

## **The Effects of Race/Ethnicity and Low Socioeconomic Status in Patients with Neuromyelitis Optica Spectrum Disorder**

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**Key Words:** Neuromyelitis Optica Spectrum Disorder, Socioeconomic status, Race, Ethnicity

### **Objective:**

This study aims to identify the impact of race/ethnicity and a lower socioeconomic status (SES) in clinical outcomes, imaging findings, and treatment responses of Neuromyelitis Optica Spectrum Disorder (NMOSD) from a cohort of patients in the Department of Neurology at UT Health Houston. Along with identifying these differences, we aim to decrease negative outcomes by providing plausible, realistic solutions and resources to these individuals.

### **Background:**

NMOSD is an autoimmune condition with clinical outcomes potentially influenced by racial and SES factors. Although some studies suggest a higher prevalence of NMOSD among black individuals compared to non-black patients, the existing literature lacks sufficient data to conclusively establish significant differences, primarily due to small sample sizes. Due to the cost, time, and treatments necessary for these patients, is our hypothesis that a lower SES would lead to worse outcomes in NMOSD patients.

### **Methods:**

An IRB approved retrospective cohort study was conducted by utilizing the electronic health records of patients in the greater Houston area. Patients were dichotomized by race into black and non-black patients (including whites, Hispanics, and Asians). Data analysis was performed to analyze the presence of statistically significant differences in prognostic factors between the two patient populations. Patients were also dichotomized by socio-economic status into low SES and non-low SES, based on the patient's zip code and the corresponding zip code's median income according to US Census data; low SES was defined as median income below 2X poverty line, and non-low SES was defined as income above 2X poverty line. Data analysis was performed to analyze the presence of statistically significant differences in prognostic factors between the two groups.

### **Results:**

We included 68 patients with NMO who had an identified race in the study, of which 29 were black (42.6%) and 38 were non-black (57.3%). There was a decreased proportion of male patients

in the black than the non-black patients (3.4% vs 28.2 %,  $p < 0.05$ ). There was no difference in the mean age, or proportion of low-income status between black and non-black patients.

There was an increase in the proportion of the presence of brain lesions on MRI between black and non-black patients (62.5% vs 29.0%,  $P < 0.05$ ). There was no difference in the proportion of the presence of cervical spine lesions, thoracic spine lesions, or optic nerve lesions on MRI between black and non-black patients. There was no difference in the proportion of the presence of vision problems, weakness, neuropathic pain, or neurogenic bladder as a presenting complaint between black and non-black patients. We included 66 patients with NMO who had an identified SES in the study, of which 19 (29%) were identified as low SES and 47 (71%) were identified as non-low SES. There was no difference in the mean age between low SES and non-low SES groups (41.4 vs 39.4,  $p > 0.05$ ). There was no difference in the proportion of male patients between low SES and non-low SES groups (15.8% vs 17.0%,  $p > 0.05$ ). There was no difference in the proportion of non-Hispanic white patients between low SES and non-low SES groups (10.5% vs 12.8%,  $p > 0.05$ ). There was a significantly decreased proportion of the presence of thoracic spine lesions on MRI in the low SES group compared to the non-low SES group (11.8% vs 56.3%,  $P < 0.01$ ).

### **Conclusion & Discussion:**

Our study reveals significant racial disparities in NMOSD patients, notably higher rates of brain lesions on MRI among black individuals compared to non-black patients. These findings underscore the critical need to address racial disparities in NMOSD management, considering challenges such as healthcare access barriers and socioeconomic constraints faced by black patients, which impact disease burden and outcomes. Our study also found that there are significant differences in imaging results between patients of low SES compared to non-low SES patients, with low SES patients having a decrease proportion of thoracic lesions. Although this is contrary to what we expected, the data sheds light on a patient population that has not been extensively studied from this perspective. Further research is warranted to understand the underlying causes and generalizability of these disparities, facilitating more equitable healthcare delivery and improved outcomes for all NMOSD patients.