Lower Socioeconomic Status is Associated with Delay to Surgery before Anterior Cruciate Ligament Reconstruction

Brittaney Pratt, Michael Gaudiani, Joshua P. Castle, Muhammad Jehad Abbas, Marquisha Diana Myles, Nicholas Emad Daher, Thomas Sean Lynch, Vasilios Moutzouros

INTRODUCTION:

The impact of social determinants of health (SDOH) on postoperative outcomes in orthopaedic surgery continues to grow. For patients undergoing anterior cruciate ligament (ACL) reconstruction, previous studies have demonstrated that socioeconomic variables are associated with differential patient-reported outcomes and complications. However, delays in care have not been fully explored. Therefore, the purpose of this study was to investigate the association between socioeconomic variables and timing to presentation and surgery in ACLR patients.

METHODS: A retrospective cohort review of patients undergoing ACLR patients at a single healthcare system in a large metropolitan area from January 2020 to December 2023 was conducted. Patients' demographic variables, mean household income (MHI) and Area of Deprivation Index (ADI) were collected using the electronic medical record and online mapping data tools based on zip codes. Patients with less than 1 year of Patient Reported Outcome Measurement Information System (PROMIS) scores were excluded. The primary outcome was to compare time from injury to orthopaedic presentation and to surgical intervention based on various sociodemographic parameters. The secondary outcome was to compare PROMIS scores at preoperative, 3, 6, and 12 months from surgery based on social determinants of health variables.

RESULTS:

Three-hundred and ninety-eight ACLR patients were included (median age, 21 years; 54.5% male). Compared with White patients, Black patients were more frequently in the lowest median household income (MHI) quartile (54% vs. 9%, respectively; p < .001). White patients were more frequently in the lowest area deprivation index (ADI) quartile when compared with Black patients (50% vs 9%, respectively; p < .001). Black patients experienced a longer delay to surgery compared to White patients, although only approached significance (5.14 vs. 4.14 weeks respectively; p=0.08). Compared to the least deprived ADI quartile 1, those in the highest ADI quartile 4 experienced a significantly longer delay to surgery (5.57 wks. vs 3.0 wks. respectively, p<0.001). Patients in the lowest income quartile experienced significantly longer delay to surgery than patients in MHI quartile 4, (5.14 wks. vs 3.86 wks. respectively; p=0.016). Additionally, increasing age was correlated with longer times from injury to presentation ($r_s = 0.268$, p<0.001) and presentation to surgery ($r_s = 0.210$, p<0.001). Increasing BMI was correlated with increased time from injury to presentation ($r_s = 0.132$, p=0.009). When examining PROs at one year, patients in the lowest income quartile (MHI Q4) demonstrated worse PROMIS-PI (52 vs. 50 p=0.035) and PROMIS-PF (49 vs. 52, p=0.018) scores compared to MHI Q1. Current smokers also demonstrated significantly worse PROMIS-PF scores compared to never smokers (47 vs. 51, p=0.014 respectively). DISCUSSION AND CONCLUSION:

Patients in the most socioeconomically deprived and lowest incomes quartiles experience significant delays in presentation and time to ACLR. These socioeconomic differences appear to be associated with worse pain and physical

function	for	these		patients				at			1	year.
Table 1. Patient Demographics	Tatal		Table 2	Time to Su	indenv	3						
	(N=398)		Tuble 2.	Time to bu	inger y	6						
Patient Age at Surgery (Years)					1	Time from presentation to		Time from initial injury to presentation		esentation		
N	398					surgery (weeks)		(weeks)				
Median (IQR)	21.0 (17.0, 31.0)						-					
BMI			Variable	Level	N	Median	P-value	N	Median	P-value		
N	396		Race	Asian	22	2 3.86 5 5.14	0.086	21	21 3.29 81 2.00	0.294		
Median (IQR)	25.1 (22.4, 28.8)			Postan						0.204		
MHI Quartile, n (%)				Black	85			81				
1 (\$20-45k)	83 (21.4%)					2712		20	2.70			
2 (\$46-57k)	56 (14.4%)			Other	32	5.14		32	2.79			
3 (\$58-79k)	84 (21.6%)			Linknown	42	2.14		38	2.00			
4 (\$80-158k)	165 (42.5%)			OIKIOWI	42	5.14		2.01	5836			
ADI				White	217	4.14		211	2.43			
N	390				-	500 S 20			10			
Mean (SD)	50.6 (29.15)		MHI Quartile	1 (\$20-	83	5.14	0.016	79	79 3.14 53 2.71 63 2.14 159 2.14	0.714		
ADI Quartile, n (%)				45k)				C 2				
1 (0-24)	89 (22.8%)			-			8					
2 (25-49)	115 (29.5%)			2 (\$46-	56	4.14	-	55				
3 (50-74)	86 (22.1%)			57k)								
4 (75-100)	100 (25.6%)			0.0050				83				
Gender, n (%)				3 (\$58-	84	5.14		0.0				
Female	180 (45.5%)			79k)								
Male	216 (54.5%)			4 (690	100	2.00		159				
Race, n (%)				4 (300-	105	3.00						
Asian	22 (5.5%)			158K)	3							
Black	85 (21.4%)		Gender	Female	180	3 79	0.117	174	2.00	0.311]	
Other	32 (8.0%)		o o na o n	. onnaro		0.110						
Unknown	42 (10.6%)			Male	216	4.86		207	2.57			
White	217 (54.5%)		4.01				1					
Ethnicity, n (%)			ADI					85	2.14	0.376		
Hispanic or Latino	22 (5.5%)		Quartile	2	115	4 14		111	2.00	1		
Not Hispanic/Latino	319 (80.2%)			~		344.5						
Unknown	57 (14.3%)			3	86	4.93		84	2.93			
Insurance Type, n (%)								05	2.14	• •		
Public/government	73 (18.3%)		Variable	4	100	5.57		55	5.14			
Private/commercial	309 (77.6%)				N	N Spearman Correlation Coefficient (r _s)	P-value	N	Spearman Correlation Coefficient (r _a)	P-value		
None	7 (1.8%)			į								
Unknown	8 (2.0%)											
Workers' compensation	1 (0.3%)			, J	1							
Smoking Status, n (%)			Age		20.0	0.268	<.001	383	0.210	<.001		
Never	337 (85.3%)	-	BMI		598	0.208		505	0.210			
Former	28 (7.1%)				396	0.132	0.009	381	0.020	0.698		
Current	30 (7.6%)			1								