

Social Determinants of Health are Associated with Poorer Peripheral Nerve Reconstruction Outcomes

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INTRODUCTION: Peripheral nerve injuries are debilitating conditions that can result in profound functional deficits and diminished quality of life. The success of peripheral nerve reconstruction procedures is influenced by various factors, including the patient's baseline health status and socioeconomic environment. Despite growing evidence of impacts of social determinants on health outcomes, they are still associated with large disparities in healthcare. The purpose of this study was to characterize the association between patient county-level and neighborhood level vulnerability with functional recovery following peripheral nerve reconstruction.

METHODS: With IRB approval, patients who underwent peripheral nerve reconstruction of a sensory nerve in the last ten years were reviewed for inclusion. Patients who were older than 18 and had at least 6 months of follow-up data were included for review. Patient's Area Deprivation Index (ADI) and Social Vulnerability Index (SVI) were determined based on their address at the time of surgical intervention. Utilizing state and national ADI, overall SVI, insurance status, and distance traveled for surgery, multivariable analysis was performed to determine the relationship between these factors and sensory function, defined at static two-point discrimination, at six-months post-operatively.

RESULTS: In total, 64 patients were included, with 22% of patients in the most disadvantaged ADI quartile and 20% of patients in the most vulnerable SVI quartile. Patients had an average State ADI of 6.2, National ADI of 62.1, and SVI of .53. Patients with higher ADI and SVI had poorer sensory function at the six-month timepoint than patients with lower ADI and SVI ($p < .01$). Similarly, these same patients had higher self-reported post-operative pain scores than patients in the highest quartile at six months (5.4 vs. 1.2, $p < .05$). Insurance status was significantly associated with functional outcomes, with self-pay patients, Medicare, and Medicaid patients having lower sensory function than patients with private insurance at the time of surgery ($p < .05$). There was no significant association between distance traveled for follow-ups and sensory function.

DISCUSSION: Understanding the impact of ADI and SVI on peripheral nerve reconstruction outcomes is crucial for developing targeted interventions to improve patient care. This study sheds light on the importance of considering the social and economic context in which patients live when planning and executing peripheral nerve reconstruction procedures. By identifying these disparities, healthcare providers can develop tailored strategies to optimize outcomes and reduce healthcare inequalities in peripheral nerve injury management. Further research is needed to elucidate the precise mechanisms underlying these associations and to develop interventions aimed at mitigating the impact of ADI and SVI on peripheral nerve reconstruction outcomes.

SIGNIFICANCE/CLINICAL RELEVANCE: Neighborhood measures of disadvantage represent a valuable tool to improve patient-centered care by allowing for modification of treatment protocols to meet the unique needs of patients and their families.