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HEALTH SERVICES RESEARCH

Greater Socioeconomic Disadvantage Is Associated with Worse Symptom Severity at Initial Presentation in Patients Seeking Care for Lumbar Disc Herniation

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Study Design. Retrospective, observational study.

Objective. To determine the association of patient socioeconomic disadvantage, insurance type, and other characteristics on presenting symptom severity in patients with isolated lumbar disc herniation.

Summary of Background Data. Little is known of the impact of socioeconomic disadvantage and other patient characteristics on the level of self-reported symptom severity when patients first seek care for lumbar disc herniation.

Methods. Between April 2015 and December 2018, 734 patients newly presenting for isolated lumbar disc herniation who completed the Patient-Reported Outcomes Measurement Information System Physical Function (PF), Pain Interference (PI), and Depression Computer Adaptive Tests (CATs) were identified. Socioeconomic disadvantage was determined using the Area Deprivation Index, a validated measure of socioeconomic disadvantage at the census block group level (0–100, 100 = highest socioeconomic disadvantage). Bivariate analyses were used. Multivariable linear regression was used to determine if there was an association between socioeconomic disadvantage, insurance type, and other patient factors and presenting patient-reported health status.

Results. Significant differences in age, insurance type, self-reported race, marital status, and county of residence were appreciated when comparing patient characteristics by socioeconomic disadvantage levels (all comparisons, $P < 0.01$). In addition, significant differences in age, insurance type, marital status, and county of residence were appreciated when comparing patient characteristics by self-reported race (all comparisons, $P < 0.01$). Being in the most socioeconomically disadvantaged cohort was associated with worse presenting Patient-Reported Outcomes Measurement Information System scores (Physical Function: $\beta = -3.27$ (95% confidence interval [CI]: -4.89 to -1.45), $P < 0.001$; Pain Interference: $\beta = 3.20$ (95% CI: 1.58–4.83), $P < 0.001$; Depression: $\beta = 3.31$ (95% CI: 1.08–5.55), $P = 0.004$.

Conclusion. The most socioeconomically disadvantaged patients with symptomatic lumbar disc herniations present with worse functional limitations, pain levels, and depressive symptoms as compared to patients from the least socioeconomically disadvantaged cohort when accounting for other key patient factors.

Key words: Area Deprivation Index, health care disparities, lumbar disc herniation, patient-reported outcome measures, Patient-Reported Outcomes Measurement Information System, social deprivation, socioeconomic status, spine.

Level of Evidence: 3

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Low back pain (LBP) and radicular symptoms are a common occurrence among patients globally.[1,2] Associated with this common occurrence is the high rate of physician visits related to LBP [3] and the high cost of providing care.[4] Lumbar disc herniation remains the most common reason for working-age patients to undergo spine surgery.[5] With such spine pathology, patients most commonly present with radicular pain. Importantly, patients who undergo surgical intervention for lumbar disc herniation with symptoms of shorter duration achieve better

clinical outcomes.[6] Therefore, patients with symptomatic lumbar disc herniation that can potentially be treated surgically may benefit from earlier access to care.

In the United States and Europe, many factors, such as socioeconomic status and disadvantage levels and insurance type, have been shown to impact access to care,[7] treatment outcomes,[8–11] symptom severity,[12] and the prevalence of musculoskeletal pain.[13] In addition, Webb *et al*[14] found that living in a disadvantaged area was associated with spine pain with disability. However, within spine care, there is limited research with validated patient-reported outcome measures (PROMs) on the impact of socioeconomic disadvantage on self-reported symptoms at presentation of common conditions—such as lumbar disc herniation. In order to both care for the "whole person" and also ensure resources are being allocated most efficiently to improve clinical outcomes, understanding the impact socioeconomic disadvantage has on self-reported symptom severity is of value. This is especially true given the call from the United States' Institute of Medicine[15] and the European Union[16] to consider social and mental health to improve overall citizen well-being.

In this study, we asked three questions: (1) In patients initially presenting with lumbar disc herniation, is there a difference in patient characteristics among subgroups established using the national Area Deprivation Index (ADI), a validated measure of socioeconomic disadvantage determined by census block group level? (2) In patients initially presenting with lumbar disc herniation, do patient characteristics differ by self-reported race (White, Black, other/unknown)? (3) Is the level of socioeconomic disadvantage, as measured by ADI, associated with worse presenting Patient- Reported Outcomes Measurement Information System (PROMIS) Physical Function (PF), Pain Interference (PI), and Depression scores in patients diagnosed with lumbar disc herniation?

MATERIALS AND METHODS

The appropriate Institutional Review Board approved this study (STUDY00000982). All patients presenting to a tertiary, academic spine center between April 2015 and December 2018 were asked to complete PROMIS PF, PI, and Depression CATs. The completion of PROMIS CATs, a set of general PROMs created with support from the National Institutes of Health and designed to be normally distributed,[17–19] are part of routine clinical care at our institution.[20] All PROMIS score information is stored prospectively in our institutional database. Higher PROMIS scores are indicative of "more" of that domain (e.g., more functional ability or more depressive symptoms), whereas the opposite is true for lower PROMIS scores.

For the present study, we retrospectively evaluated our database for new patient visits in which patients were diagnosed with lumbar disc herniation (ICD-9 codes 722.10 and 722.73; ICD-10 = M 51.26, M 51.56, and M 51.57). A total of 1,199 patients were identified. Of those, 434 patients (36%) were removed because they had been diagnosed with lumbar disc herniation by another physician prior to seeing a spine surgeon or the diagnosis was made greater than three years ago but the patients were still categorized as a new patient because of the length of time between clinic visits. An additional 17 patients (1.4%) were removed because they concurrently or previously had a diagnosis of lumbar stenosis and 14 patients (3.2%) were removed because of missing PROMIS scores. This left a total of 734 patients (61%) for analysis.

In the present study, the continuous variables recorded included age (in years) and each of the three PROMIS domains of interest—PF, PI, and Depression. The categorical variables considered included sex (men or women), self-reported race (White, Black, or other), ethnicity (Hispanic, non-Hispanic, or unknown), marital status (married, single, or other), insurance type (commercial, Medicaid, Medicare, Workers Compensation, or other), county of residence (county where spine clinic is located [more urban, less rural]), surrounding counties (*i.e.*, those counties where our institution is the closest tertiary care center [less urban, more rural]), or other), and ADI tertiles (first tertile, second tertile, third tertile). The ADI is a validated measure of socioeconomic disadvantage using census data and calculated by census block group level (0–100, 100 = highest socioeconomic disadvantage).[21] The reported value is a national percentile ranking. Importantly, the ADI is a geographically-derived measure and does not directly measure an individual patient's level of socioeconomic disadvantage. The ADI allows for researchers and policy makers to compare neighborhoods by socioeconomic status level at the national level.[21] For the present study, patients with ADI rankings between 0 to 33, 34 to 66, and 67 to 100 were grouped into the first, second, and third tertiles (*i.e.*, least to most socioeconomically disadvantaged tertiles), respectively.

Chi-square analysis was used to compare categorical patient variables among the socioeconomically disadvantaged tertiles, as well as among self-reported race. Fisher exact test was used when a cell to be analyzed had less than five observations (*i.e.*, $n < 5$). One-way analysis of variance was used to compare patient age by socioeconomic disadvantage tertiles and self-reported race. Multivariable linear regression was used to determine if there was an association between socioeconomic disadvantage and presenting patient-reported health status (PROMIS PF, PI, and Depression).

Stata/SE 14.2 for Mac (College Station, TX) was used for all statistical tests, and $P < 0.05$ was considered significant.

RESULTS

Patient characteristics for the entire sample are noted in Table 1. Most patients in our sample presenting with lumbar disc herniation were in the second ADI tertile (356 [49%]) and the overall average ADI ranking was 48 (range, 1–100). A total of 525 patients had commercial insurance (72%). A majority of patients self-reported as White (656 [89%]) and non-Hispanic/Unknown (714 [97%]). Across all patients, the average PROMIS PF, PI, and Depression scores were

TABLE 1. Patient Characteristics (n = 734)	
Age (y), mean (range)	48 (17–90)
Sex, n (%)	
Male	384 (52)
Female	350 (48)
Insurance type, n (%)	
Commercial	525 (72)
Medicaid	70 (9.5)
Medicare	115 (16)
Workers' compensation	13 (1.8)
Other/unknown	11 (1.5)
Race, n (%)	
White	656 (89)
Black	52 (7.1)
Other/unknown	26 (3.5)
Ethnicity	
Non-Hispanic/unknown	714 (97)
Hispanic	20 (2.7)
Marital status, n (%)	
Married	220 (30)
Single	432 (59)
Other/unknown	82 (11)
County of Residence, n (%)	
County of spine clinic location (more urban, less rural)	494 (67)
Surrounding counties (less urban, more rural)	189 (26)
Other	51 (7.0)
National ADI, mean (range)	48 (1–100)
First tertile (lowest ADI)	223 (30)
Second tertile	356 (49)
Third tertile (highest ADI)	155 (21)
PROMIS scores, mean (range)	
PF	40.09 (17.75–73.35)
PI	63.01 (38.67–83.84)
Depression	50.23 (34.17–84.36)

ADI indicates Area Deprivation Index; PF, Physical Function; PI, Pain Interference; PROMIS, Patient-Reported Outcomes Measurement Information System.

40.09 (range, 17.75–73.35), 63.01 (range, 38.67–83.84), and 50.23 (range, 34.17–84.36), respectively.

When comparing patient characteristics by socioeconomic disadvantage tertiles, there was a significant difference in age, with patients in the most socioeconomically disadvantaged tertile being the youngest (43 years [SD: 14] third tertile *vs.* 49 years [SD: 16] second tertile *vs.* 48 years [SD: 17] first tertile, $P = 0.004$) (Table 2). In addition, there were significant differences in insurance type (*e.g.*, commercial insurance: 76% [first tertile] *vs.* 71% [second tertile] *vs.* 66% [third tertile], $P < 0.001$), self-reported race (*e.g.*, White: 93% [first tertile] *vs.* 93% [second tertile] *vs.* 76% [third tertile], $P < 0.001$), marital status (*e.g.*, single: 28% [first tertile] *vs.* 26% [second tertile] *vs.* 41% [third tertile], $P = 0.001$), and county of residence (*e.g.*, county of spine clinic location [more urban, less rural]: 82% [first tertile] *vs.* 65% [second tertile] *vs.* 52% [third tertile], $P < 0.001$) by ADI tertile.

When comparing patient characteristics by self-reported race, there was a significant difference in county of residence, with nearly all self-reported Black patients residing in the county of the spine clinic location (more urban, less rural) (92% *vs.* White: 66% *vs.* other/unknown: 54%, $P < 0.001$) (Table 3). In addition, there were significant differences in age, insurance type, and marital status by self-reported race (all comparisons, $P < 0.05$).

In multivariable linear regression analysis, being in the most socioeconomically disadvantaged tertile ($\beta = -3.17$ [95% confidence interval (CI): −4.89 to −1.45], $P < 0.001$) was associated with worse presenting PROMIS PF scores (Table 4). In addition, age ($\beta = -0.07$ [95% CI: −0.12 to −0.02], $P = 0.008$), female sex ($\beta = -1.52$ [95% CI: −2.65 to −0.39], $P = 0.008$), Medicaid coverage ($\beta = -2.24$ [95% CI: −4.28 to −0.20], $P = 0.031$), and workers' compensation ($\beta = -5.30$ [95% CI: −9.60 to −1.01], $P = 0.016$) were associated with worse presenting PROMIS PF scores. Interestingly, self-reported Black race was associated with improved presenting PROMIS PF scores ($\beta = 2.75$ [95% CI: 0.42–5.08], $P = 0.021$).

When analyzing factors associated with presenting PROMIS PI scores, being in the middle socioeconomically disadvantaged tertile ($\beta = 1.49$ [95% CI: 0.24–2.74], $P = 0.02$) and most socioeconomically disadvantaged tertile

TABLE 2. A Comparison of Patient Characteristics Across Area Deprivation Index Tertiles

	First Tertile* (n = 223)	Second Tertile (n = 356)	Third Tertile† (n = 155)	*P*
Age (y), average (SD)	48 (17)	49 (16)	43 (14)	0.0004
Men, n (%)	118 (53)	185 (52)	81 (52)	0.98
Insurance type, n (%)				<0.001
Commercial	170 (76)	252 (71)	103 (66)	
Medicaid	10 (4.9)	30 (8.4)	30 (19)	
Medicare	41 (18)	62 (17)	12 (7.7)	
Workers' compensation	–	7 (2.0)	6 (3.9)	
Other/unknown	2 (0.9)	5 (1.4)	4 (2.6)	
Race, n (%)				<0.001
White	208 (93)	330 (93)	118 (76)	
Black	5 (2.2)	17 (4.8)	30 (19)	
Other/unknown	10 (4.9)	9 (2.5)	7 (4.5)	
Ethnicity				0.27
Non-Hispanic	217 (97)	349 (98)	148 (95)	
Hispanic	6 (2.7)	7 (2.0)	7 (4.5)	
Marital status, n (%)				0.001
Single	62 (28)	94 (26)	64 (41)	
Married	142 (64)	222 (62)	68 (44)	
Other	19 (8.5)	40 (11)	23 (15)	
County of residence, n (%)				<0.001
County of spine clinic location (more urban, less rural)	183 (82)	230 (65)	81 (52)	
Surrounding counties (less urban, more rural)	27 (12)	111 (31)	51 (33)	
Other	13 (5.8)	15 (4.2)	23 (15)	

*Least socioeconomically disadvantaged.
†Most socioeconomically disadvantaged.

(β = 3.20 [95% CI: 1.58–4.83], $P < 0.001$) were associated with worse presenting levels of functional limitation secondary to pain. Furthermore, Medicaid coverage (β = 2.15 [95% CI: 0.22–4.07], $P = 0.029$) was also associated with worse presenting PROMIS PI scores. However, self-reported Black associated with improved presenting PROMIS PI scores (β = −2.27 [95% CI: −4.47 to −0.07], $P = 0.043$).

Lastly, for PROMIS Depression, being in the most socioeconomically disadvantaged tertile (β = 3.31 [95% CI:

TABLE 3. A Comparison of Patient Characteristics by Self-reported Race (n = 734)

	White (n = 656)	Black (n = 52)	Other/Unknown (n = 26)	*P*
Age (y), average (SD)	48 (16)	48 (12)	36 (15)	0.001
Men, n (%)	342 (52)	26 (50)	16 (62)	0.60
Insurance type, n (%)				<0.001
Commercial	475 (72)	32 (62)	18 (69)	
Medicaid	52 (7.9)	12 (23)	6 (23)	
Medicare	111 (17)	3 (5.8)	1 (3.8)	
Workers' compensation	9 (1.4)	4 (7.7)	0 (0)	
Other/unknown	9 (1.4)	1 (1.9)	1 (3.8)	
Marital status, n (%)				0.003
Single	185 (28)	21 (40)	14 (54)	
Married	401 (61)	24 (46)	7 (27)	
Other	70 (11)	7 (13)	5 (19)	
County of residence, n (%)				<0.001
County of spine clinic location (more urban, less rural)	432 (66)	48 (92)	14 (54)	
Surrounding counties (less urban, more rural)	182 (28)	2 (3.8)	5 (19)	
Other	42 (6.4)	2 (3.8)	7 (27)	

TABLE 4. Multivariable Linear Regression Analysis for Each Patient-Reported Outcomes Measurement Information System Domain

Variable	PROMIS Physical Function Adjusted R^2: 0.04		PROMIS Pain Interference Adjusted R^2: 0.03		PROMIS Depression Adjusted R^2: 0.06	
	Coefficient (95% CI)	*P*	Coefficient (95% CI)	*P*	Coefficient (95% CI)	*P*
Age	−0.07 (−0.12, −0.02)	0.008	0.04 (−0.01, 0.09)	0.12	0.06 (−0.004, 0.13)	0.065
Female	−1.52 (−2.65, −0.39)	0.008	0.001 (−1.07, 1.07)	0.99	2.96 (1.49, 4.43)	<0.001
National Area Deprivation Index (ADI)						
First tertile (least disadvantage)	Ref		Ref		Ref	
Second tertile	−1.16 (−2.48, 0.16)	0.09	1.49 (0.24, 2.74)	0.02	0.89 (−0.83, 2.61)	0.31
Third tertile (most disadvantage)	−3.17 (−4.89, −1.45)	<0.001	3.20 (1.58, 4.83)	<0.001	3.31 (1.08, 5.55)	0.004
Insurance type						
Commercial	Ref		Ref		Ref	
Medicaid	−2.24 (−4.28, −0.20)	0.031	2.15 (0.22, 4.07)	0.029	3.58 (0.93, 6.24)	0.008
Medicare	0.009 (−1.99, 2.01)	0.99	−1.01 (−2.90, 0.88)	0.29	−1.84 (−4.43, 0.76)	0.17
Workers' compensation	−5.30 (−9.60, −1.01)	0.016	3.29 (−0.77, 7.36)	0.11	4.55 (−1.04, 10.14)	0.11
Other	−2.54 (−7.17, 2.08)	0.28	3.32 (−1.05, 7.70)	0.14	−0.34 (−6.36, 5.68)	0.91
Race						
White	Ref		Ref		Ref	
Black	2.75 (0.42, 5.08)	0.021	−2.27 (−4.47, −0.07)	0.043	−1.24 (−4.27, 1.79)	0.42
Other	0.64 (−2.59, 3.87)	0.70	−2.03 (−5.09, 1.03)	0.19	0.87 (−3.33, 5.08)	0.68
Ethnicity						
Non-Hispanic/ unknown	Ref		Ref		Ref	
Hispanic	−0.79 (−4.64, 3.07)	0.69	1.46 (−2.18, 5.11)	0.43	0.17 (−4.84, 5.19)	0.95
Marital status						
Single	Ref		Ref		Ref	
Married	0.23 (−1.28, 1.75)	0.76	0.33 (−1.11, 1.76)	0.65	−1.41 (−3.39, 0.56)	0.16
Other	0.71 (−1.41, 2.83)	0.51	0.61 (−1.40, 2.61)	0.55	1.98 (−0.77, 4.74)	0.16
County of residence						
County of spine clinic location (more urban, less rural)	Ref		Ref		Ref	
Surrounding counties (less urban, more rural)	−0.11 (−1.48, 1.27)	0.88	−0.17 (−1.47, 1.13)	0.80	0.57 (−1.22, 2.35)	0.53
Other	−1.03 (−3.45, 1.39)	0.40	1.12 (−1.16, 3.41)	0.34	0.59 (−2.56, 3.74)	0.71

CI indicates confidence interval; PROMIS, Patient-Reported Outcomes Measurement Information System.

1.08–5.55], $P = 0.004$) was associated with worse presenting mental health. In addition, female sex ($\beta = 2.96$ [95% CI: 1.49–4.43], $P < 0.001$) and Medicaid coverage ($\beta = 3.58$ [95% CI: 0.93–6.24], $P = 0.008$) were also associated with worse presenting PROMIS Depression scores.

DISCUSSION

As the Institute of Medicine noted in 2014, a more thorough understanding of a patient's social and mental well-being will help improve the health of the United States.[15] Although a number of patient factors (*e.g.*, sex, race, insurance status) are commonly considered in spine care access and clinical outcomes research,[22–25] there remains a paucity of research that considers patients overall social and community context (*i.e.*, socioeconomic disadvantage) and its impact on spine health, treatment decisions, and clinical outcomes. Therefore, it is of value for spine specialists to consider socioeconomic disadvantage in the care of patients presenting for spine care. Validated PROMs, such as PROMIS PF, PI, and Depression, can be used to study the impact of socioeconomic disadvantage on presenting symptom severity for a common spine condition (*i.e.*, lumbar disc herniation). We found that patients in our sample in the least socioeconomically disadvantaged tertile were more often insured by commercial insurance, whereas patients in the most socioeconomically disadvantaged tertile more often utilized Medicaid. In addition, a greater percentage of White patients were in the least socioeconomically disadvantaged

tertile, whereas a greater percentage of Black patients were in the most socioeconomically disadvantaged tertile. Nearly all Black patients lived within the county where the spine center was located (*i.e.*, more urban, less rural). Lastly, being in the most socioeconomically disadvantaged tertile was associated with worse presenting self-reported functional status, pain, and mental health status.

Our findings demonstrate a difference in patient characteristics in those seeking spine care for lumbar disc herniation based on the level of socioeconomic disadvantage. While our study focuses on only a subset of spine patients, the insights are similar to overarching health trends. For example, in our patient sample, we found that Black patients were more likely to be in the most socioeconomically disadvantaged tertile. This is consistent with the Henry J. Kaiser Family Foundation (KFF), which found that Black Americans were more likely to face numerous challenges that impact health, such as decreased high school education rates, high food insecurity levels, unsafe neighborhoods, and high poverty levels.[26] Many of these challenges for Black patients noted by Henry J. Kaiser Family Foundation are part of the formula to calculate ADI.[21] In addition, patients in the most socioeconomically disadvantaged tertile were found to have higher rates of Medicaid as their primary health insurance source. Indeed, given the notable social and financial challenges faced by patients in this population subset, it is reasonable that many of these patients seek coverage under Medicaid, which was designed to support health care coverage for those with limited financial means.

When analyzing the patients by self-reported race, perhaps the most notable finding is that nearly all Black patients lived within the local, urban county where the spine clinic was located, whereas just two-thirds of White patients lived in the same area. This is an important finding to consider because interventions and policies aimed at improving health care access and ensuring equity of spine care need to be tailored to the population and setting (*e.g.*, urban *vs.* rural). For example, in one study evaluating a multicomponent health promotion and disease self-management intervention, the authors found that the initiative reduced PF decline within the rural patient sample but not the urban patient sample.[27] Importantly, we did not find that location of residence (*i.e.*, more urban, less rural county *vs.* less urban, more rural county) was associated with presenting symptom severity, but as previously noted, ADI was associated. However, those who are most socioeconomically disadvantaged likely differ in many ways based on their surroundings; this should be a strong consideration. Therefore, we believe a more targeted approach that considers each patient population's needs is warranted, and orthopedic spine surgeons may be able to play an important role in evaluating these specific needs through their daily patient contact.

Being in the most socioeconomically disadvantaged tertile of patients was associated with worse presenting PROMIS PF, PI, and Depression scores. In the case of PROMIS PF and PROMIS PI, the effect size nears or is at the difference in PROMIS scores representative of the minimal clinically important difference, or the difference in PROMIS scores indicative of a clinical change (good or bad) appreciated by a patient.[28] This suggests the most socioeconomically disadvantaged patients with lumbar disc herniation truly present for care when their symptoms are noticeably worse. Similar findings were noted in a study of patients presenting with carpal tunnel syndrome,[29] as well as a study that evaluated a heterogenous population of orthopedic patients[12]; however, in both cases, the effect size associated with ADI was not as pronounced. This difference may represent the fact that any clinical change of a spine condition can impact day-to-day well-being to an appreciable degree and more so than in other orthopedic conditions. Interestingly, we also feel it is important to note that self-reported Black race was found to be associated with improved PROMIS PF and PI scores at presentation. This may be reflective of the resiliency of this patient subgroup in the setting of known structural racism in the United States. In addition, this work emphasizes the importance of considering the impact of a multitude of patient sociodemographic factors—including a composite measure of social disadvantage (*e.g.*, ADI)—when better understanding spine care access.

The present study should be evaluated with its limitations in mind. First, because all patients in this study were from a single institution located in one state, our results may not be fully generalizable. Indeed, support systems for the more socioeconomically disadvantaged in one state may differ from another. However, the ADI is a nationally validated measure of socioeconomic disadvantage that utilize percentile rankings[21]; thus, we feel that the insight gained from our study remains important to consider and can be transferred to different context- and culturally specific situations. Second, despite the ADI being a nationally validated measure of socioeconomic disadvantage, it is a geographically-derived percentile ranking; therefore, it is possible that a wealthy patient could live in a disadvantaged census block and *vice versa*. Overall, however, such patients would be outliers and not the norm. Third, lumbar disc herniation is commonly associated with other spine conditions, which could impact presenting self-reported symptom severity. In order to try to mitigate this potential confounder, we removed patients with concurrent or previously diagnosed lumbar stenosis, a common condition associated with lumbar disc herniation. Fourth, patients in our sample were only included if they presented to an orthopedic spine surgeon at our institution's spine center for care. It is possible that a portion of these patients first presented to a primary care physician, who only referred to a spine specialist when symptom improvement was not observed. Consequently, the patients in this sample may represent more of the population destined for surgical intervention and not indicative of all patients with LBP from a lumbar disc herniation. Nevertheless, this is important to consider, as previous research has demonstrated that early surgical intervention in such patients leads to better clinical outcomes.[6] Fifth, a large majority of our patient sample was White, which is an

inherent limitation of the overwhelmingly White patient population we serve in our county and surrounding counties.[30] Further evaluation of the impact of self-reported race when also considering social disadvantage is warranted in other geographic regions. Sixth, it is also important to consider that not all patients seeking care for a lumbar disc herniation ultimately presented to our institution or to an orthopaedic spine surgeon (i.e., patients could have sought neurosurgical care). Nonetheless, we have a large patient sample for analysis that is representative of the surrounding community. Lastly, as with all studies that utilize administrative data, we are limited by accurate and proper documentation.

Overall, our findings support the notion that the patient population with lumbar disc herniation seeking spine care differs based on socioeconomic disadvantage levels. Furthermore, socioeconomic disadvantage is associated with a considerable change in presenting PROMIS PF, PI, and Depression scores. These insights raise important questions as to whether the worse symptom severity upon presentation among these patients is due to inequitable access to health care, a predilection of more socioeconomically disadvantaged patients to present later because of personal factors (*e.g.*, need for income), a perception by the most socioeconomically disadvantaged patients that a condition is more debilitating (either because of complex lifelong factors or otherwise), or the idea that those with less socioeconomic disadvantage have higher health awareness and present earlier.

➢ Key Points

- ❑ Greater social deprivation is associated with greater functional limitations, pain levels, and depressive symptoms in patients with symptomatic lumbar disc herniation, as measured by PROMIS PF, PI, and Depression questionnaires.
- ❑ The most deprived third of patients were more likely to be on Medicaid, self-report as Black, and live in more urban areas than the least deprived third of patients.
- ❑ Greater work is needed to determine the underlying cause of this crucial finding and how best to ensure equitable spine care access.

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