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The Effect of Socioeconomic Status and Race on Age of Diagnosis, and Receiving Surgery and Radiation Therapy in Patients with Acoustic Neuromas

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Introduction

Socioeconomic status (SES) and race is associated with receiving treatment in many cancers but the effect of SES on access to care for patients with acoustic neuromas has not been studied.

Methods

9714 patients from the SEER Program at the National Cancer Institute database were included in this study. All patients were diagnosed with acoustic neuromas from 2003 to 2012.

Patient SES was divided into tertiles based on an index developed by Yost et al. [1]. Race was self-reported (Caucasian/non-Caucasian).

Treatment options included radiation (yes/no), and surgery (gross total resection [GTR]/other surgery/no surgery). Patient demographics are as detailed in Table 1.

Multivariable logistic regression was used to analyze data with SAS v9.4. The results were adjusted as indicated below tables.

Table 1. Study Population Demographics

N	9,714
Sex (%)	
Male	47.95
Female	52.05
Race (%)	
Caucasian	86.37
Non-Caucasian	13.63
Mean age at diagnosis (years)	55.07 ± 0.15
Tertile distribution (%)	
Tertile 1	20.09
Tertile 2	33.19
Tertile 3	46.72
Treatment (%)	
Gross Total Resection	18.32
Other Surgery	27.67
Radiation	25.70
Radiation and Surgery	2.08
Mean survival (months)	41.35 ± 0.21

Results

Patients of higher SES tertile were significantly more likely to receive gross total resection (OR=1.067, p=0.0137) and less likely to receive radiation with surgery (OR=0.809, p=0.0182) [Table 2.].

Patients of Caucasian race were significantly more likely to receive gross total resection (OR=1.249, p=0.0002), and any kind of surgery (OR=1.259, p=0.0004), and less likely to receive radiation (OR=0.821, p=0.0039) and radiation with surgery (OR=0.527, p=0.0002) [Table 3.].

Results (cont.)

Younger age at diagnosis was a significant predictor of receiving gross total resection (OR=0.955, p<0.0001), any kind of surgery (OR=0.948, p<0.0001), and radiation with surgery (OR=0.969, p<0.0001), while older age at diagnosis was a significant predictor of receiving radiation therapy (OR=1.018, p<0.0001) [Table 4.].

Table 2. Odds of Receiving Treatment by SES

	OR*	95% Confidence Interval	P
Gross Total Resection	1.067	(1.013 – 1.124)	**0.0137**
Any Surgery	1.051	(0.994 – 1.112)	0.0807
Radiation	0.985	(0.927 – 1.047)	0.6302
Radiation and Surgery	0.809	(0.679 – 0.965)	**0.0182**

Reference = Lowest 3rd SES Tertile
*Adjusted for Age at Diagnosis, Sex,and Race

Caucasian race was significantly associated with earlier age at diagnosis (beta=-0.41, p<0.0001), and higher SES also had an association with younger age at diagnosis (beta=-0.37, p=0.050).

Table 3. Odds of Receiving Treatment by Race

	OR*	95% Confidence Interval	P
Gross Total Resection	1.249	(1.110 – 1.405)	**0.0002**
Any Surgery	1.259	(1.109 – 1.429)	**0.0004**
Radiation	0.821	(0.718 – 0.939)	**0.0039**
Radiation and Surgery	0.527	(0.378 – 0.734)	**0.0002**

Reference = Non-Caucasian race
*Adjusted for Age at Diagnosis, Sex, and SES

Table 4. Odds of Receiving Treatment by Age at Diagnosis

	OR*	95% Confidence Interval	P
Gross Total Resection	0.955	(0.952 – 0.958)	**<0.0001**
Any Surgery	0.948	(0.945 – 0.951)	**<0.0001**
Radiation	1.018	(1.015 – 1.022)	**<0.0001**
Radiation and Surgery	0.969	(0.960 – 0.978)	**<0.0001**

*Adjusted for Sex, Race, and SES

Conclusion

The findings from this national study on patients with acoustic neuromas suggest an effect of SES and race on age of diagnosis, which further has an effect on treatment received. Furthermore, this study also finds that SES and race also have an independent effect on treatment received. Further studies are required to understand the reasons underlying these disparities and how they may be addressed.

Learning Objectives

1. Socioeconomic status is a significant predictor of receiving surgery and age at diagnosis for patients with acoustic neuromas.
2. Race is an independent predictor of receiving surgery, receiving radiation therapy, and age at diagnosis for patients with acoustic neuromas.
3. Age at diagnosis is a significant predictor for receiving surgery and receiving radiation therapy for patients with acoustic neuromas.