

Neighborhood Socioeconomic Stressor Effect in Head and Neck Cancer Patients

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Introduction

Stress is known for its adverse health consequences. Stressors can influence the efficacy of treatment in head and neck cancer (HNC) patients. Specifically, neighborhood socioeconomic stressors can impede one's ability to effectively fight HNC. Stress levels modulate with the following variables: median household income, percentage of homes below the poverty level, percentage of single parents homes, and percentage of renter occupied homes. Ultimately, these stressors compound and can lead a patient to feel hopeless, defeated, or even depressed (Hill et al., 2005).

Moreover, treatment completion is vital for efficacy. HNC patients with greater stressors may be prone to incomplete treatment, or missed treatments, due to time constraints from the aforementioned stressors. Furthermore, HNC patients experience depressive symptoms with greater frequency than the general population (Zimmaro et al., 2018). Additionally, psychiatric diagnoses (e.g., anxiety and/or depression) in HNC patients open the door to maladaptive coping mechanisms, such as alcohol use, which is a significant risk factor for HNC.

Purpose

The objective of this study is to investigate the prognostic value of neighborhood socioeconomic stress at the zip code level among patients with head and neck cancer. Additionally, our aim is to explore the association between neighborhood socioeconomic stress with treatment completion, psychiatric diagnoses (i.e., anxiety and/or depression), and alcohol use (i.e., history and current).

Hypotheses

1) Greater neighborhood socioeconomic stress will be associated with earlier mortality in patients with head and neck cancer.

2) Greater neighborhood socioeconomic stress will be associated with poorer treatment completion in patients with head and neck cancer.

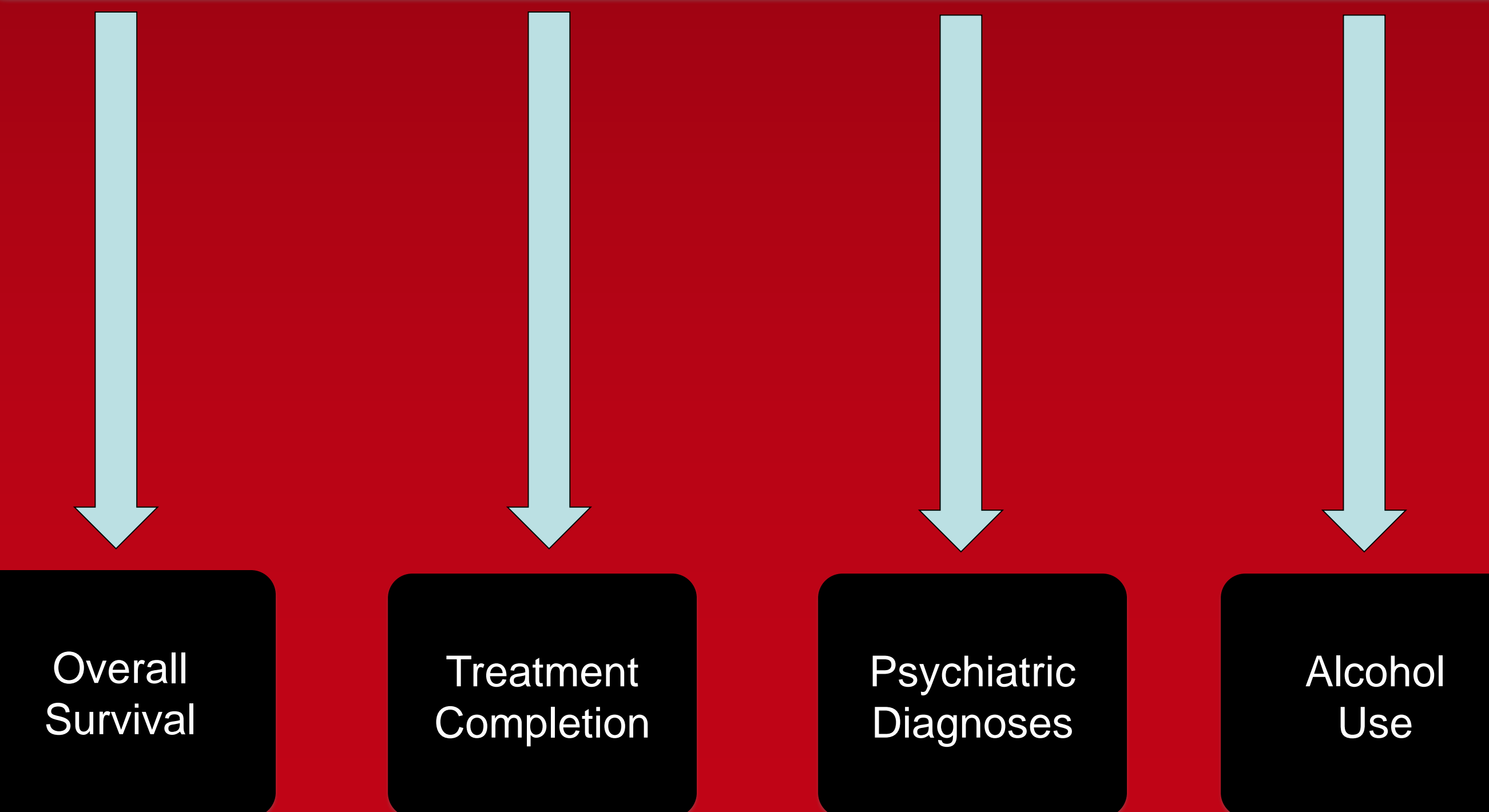
3) Greater neighborhood socioeconomic stress will be associated with a greater likelihood of having a diagnosis of anxiety and/or depression.

4) Greater neighborhood socioeconomic stress will be associated with a greater likelihood of a history or current use of alcohol.

Neighborhood Socioeconomic Stress

Variables obtained at zip code level.

Median Household Income, Percentage of Homes below the Poverty Level, Percentage of Renter Occupied Homes, and Percentage of Single Parent Homes



Methods

Participants. Retrospective study design, in which data were culled from medical records for patients that presented to the multidisciplinary head and neck cancer clinic from 2009 to 2012. Inclusion criteria included patients between who had a head and neck cancer diagnosis that required both radiation and chemotherapy.

Measures.

Neighborhood Socioeconomic Stress	Zip code	Medical Records
Median Household Income		
Percentage of Renter Occupied Homes		United States Census Bureau American FactFinder Application
Percentage of Single Parent Homes		United States Census Bureau American FactFinder Application
Percentage of Homes Below the Poverty Level		
6-Year Overall Survival		Medical Records
Treatment Completion Percentage		Medical Records
Psychiatric Diagnoses	Anxiety	Medical Records
	Depression	Medical Records
Alcohol Use	History of	Medical Records
	Current	Medical Records

Statistical Analysis Plan. Using the four variables extracted from the census data, an index of neighborhood socioeconomic stress was created with principal components analysis (PCA). A two-tailed Cox proportional hazards model was utilized to test the effects of neighborhood socioeconomic stress on overall survival time, measured from the date of consult. Linear regressions were employed to investigate the association between neighborhood socioeconomic stress and treatment completion. Logistic regressions were applied to test the associations between neighborhood socioeconomic stress and the following: anxiety, depression, history of alcohol use, and current alcohol use (at time of consultation).

Results

Table 1. Demographic and medical characteristics.

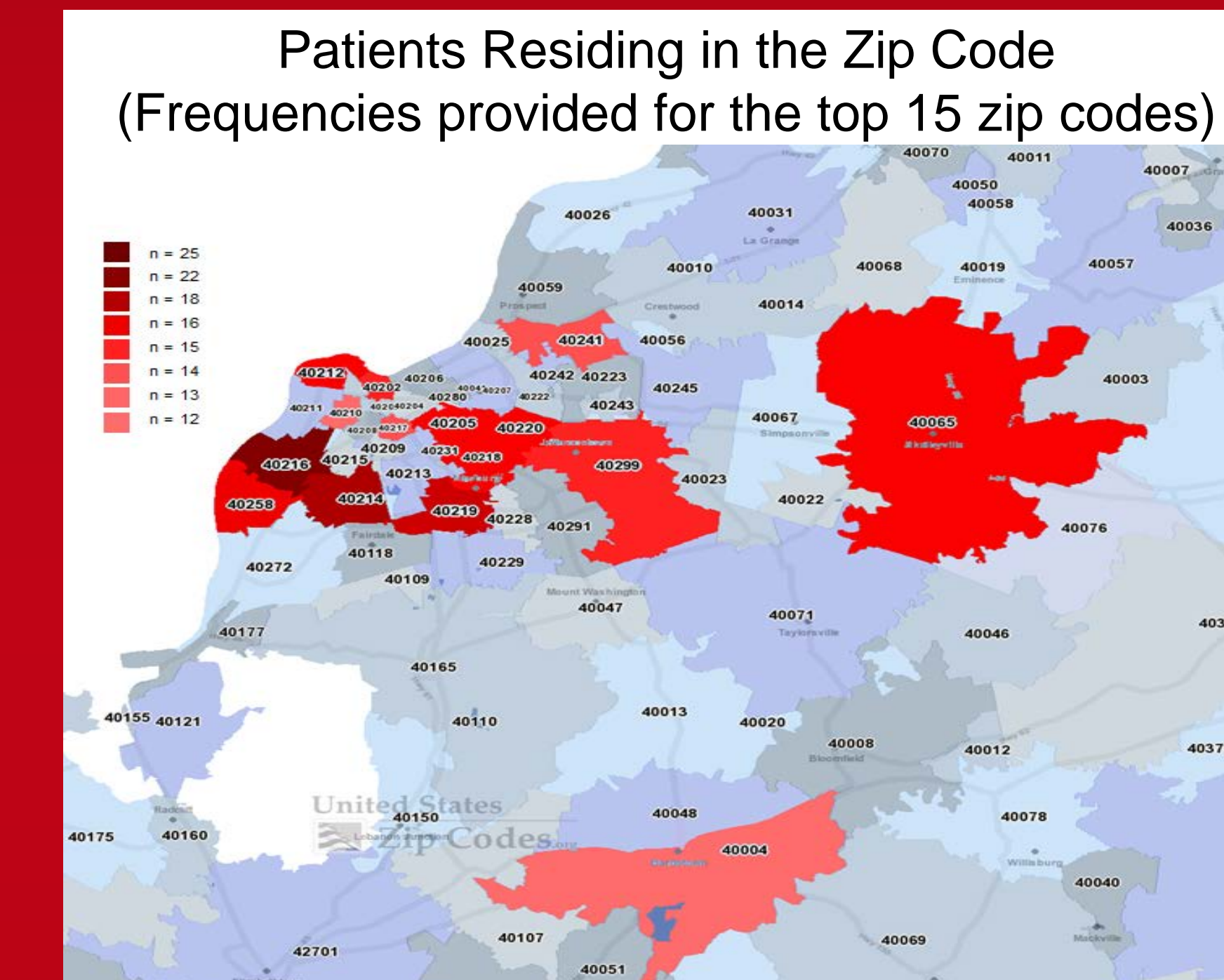
Variable	n (%)	Mean (SD)
Age	--	63.02 (11.99)
Site	--	--
Oropharyngeal	180 (31.9%)	--
Laryngeal	161 (28.5%)	--
Other (e.g., nasal cavity, sinus)	87 (15.4%)	--
Oral Cavity	70 (12.4%)	--
Unknown Primary	28 (5.0%)	--
Nasopharyngeal	23 (4.1%)	--
Hypopharyngeal	16 (2.8%)	--
Stage	--	--
Early (Stage I and II)	141 (23.2%)	--
Late (Stage III, IVa, and IVb)	365 (60.0%)	--
Metastatic (Stage IVc)	17 (2.8%)	--
Recurrent	73 (12.0%)	--
Unknown	12 (2.0%)	--
Squamous Cell Carcinoma	513 (85.1%)	--

Note. Total sample size is 609.

Table 2. Variables of interest.

Variable	n (%)	Mean (SD)
Median Household Income of Zip Code	--	\$50,213.86 (\$17,694.57)
Percentage of Renter Occupied Homes in Zip Code	--	34.23 (18.59)
Percentage of Single Parent Homes in Zip Code	--	37.21 (18.97)
Percentage of Homes Below the Poverty Level in Zip Code	--	16.15 (10.29)
Death Event	220 (38.5%)	--
Survival Time, in years	--	Median (range) = <1 (6.00)
Completed Treatment	581 (95.4%)	--
Anxiety Diagnosis	64 (10.5%)	--
Depression Diagnosis	66 (10.8%)	--
Alcohol Use History	180 (29.6%)	--
Currently Using Alcohol	99 (16.3%)	--
Distance Residing from Cancer Center, in miles	--	19.85 (21.76)
0 – 24	438 (71.9%)	--
25 – 50	116 (19.0%)	--
51 – 100	48 (7.9%)	--
> 100	7 (1.1%)	--

Note. Total sample size is 609.



- Neighborhood socioeconomic stress did not emerge as a significant predictor of overall survival measured from date of consult.
- Neighborhood socioeconomic stress was significantly associated with lower percentage of treatment completed, $F(1, 590) = 4.443, p = .035, R^2 = .007, \text{partial } R = -.086$.
- Neighborhood socioeconomic stress was not significantly associated with psychiatric diagnoses (i.e., anxiety and/or depression).
- Neighborhood socioeconomic stress was significantly associated history of (odds ratio [OR] = 1.211, 95% confidence interval [CI] = 1.023 – 1.435, $p = .027$) and current (OR = 1.284, 95% CI = 1.056-1.561, $p = .012$) alcohol use.

Conclusions

- Neighborhood socioeconomic stress was not predictive of overall survival; however, it was significantly associated with treatment completion. The environmental status, in which one resides, may negatively impact one's abilities to successfully complete cancer treatments, regardless of the distance they live from the treatment facility.
- With respect to overall survival, one can reasonably posit that survival is dependent on a myriad of factors, including but not limited to: access to care, access to nutritious food, air quality of neighborhood, and health literacy. In other words, overall survival is not exclusively associated with neighborhood socioeconomic stress.
- The socioeconomic stress of the area (i.e., zip code) in which one lives may contribute to their alcohol use (i.e., history of and current). Alcohol use is a significant risk factor for head and neck cancer and continued use throughout treatment may have adverse effects on the patient.
- Implications of this study provide insight into the importance of a treatment team's awareness to patient residence in neighborhoods of higher socioeconomic stress, in order to identify individuals that may need additional resources to aid in completion of treatment.
- Future studies should focus on a prospective design in order to gain a more nuanced understanding of the impact of the neighborhood in which one lives. Additionally, data from the census tract level, rather than zip code, would be more fruitful given the likely socioeconomic differences within a zip code.

Acknowledgements

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Bibliography

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