Lower Socioeconomic Status is Associated with Recurrent Shoulder Instability before Surgical Shoulder Stabilization

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INTRODUCTION: Social determinants of health (SDOH) are comprised of a patient's environmental conditions including social and economic factors, which influence access to healthcare and resources. Growing evidence in orthopaedic surgery has revealed that SDOH factors lead to differential access to care and ultimately health disparities after surgery. Previous literature for shoulder instability have shown that the number of previous dislocations before a stabilization procedure increases the risk of recurrent instability after the procedure. The purpose of this study was to investigate the impact of SDOH on the number of dislocation events before surgical intervention.

METHODS: Patients that underwent shoulder instability surgery at a single center in a large metropolitan area between 1/1/2021 and 4/13/2023 were identified. Patients' demographic and social determinant variables were extracted using the electronic medical record. Social Vulnerability Index (SVI) socioeconomic subscore and Area of Deprivation Index (ADI) were collected using online mapping data based on patient zip codes. Patient demographics, number of dislocations, and the time from first shoulder dislocation to orthopaedic presentation and surgical intervention were collected. Univariate linear regression analysis was used to evaluate potential predictors of increasing time to presentation and increasing time to surgery. Univariate logistic regression analysis was also performed of all potential predictors of having >1 dislocation event. A multivariate model was then created using all predictors with a P value < 0.05 in the univariate models.

RESULTS: There were 106 patients that underwent shoulder stabilization surgery for instability and had complete social determinant data. In total, 54% (n = 57) identified as White, 29% (n = 31) as Black/African American, and 17% (n = 18) as other. Thirty-eight (35.8%) patients suffered 1 dislocation (single dislocation cohort) before undergoing surgery and 68 (64.2%) experienced > 1 dislocation (recurrent cohort) before surgery. No significant variables were associated with delay in time to orthopaedic presentation or surgery. Univariate logistic regression showed that decreasing age (odds ratio [OR] 0.94 [95% confidence interval (CI) 0.89 – 0.99]; P = 0.02), decreasing BMI (OR 0.90 [95% CI 0.83 – 0.98]; P = 0.02), increasing SVI (OR 1.21 [95% CI 1.05 – 1.38]; P = 0.006), and increasing ADI (OR 6.04 [95% CI 2.05 – 17.8]; P = 0.003) were associated with increased odds of having > 1 instability event before surgical intervention. Multivariate logistic regression modeling revealed that decreasing BMI (OR 0.87 [95% CI 0.78 – 0.98]; P = 0.02), and increasing ADI (3rd tercile compared to 1st tercile, OR 7.46 [95% CI 1.26 – 44.2]; P – value = 0.02), were associated with increased odds of having > 1 instability event before shoulder stabilization surgery.

DISCUSSION AND CONCLUSION:
Lower socioeconomic status, as measured by ADI, is an independent predictor of a higher likelihood of recurrent instability before surgery. Recognizing these relationships can motivate surgeons to create pathways to prevent these treatment disparities among shoulder instability patients. Further studies are needed to examine if these SDOH variables lead to disparities in postoperative outcomes.

Table 1. Univariate Logistic Regression

	1 instability event (n = 38)	> 1 instability event (n = 68)	OR of having > 1 instability event (95% CI)	P - value
Age (median [IQR] {range}, years)	25.0 [19.8 – 34] {14-52}	22.0 [19.0 – 28.8] {15 – 45}	0.94 (0.89 – 0.99)	0.02
BMI (kg/m²)	27.8 ± 4.8	24.8 [22.2 – 27.4] {18.0 – 39.9]	0.90 (0.83 – 0.98)	0.02
Sex (n, %)				0.12
Male	34 (89%)	53 (78%)	0.41 (0.13 – 1.36) (male compared to female)	
Female	4 (11%)	15 (22%)		
Race (n, %)				0.64
White	22 (58%)	35 (51%)		
Black	9 (24%)	22 (33%)	1.53 (0.60 – 3.94) (black compared to white)	
Other	7 (18%)	11 (16%)	0.98 (0.33 – 2.93) (other compared to white)	
SVI SE (median [IQR] {range})	21.4 [7.7 – 60.8] {2.0 – 99.6}	53.3 [26.7 – 84.3] {3.3 – 99.8}	1.21 (1.05 – 1.38) (per every 10-percentile increase)	0.006
ADI Tertile (n, %)				0.003
1 (least deprived)	16 (42%)	10 (15%)		
2 (mid-range)	13 (34%)	24 (34%)	2.95 (1.05 – 8.45) (2nd tertile compared to 1st tertile)	0.04
3 (most deprived)	9 (24%)	34 (50%)	6.04 (2.05 – 17.8) (3rd tertile compared to 1st tertile)	0.01

Abbreviations: IQR = interquartile range; SVI SE = social deprivation index socioeconomic; ADI = area deprivation index; CI = confidence interval; OR = odds ratio

Table 2. Multivariate Logistic Regression

	OR of having > 1 instability event (95% CI)	P - value
Age (median [IQR] {range}, years)	0.96 (0.90 – 1.02)	0.18
BMI (kg/m²)	0.87 (0.78 – 0.98)	0.02
SVI SE	1.07 (0.86 – 1.33)	0.55
ADI Tertile (n, %)		0.04
1 (least deprived)		
2 (mid-range)	3.65 (1.11 – 11.9) (2nd tertile compared to 1st tertile)	0.03
3 (most deprived)	7.46 (1.26 – 44.2) (3rd tertile compared to 1st tertile)	0.02

Abbreviations: IQR = interquartile range; OR = odds ratio; SVI SE = social deprivation index socioeconomic; ADI = area deprivation index; CI = confidence