Is Child Opportunity Index a Factor in Surgical Outcomes for Adolescent Idiopathic Scoliosis?

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INTRODUCTION:

Low socioeconomic status (SES) has been previously associated with delays in orthopaedic care, but it is unclear if SES is associated with differences in adolescent idiopathic scoliosis (AIS) preoperative Cobb angle or surgical outcomes. Utilizing the child opportunity index (COI) – a validated composite measure of neighborhood socioeconomic deprivation specific to children – we investigated if COI is associated with differences in preoperative scoliosis magnitude, age at surgery, and surgical outcomes.

METHODS: Consecutive AIS patients surgically treated at a single-center from 2011-2017 were reviewed. The patient's home address was used to calculated COI; those without addresses were excluded. Patients without proper radiographs to assess curve correction were also excluded. COI was dichotomized as low (< 60.0) or high (≥ 60.0) based on documented thresholds. Outcomes including preoperative curve magnitude, age at surgery, percent curve correction, operative time, estimated blood loss per level fused, length of stay, and complications were stratified. Pearson correlation analysis was used to assess correlations between COI and preoperative curve magnitude, as well as age.

RESULTS: A total of 404 patients were included in the study, and 263 had two-year follow-up data. Patients were an average age of 14.9 years old (range, 11.2 to 19.8), had a median COI of 76 (range, 4-100), and an average preoperative Cobb of 59 degrees (range 36-93). COI was significantly higher for white patients compared to non-white (80.0 vs. 40.0, p<0.001), and higher for non-Hispanic individuals (79.0 vs. 15.0, p<0.001) (Figure 1). Low COI patients were associated with a lower operative time per level fused (p=0.003) and decreased postoperative complication risk (p=0.02). COI was not associated with preoperative Cobb angle, age at surgery, or any other surgical outcomes (Table 1).

DISCUSSION AND CONCLUSION:

COI was significantly lower for non-white patients and those of Hispanic ethnicity. However, patients from low COI backgrounds achieved similar surgical results as those from high COI addresses, and had a decreased operative time per level fused and complication incidence. This study demonstrates that low COI patients are associated with equitable scoliosis care at our institution, and that patients from high COI backgrounds may be at an increased risk of elevated operative time and complications.

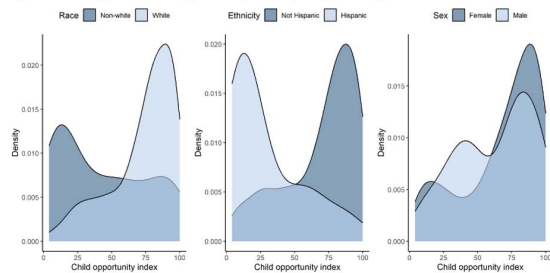Figure 1. Density plot of child opportunity index by race, ethnicity, and sex.

Table 1. Outcomes by COI group (N=404).

	High COI (n=271)		Low COI (n=133)		
	Mean	± SD	Mean	± SD	P-value
Pre-operative curve magnitude	58.7	± 9.64	59.1	± 8.75	0.62
Age at surgery	14.9	± 1.92	14.9	± 1.86	0.96
% curve correction	64.6	± 12.53	66.7	± 11.43	0.10
Operative time	278	(212-312)	286	(218-342)	0.08
Number of levels fused	10	(8-11)	10	(8-11)	0.96
Operative time per level fused (*minutes; median (IQR)*)	30	(24-38)	28	(23-34)	0.02
EBL per level fused (*median (IQR)*)	58	(36-90)	55	(36-88)	0.33
Length of stay (*days; median (IQR)*)	4	(3-5)	4	(3-5)	0.39
Intraoperative complications (*Freq. (%)*)	8	(3%)	4	(3%)	1.00
Perioperative complications (*Freq. (%)*)	9	(3%)	3	(2%)	1.00
Postoperative complications (*Freq. (%)*)	18	(7%)	2	(2%)	0.03
Two year curve correction (*median (IQR); n=263*)*	61	(53-69)	62	(48-70)	0.81
Curve progression at 2 years follow-up (*n=263*)*	-35.4	± 10.87	-34.9	± 11.12	0.76

SD, standard deviation; IQR, interquartile range.
*The number is parentheses represents the number of cases with information available.