Examining socioeconomic disparities in brachial plexus birth injuries: A multicenter public health analysis

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INTRODUCTION:
Brachial plexus birth injuries (BPBI) have been attributed with associative factors that have been speculated to be more predominant in socioeconomically disadvantaged populations. Since the direct socioeconomic status of infants with BPBI has not been previously studied in the United States, the primary objective of this investigation is to analyze and compare the socioeconomic characteristics of infants diagnosed with BPBI at two high-volume, distinct healthcare systems in the United States.
METHODS:
All patients diagnosed with non-transient BPBI presenting to clinic between November 2021 and November 2023 at either institution, New York City ("NY") or Los Angeles ("LA"), were included in the analysis. To stratify patients based on socioeconomic background, the Area Deprivation Index (ADI) and the Child Opportunity Index (COI) were utilized. ADIs were presented in either national percentiles (1-100%) or state-normed deciles (1-10), with a higher ranking for each indicating a more disadvantaged level. COI scores and quintiles were assigned based on nationally normed ZIP code-level data, with a lower COI signifying a lower childhood opportunity. For analysis, continuous variables underwent two-tailed, unpaired Mann-Whitney U and t-tests, while categorical variables were assessed using chi-squares. The significance level was set at $p < 0.05$.
RESULTS:
When comparing the LA (n = 92) and NY (n = 107) cohorts, the average ADI when normed statewide was 6 (SD 2.5) and 5 (SD 1.4) out of 10, respectively ($p = 0.001$). When normed nationally, the average ADI scores were 24.5% (SD 21.1) for LA and 25.4% (SD 13.5) for NY ($p = 0.0057$). When utilizing the COI scores to undergo further analysis, the overall COI of LA and NY averaged 37.7 (SD 28.2) and 17.3 (25.6), respectively ($p < 0.05$). While there was a significantly higher number of patients from NY than LA falling into the categories of very low or low in the education domain, social and economic domain, and overall COI when normalized nationally and at the state level, the distributions of these categories in the LA cohort were more evenly spread across the cohort.
DISCUSSION AND CONCLUSION:
Our findings challenge the previously held notion that BPBI infants primarily originate from lower socioeconomic backgrounds: at one location (LA), the child opportunity scores of BPBI infants were distributed among the COI quintiles. While this study does not offer an explanation for these trends, the results suggest the need to reconsider how we describe the associations with BPBIs. This reevaluation may contribute to dispelling the theory that such injuries are confined to a specific socioeconomic group and our findings support the need for a widespread, multicenter national examination of BPBI socioeconomic factors.