

The Impact of Socioeconomic Status on the Magnitude of Scoliosis Curve at Initial Presentation

Nathaniel Hunter¹, Cole Payne¹, Aidan Wright¹, Jacob Siaahan MS², Rohini Vanodia MD², Timothy Borden MD²

¹McGovern Medical School, The University of Texas Health Science Center at Houston, TX, ²Department of Orthopedic Surgery, The University of Texas Health Science Center at Houston, TX

Email of Presenting Author: Nathaniel.B.Hunter@uth.tmc.edu

Disclosures: The authors have received nothing of value in the preparation of this manuscript. There are no conflicts of interest relating to these topics.

INTRODUCTION: The correlation between socioeconomic status (SES) and worse health outcomes is an increasingly important topic. Identifying which patients are more likely to present with advanced musculoskeletal pathology is a top priority. The Area Deprivation Index (ADI) ranks neighborhoods across the United States of America based on levels of socioeconomic disadvantage.¹ The Childhood Opportunity Index 2.0 (COI 2.0) measures neighborhood resources essential for a child's development and ranks neighborhoods according to the social determinants of health.² Our study aimed to determine the relationship between scoliosis curve magnitude at initial presentation and SES as measured by the ADI and COI 2.0.

METHODS: We retrospectively identified 1,649 patients presenting for evaluation of adolescent idiopathic scoliosis (AIS) at a single academic center between June 27, 2018, and June 6, 2023. The patients were divided into a non-surgical and surgical cohort with 1,510 and 139 patients, respectively. Curve magnitude at initial presentation (Cobb angle), BMI, and address were recorded using the institution's electronic health record (EHR). The patients' addresses documented in the EHR were used to determine their respective ADI and COI 2.0 scores. The information was assessed using univariate analysis.

RESULTS SECTION: Patients in the surgical cohort were more likely to have a higher ADI National Percentile, higher ADI State Decile, higher BMI, and greater Cobb angle at initial presentation compared to patients in the non-surgical cohort ($p = <0.05$). Within the surgical cohort, patients with a higher BMI were more likely to present with a greater Cobb angle at initial presentation ($p = <0.05$). Within the non-surgical cohort, patients with a Cobb angle >45 were more likely to have a higher ADI State Decile and live in neighborhoods with a higher poverty rate compared to non-surgical patients with a curve <45 ($p = 0.05$). Within the non-surgical cohort, patients with a Cobb angle >45 were more likely to live near hazardous waste dump sites compared to patients with a curve <45 ($p = <0.05$).

DISCUSSION: There are significant associations between SES and the magnitude of the scoliosis curve at initial presentation. Patients that have undergone surgical correction of their scoliosis deformity are more likely to be socioeconomically disadvantaged at a state and national level, according to the ADI. Non-surgical patients with a greater amount of socioeconomic deprivation, those who live in neighborhoods with higher poverty rates, and those with greater environmental pollutant exposure are more likely to present with a Cobb angle that exceeds bracing indications (>45). More work must be done on a state and national level to identify, treat, and educate socioeconomically disadvantaged patients before their curve magnitude exceeds non-operative management.

SIGNIFICANCE/CLINICAL RELEVANCE: This study emphasizes that socioeconomically disadvantaged patients are likely to present with more severe scoliosis pathology and exceed nonoperative management indications. Healthcare institutions across the United States must implement methods of identifying, treating, and educating these patients early in their disease course to reduce healthcare costs and maximize resources.

REFERENCES:

[1] University of Wisconsin School of Medicine and Public Health. 2023 Area Deprivation Index V3.0. Downloaded from <https://www.neighborhoodatlas.medicine.wisc.edu/>. April 12, 2023.

[2] Noelke, C., McArdle, N., Baek, M., Huntington, N., Huber, R., Hardy, E., & Acevedo-Garcia, D. (2020). Child Opportunity Index 2.0 Technical Documentation. Retrieved from diversitydatakids.org/researchlibrary/research-brief/how-we-built-it.

ACKNOWLEDGEMENTS: I would like to acknowledge Dr. Borden and the Department of Orthopedics for their continued help, support, and mentorship throughout my medical education.