N Mean (SD)	619 63.3 (11.4)
Sex	
Male	482 (78%)
Female	137 (22%)
Race	
Caucasian	239 (39%)
African American	364 (59%)
Hispanic	12 (2%)
Middle Eastern	4 (1%)
Alcohol	
Never	179 (32%)
Social	309 (55%)
Heavy	77 (14%)
Pretreament tobacco	
No	57 (10%)
Yes	540 (90%)
Posttreatment tobacco	
No	446 (77%)
Yes	132 (23%)
Pack years, N Mean (SD)	580 40.3 (29.6)

Variable	All patients (N=619)
Stage	
Stage 0	80 (12.9%)
Stage 1	162 (26.2%)
Stage 2	101 (16.3%)
Stage 3	74 (12%)
Stage 4	202 (32.6%)
T	
0	84 (14%)
1	174 (29%)
2	132 (22%)
3	102 (17%)
4	100 (17%)
Unknown	25 (4%)
N	
0	431 (72%)
1	52 (9%)
2	104 (17%)
3	14 (2%)
M	
0	577 (93%)
1	21 (3%)
Unknown	21 (3%)

Variable	All patients (N=619)
Follow-up time (months), N Mean (SD)	618 70.9 (59.5)
Status	
Dead	354 (57%)
Alive	265 (43%)
Median HH inc, N Mean (SD)	588 44198.0 (20459.2)
Below poverty, N Mean (SD)	572 15.3 (15.2)
Less than high school, N Mean (SD)	587 22.8 (13.1)
High school diploma, N Mean (SD)	589 30.4 (9.1)
Some college, N Mean (SD)	589 29.8 (7.3)
Bachelor's degree, N Mean (SD)	559 11.4 (8.6)
Postgraduate degree, N Mean (SD)	525 7.0 (6.6)
Overall survival time (months), median (95% CI)	89.8 (78.8, 105.6)
5-year survival rate, Prob (SE)	0.587 (0.021)
10-year survival rate, Prob (SE)	0.394 (0.023)

Table 1. Descriptive statistics on all variables

Results – median survival time

Variable	Response	Median survival time in months (95% CI) or HR (95% CI)	P Value
Age group	<65	123.0 (107.3, 162.5)	<0.001
	>65	55.7 (43.7, 76.7)	
Age (continuous)	HR (95% CI) per +1 year	1.04 (1.03, 1.05)	<0.001
Stage (binary)	Early	115.8 (107.1, 142.1)	<0.001
	Late	34.9 (25.4, 51.8)	
T stage (binary)	1 or 2	107.3 (90.5, 120.0)	<0.001
	3 or 4	43.0 (25.4, 80.8)	
N stage (binary)	0	112.6 (102.1, 123.0)	<0.001
	>0	30.9 (20.8, 49.0)	
Sex	Female	76.7 (49.0, 112.6)	0.880
	Male	95.4 (79.8, 109.2)	
Race	African American	107.3 (88.6, 122.4)	0.010
	Caucasian	73.3 (51.8, 87.0)	
Charlson Comorbidity Index	HR (95% CI) per +1 unit	1.23 (1.15, 1.32)	<0.001

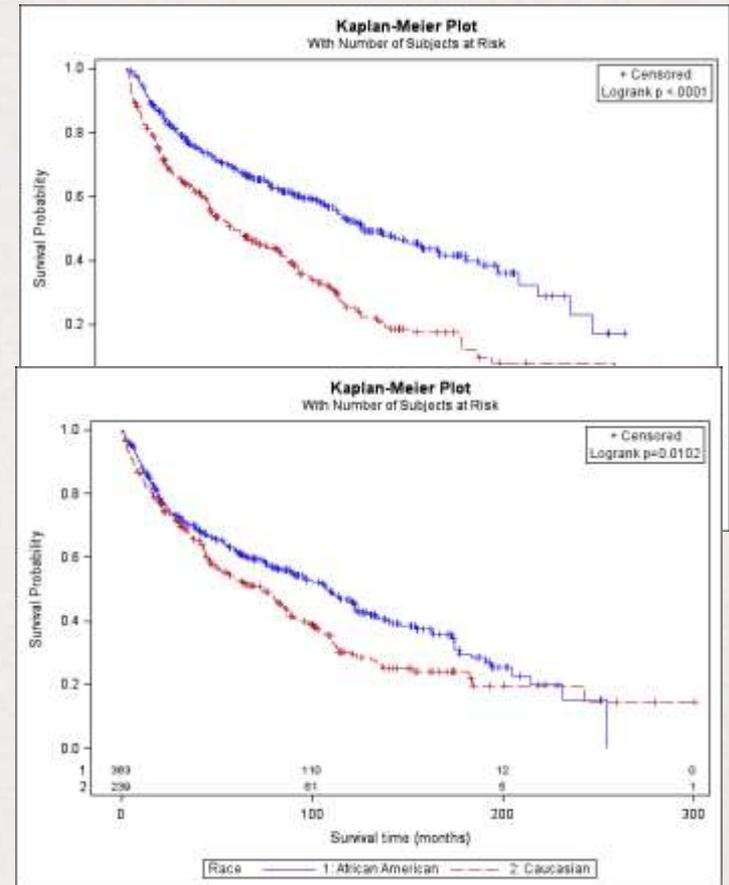**Table 2.** Univariable associations with median survival time

Figure 2. Overall survival curves by race

Results

Variable	Response	Median survival time in months (95% CI) or HR (95% CI)	P Value
Less than high school	HR (95% CI) per +10 percentage points	1.14 (1.06, 1.23)	<0.001
Bachelor's degree	HR (95% CI) per +10 percentage points	0.85 (0.74, 0.98)	0.026
Post-professional degree	HR (95% CI) per +10 percentage points	0.85 (0.71, 1.03)	0.087
Below poverty	HR (95% CI) per +10 percentage points	1.14 (1.07, 1.22)	<0.001
Median HH inc	HR (95% CI) per $10,000 increase	0.89 (0.84, 0.94)	<0.001

Table 2. Univariable associations with median survival time

Results – multivariate analysis

Predictor	HR (95% CI)	P-Value
Race (African American vs Caucasian)	0.95 (0.73, 1.23)	0.704
MedHHinc (per +$10K)	0.90 (0.79, 1.01)	**0.028**

Table 3. Multivariable model: risk of death by race controlling for socioeconomic factors

- When controlling for median household income (the was associated with decreased risk of death the risk was reduced by approximately 11% for each $10,000 increase in median household income when controlling for race, and the percentage of the patients' zip code which was below the poverty level (federal poverty level), there was no significant difference in risk of death between African Americans and Caucasians (*P* = .704).

Conclusion

- Socioeconomic factors and medical comorbidities were negative prognostic indicators of survival in patients with laryngeal squamous cell carcinoma.

- Contrary to previous reports, African American race was associated with improved overall survival in univariate analysis. However, once socioeconomic factors were controlled for, race conferred no effect on survival.

- **Rather, living in neighborhoods with higher median household income was protective access to other patients**