ORIGINAL RESEARCH

Income as a Predictor of Self-Efficacy for Managing Pain and for Coping With Symptoms Among Patients With Chronic Low Back Pain

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ABSTRACT

Objectives: The purpose of this study was to evaluate pain self-efficacy (PSE) and coping self-efficacy (CSE) for people with chronic low back pain (CLBP), and to assess whether lower income may be associated with less PSE and CSE in the United States.

Methods: We conducted a cross-sectional study using survey data collected between June 2016 and February 2017 from n = 1364 patients with CLBP from chiropractic clinics in the United States to measure the relationship between income and both types of self-efficacy. We created 4 multivariate models predicting PSE and CSE scores. We used both a parsimonious set of covariates (age, sex) and a full set (age, sex, education, neck pain comorbidity, catastrophizing, and insurance). We also calculated effect sizes (Cohen's d) for unadjusted differences in PSE and CSE score by income.

Results: Lower income was associated with lower PSE and CSE scores across all 4 models. In the full models, the highest-income group had an average of 1 point (1-10 scale) higher PSE score and CSE score compared to the lowest income group. Effect sizes for the unadjusted differences in PSE and CSE scores between the highest and lowest income groups were 0.94 and 0.84, respectively.

Conclusions: Our findings indicate that people with lower income perceive themselves as less able to manage their pain, and that this relationship exists even after taking into account factors like health insurance and educational attainment. There is a need to further investigate how practitioners and policymakers can best support low-income patients with chronic pain. (J Manipulative Physiol Ther 2021;44;433-444)

Key Indexing Terms: *Low Back Pain; Self-Efficacy; Income; Pain Management; Coping Behavior*

INTRODUCTION

Self-efficacy, an individual's self-appraisal of their ability to engage in a behavior,[1] has been integrated into health behavior theories[2] and used to explain why some people are better able to cope with chronic health problems and maintain higher functioning and quality of life.[3] The concept has been described as a central "organizing framework" to guide coping and care for chronic diseases, and it is frequently studied as a precursor of health outcomes.[4] In the field of chronic pain, self-efficacy can predict chronic pain-related outcomes such as pain intensity,[5] disability,[6] fatigue and stiffness,[7] and depression.[5]

Low back pain affects over a quarter of Americans[8] and is the leading cause of years of lived disability worldwide.[9] Chronic low back pain (CLBP), defined as ongoing pain for at least 3 months, affects over 1 in 10 Americans, disproportionately older adults, women, and people with less education.[10] In the United States, healthcare costs for people with back pain are $86 billion more than for those without,[11] aside from extensive indirect costs from absenteeism and decreased productivity.[12] Given these major consequences, identifying barriers to optimal coping for CLBP is urgent for practitioners and policymakers.

Many factors outside of clinical treatment influence whether conditions worsen or improve over time for a patient with CLBP;[6,13,14] one factor is the wide variety of coping behaviors that the patient may engage in.[15] Self-efficacy can

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Paper submitted June 9, 2020; in revised form January 4, 2021; accepted May 28, 2021.
0161-4754

https://doi.org/10.1016/j.jmpt.2021.05.004

serve as a comprehensive indicator of how well a patient is coping with their condition.[5,16] Although prior studies have examined self-efficacy among general CLBP populations,[17] we are not aware of any that focused on the determinants of self-efficacy among chiropractic patients with CLBP. A growing number of Americans see chiropractors for pain,[18] including 30% to 47% of people with low back pain,[19,20] typically in addition to other healthcare providers.[21] Modalities like spinal manipulation and mobilization, standard in chiropractic care,[22] are increasingly recognized as safe and efficacious CLBP treatment approaches.[23,24] Examining chronic pain-related self-efficacy among chiropractic patients would contribute to knowledge about coping and pain management in this understudied yet expanding population.

Socioeconomic status (SES) may predict health-related self-efficacy through multiple pathways: income and material resources, education and problem-solving skills,[25] and health insurance and access to care.[26] The income pathway is particularly relevant in the United States, where income inequality is marked and increasing[27] and there is a strong SES and health gradient.[28] Income may be especially relevant for patients with CLBP, as they often cope using approaches that require personal financial and/or time resources such as exercise, over-the-counter medications,[15] pain management education programs,[29] and care from providers like chiropractors.[21]

Pain-related self-efficacy has been conceptualized 2 ways: perceived ability to continue normal functioning despite one's pain,[30] and perceived ability to manage one's pain and to cope with symptoms.[5] Our study has taken the second approach, focusing on 2 subdomains: pain self-efficacy (PSE),[5] which is linked to disability,[6] pain intensity,[5] fatigue, and stiffness,[7] and coping self-efficacy (CSE), which is linked to depression, hopelessness, and affective distress.[5] Because they are patient-centered measures of how well a person is managing their CLBP, PSE and CSE can be useful in informing clinic-based education around pain coping. A study of patients with CLBP in Brazil found that income was positively associated with chronic pain self-efficacy;[31] however, to our knowledge, no prior study has assessed whether income relates to self-efficacy for managing pain and other symptoms in a US CLBP population.

Therefore, the purpose of this study was to evaluate PSE and CSE for people with CLBP in the United States, and to assess whether lower income may be associated with less PSE and CSE. We hypothesized that there would be a positive association between income and PSE and between income and CSE among patients with CLBP.

Methods

Dataset

We used a dataset collected as part of a National Institutes of Health Center of Excellence on Complementary and Alternative Medicine.[21,32] The Center had a topical focus on chiropractic care for CLBP and chronic neck pain (CNP). Patients were recruited from 125 chiropractic clinics in 6 cities in the United States. Inclusion criteria were minimum age 21 years, CLBP and/or CNP (chronicity defined as either pain for at least 3 months prior to beginning chiropractic care, or self-defined as chronic), not having an active workers' compensation or personal injury claim, and willingness to complete online surveys.

Survey data were collected between June 2016 and February 2017. Participants completed 8 online surveys over a 3-month follow-up period; data included in the present study were from the first 2 surveys (screening and baseline), making the present study cross-sectional. Study participants were provided online gift cards for their participation. The study was approved by RAND's Human Subjects Protection Committee. The study methods, sample, and survey development have been described in greater detail in earlier publications.[21,32]

Constructs and Variables

Dependent Variables. Two subscales of Chronic Pain Self-Efficacy—PSE (5 items) and CSE (8 items)—were available in this survey. These subscales were validated with a patient population similar to ours[5] and have been applied to similar CLBP patient populations.[33] Items asked how certain the person was that they could accomplish tasks such as "decrease your pain quite a bit?" (from the PSE domain) or "control your fatigue?" (from CSE). Responses were on a 1-10 scale where higher scores indicated more confidence. We calculated an average score for each subscale and scaled them to a 1-to-10 range for ease of interpretability. These scores were treated as continuous variables in models. These subscale scores had high reliability, with a Cronbach's alpha of 0.925.

Independent Variable. Participants were asked a single item about income: "What is the approximate gross yearly income for your household?" There were 10 response choices (all in US dollars): less than $10 000; $10 000 to $19 999; $20 000 to $29 999; $30 000 to $39 999; $40 000 to $49 999; $50 000 to $59 999; $60 000 to $79 999; $80 000 to $99 999; $100 000 to $199 999; $200 000 or more. Because few respondents (2%) selected the lowest income category, the 2 lowest categories were collapsed into a single category for income less than $20 000, an amount approximate to the US federal poverty threshold for a 3-person family during the 2 years the surveys were administered.[34] This type of ordinal, single-item approach to measuring household income has been used in prior research.[35-37]

Survey respondents were also asked how many people in the household were supported by that income. We took responses from that variable into account for sensitivity analyses.

Control Variables. Decisions about which control variables to include in the models were based on epidemiologic causal diagrams and evidence from prior studies about associations between those variables and our independent and/or dependent variables. In all models, we controlled for age in years and sex, as they may be precursors to income (our independent variable)[38] and to domains of health-related self-efficacy (our dependent variable).[39,40] In addition, in the full models we controlled for educational attainment[41] to discern the effects of income independent of education. The surveys assessed education with an item asking about the highest grade or degree the respondent had attained; for analyses we collapsed 10 possible response choices into 4 categories: up to high school diploma, some post-high school education, bachelor's degree, and graduate degree. Further, the full models controlled for CNP comorbidity,[42] catastrophizing score[7] based on the 3 items from the Helplessness subscale of the Pain Catastrophizing Scale[43] (range 0-12, higher values indicated more catastrophizing thoughts), and health insurance status,[41] which we operationalized as none, insurance that does not cover any chiropractic care, or insurance that covers some chiropractic care. Table 1 provides univariate statistics for these control variables and for additional sociodemographic and health-related characteristics.

Analyses. The goals of the present study were to determine whether income was a significant predictor of PSE and of CSE among a population of patients with CLBP. All analyses were conducted in Stata/MP version 15 (StataCorp LLC).

Model Building. We created separate multivariate models for PSE and CSE. To determine whether we needed to control for clustering at the level of the clinic and/or the state, we did pairwise comparisons using likelihood ratio tests—conducted separately for PSE and CSE—of unconditional models that did not control for clustering, or that controlled for clustering using a random intercept at the clinic level, at the state level, or both.

Final Models

We fit 4 mixed-effects linear regression models: (1) a parsimonious model to predict PSE, (2) a full model to predict PSE, and (3) a parsimonious model to predict CSE, and (4) a full model to predict CSE (Table 2). The parsimonious models controlled only for age and sex, and the full models also controlled for education, CNP comorbidity, catastrophizing score, and insurance. To better illustrate the relationships observed between income and self-efficacy scores, we calculated and graphed the adjusted average PSE and CSE scores (average marginal effects) for each income category.

Effect Size

To convey the magnitude of the differences in self-efficacy scores, we calculated effect sizes (Cohen's d) comparing average, unadjusted PSE and CSE scores between the lowest and the highest income categories, the second-highest and second-lowest categories, as well as between the 2 lowest categories and between the 2 highest categories. We interpreted these effect sizes, which range from 0 to 1, using a standard approach wherein 0.20 represents a small effect, 0.50 represents a medium-sized effect, and 0.08 represents a large effect.[44]

Sensitivity Analysis

Lastly, we conducted a sensitivity analysis wherein income was adjusted for the number of people in the household. Using the midpoint of each income category, we divided income by the square root of the number of individuals in the household.[45]

Results

Preliminary Analyses

A total of 4606 people were invited to the study, and 2024 were eligible, consented, agreed to participate, and completed the initial surveys. Of those, 1677 had CLBP, and 1364 had complete data for the variables of interest for the present study. Among the 313 respondents excluded from the present study due to missing data, the survey item about income was the item most frequently missing (220 eligible respondents did not respond).

To determine whether there were significant differences between the analytic sample of 1364 and the 313 excluded, we examined average scores and frequencies for key constructs in the 1364 analytic sample and the group excluded (maximum sample of n = 313, but due to missing data, some variables had fewer observations). There was only 1 statistically significant difference between the n = 1364 respondents in the analytic sample and the n = 313 observations excluded due to missing data: respondents in the analytic sample were on average 4.61 years younger than those excluded (Table 1).

The average PSE and CSE scores (7.19 and 7.44, respectively, 1-10 scale) in our sample, as shown in Table 1, were 2 to 4 points higher than equivalent scores in other samples of people with pain.[7,46] Over a quarter of respondents reported annual household income of less than $50 000 (including nearly 5% of the sample with income less than $20 000 annually). In contrast, just over 5% had income in the highest category (greater than $200 000).

The sample was predominately female, white non-Hispanic and over 40 years of age (Table 1). Roughly half of the sample had a bachelor's degree or more. Nearly 80% also reported having CNP. The catastrophizing score in our

Table 1. *Characteristics of Sample of Patients With Chronic Low Back Pain (N = 1364)*

Characteristic	Value
Chronic pain self-efficacy scores	
Pain self-efficacy (PSE), scale of 1 to 10, mean (SD)	7.44 (1.81)
Coping self-efficacy (CSE), scale of 1 to 10, mean (SD)	7.19 (1.68)
Socioeconomic status	
Household income, count (%)	
Less than $20 000	67 (4.91)
$20 000-$29 999	97 (7.11)
$30 000-$39 999	99 (7.26)
$40 000-$49 999	108 (7.92)
$50 000-$59 999	151 (11.07)
$60 000-$79 999	220 (16.13)
$80 000-$99 999	183 (13.42)
$100 000-$199 999	369 (27.05)
$200 000 or more	70 (5.13)
Education, count (%)	
Up to high school diploma	101 (7.40)
Some post-high school education	515 (37.76)
Bachelor's degree	460 (33.72)
Graduate degree	288 (21.11)
Demographic characteristics	
Sex, count (%)	
Female	971 (71.19)
Male	393 (28.81)
Age in years, mean (SD)	48.04 (14.47)[d]
Race, count (%)[a]	
White	1206 (91.71)
Black or African American	26 (1.98)
Asian	27 (2.05)
Native Hawaiian or Other Pacific Islander	5 (0.38)
American Indian or Alaska Native	6 (0.46)
Other or multiple races	45 (3.42)
Ethnicity, count (%)[b]	
Hispanic/Latino	64 (4.79)
Not Hispanic/Latino	1273 (95.21)
US State, count (%)	
California	196 (14.37)
Florida	123 (9.02)
Minnesota	343 (25.15)
New York	235 (17.23)
Oregon	201 (14.74)
Texas	266 (19.50)
Health characteristics	
Chronic neck pain (CNP) comorbidity, count (%)	1068 (78.30)
Catastrophizing score, scale of 0 to 12, mean (SD)	2.43 (2.25)
Health insurance, count (%)	
No insurance	61 (4.47)
Insurance, but does not cover chiropractic care	334 (24.49)
Insurance that covers some amount of chiropractic care	969 (71.04)
Average back pain rating in the last 7 days, scale of 0-10, mean (SD)[c]	3.61 (2.05)
Oswestry Disability Index (ODI), scale of 0-100, mean (SD)	20.31 (12.60)
Number of visits to chiropractor, last 6 months, mean (SD)	11.21 (11.77)

The Oswestry Disability Index assesses physical functioning and disability among people with spine problems.[48,49] Higher scores indicate greater disability. Statistical significance was based on 2-sample *t* tests for continuous variables and Pearson's chi-squared tests for ordinal or categorical variables.

CNP, chronic neck pain; *ODI*, Oswestry Disability Index.

[a] Fourty-nine respondents had incomplete responses to the race item and were excluded.

[b] Twenty-seven respondents had incomplete responses to the ethnicity item and were excluded.

[c] Two respondents had incomplete responses to the average back pain item and were excluded.

[d] Statistically significant (alpha <0.05) differences between analytic sample and observations available from the n = 313 individuals excluded due to nonresponse. Actual number of observations used for the excluded sample varied from a low of n = 93 for income to n = 313 for number of visits with chiropractor, CNP comorbidity, ODI score, and US state. Maximum possible sample size was 1,677.

Table 2. *Income as a Predictor of Self-Efficacy for Pain Management and Self-Efficacy for Coping With Symptoms Among Patients With Chronic Low Back Pain, United States, 2016, N = 1364*

Variable	PSE						CSE					
	1. Parsimonious Model			2. Full Model			3. Parsimonious Model			4. Full Model		
	b	95% CI	P	b	95% CI	P	b	95% CI	P	b	95% CI	P
Household income: (compared to <$20 000)												
$20 000-$29 999	1.041	0.493, 1.590	<.001	0.687	0.193. 1.181	.006	0.941	0.428, 1.454	<.001	0.657	0.184, 1.130	.006
$30 000-$39 999	1.158	0.610, 0.706	<.001	0.751	0.257, 1.244	.003	1.177	0.666, 1.688	<.001	0.851	0.379, 1.323	<.001
$40 000-$49 999	0.927	0.388, 1.467	.001	0.537	0.051, 1.023	.030	0.96	0.457, 1.462	<.001	0.669	0.204, 1.133	.005
$50 000-$59 999	1.026	0.519, 1.534	<.001	0.630	0.172, 1.087	.007	0.951	0.477, 1.426	<.001	0.657	0.219, 1.095	.003
$60 000-$79 999	1.189	0.705, 1.674	<.001	0.630	0.192, 1.069	.005	1.162	0.711, 1.614	<.001	0.75	0.331, 1.168	<.001
$80 000-$99 999	1.268	0.772, 1.763	<.001	0.663	0.213, 1.113	.004	1.301	0.839, 1.762	<.001	0.847	0.417, 1.277	<.001
$100 000-$199 999	1.35	0.888, 1.811	<.001	0.723	0.301, 1.146	.001	1.311	0.881, 1.741	<.001	0.857	0.454, 1.260	<.001
$200 000 or more	1.779	1.184, 2.374	<.001	1.052	0.510, 1.593	<.001	1.565	1.011, 2.119	<.001	1.033	0.516, 1.549	<.001
Education: (compared to HS or less)												
Some college				0.116	−0.225, 0.456	.506				0.223	−0.103, 0.548	.180
Bachelor's degree				0.332	−0.020, 0.683	.064				0.188	−0.147, 0.524	.271
Graduate degree				0.375	0.004, 0.745	.047				0.165	−0.189, 0.518	.361
Age in years	0.001	−0.006, 0.008	.780	−0.001	−0.007, 0.005	.653	0.004	−0.002, 0.010	.206	0.002	−0.004, 0.008	.471
Male sex (compared to female)	−0.02	−0.229, 0.190	.855	0.075	−0.117, 0.266	.445	0.051	−0.144, 0.245	.609	0.145	−0.038, 0.327	.121
CNP comorbidity				−0.129	−0.338, 0.080	.226				−0.019	−0.219 0.180	.851
Catastrophizing score				−0.329	−0.366, -0.292	<.001				−0.279	−0.314, −0.244	<.001
Insurance: (compared to no insurance)												
Insurance does not cover chiropractic				−0.077	−0.514, 0.360	.729				−0.035	−0.454, 0.384	.871
Insurance covers chiropractic				−0.241	−0.661, 0.178	.259				−0.196	−0.595, 0.204	.337
Intercept	6.232	5.705, 6.759	<.001	7.685	6.971, 8.399	<.001	5.838	5.353, 6.323	<.001	6.947	6.268, 7.626	<.001

All 4 models are linear mixed-effects models that include a random intercept to control for clustering at the clinic level (123 clinics).
B, regression coefficient; *CNP*, chronic neck pain; *CI*, confidence interval; *CSE*, Coping self-efficacy; *PSE*, pain self-efficacy.

sample (average of 2.43, 0-12 range) was slightly lower than in a comparable sample of patients with low back pain,[17] and participants reported moderate pain intensity and physical function scores.[47,48] Over two-thirds of the sample had health insurance that covered at least some of the cost of chiropractic care, and respondents reported visiting their chiropractor approximately twice per month.

Models to Predict Chronic Pain Self-Efficacy Subscales

Likelihood ratio tests to determine whether we needed to control for clustering at the level of clinic and/or state indicated that it was most appropriate to control for clustering at the clinic level only. For this reason, all 4 models included random intercepts for the 123 clinics in the final analytic sample.

Table 2 shows the results of 4 mixed-effects linear regression models. Models 1 (parsimonious) and 2 (full) predicted PSE, while models 3 (parsimonious) and 4 (full) predicted CSE. Income was significantly and positively associated with both types of chronic pain self-efficacy in all 4 models. The magnitude of the difference in PSE and CSE scores between each income category and the <$20 000 category ranged from just over half a point difference to over 1.5 points difference on a 1-to-10 scale.

In the models, the regression coefficients tended to increase from the lowest to the highest income levels with the biggest differences occurring at the lowest and highest ends of the income spectrum. This trend was apparent in the average predicted self-efficacy scores (Fig 1), where predicted PSE and CSE scores were lowest for the lowest income category, increased most between the first 2 categories, and then trended gradually upward to peak at the highest income level. Although the full models had smaller differences in PSE and CSE scores overall compared to the parsimonious models, the upward trend of self-efficacy scores in accordance with increased income was still apparent.

In the full models (2 and 4), education did not add explanatory power to our parsimonious models predicting PSE and CSE; only 1 education coefficient out of the 6 shown in Table 1 had a P value < .05. Age, sex, insurance status, and CNP comorbidity also were not significant predictors of PSE

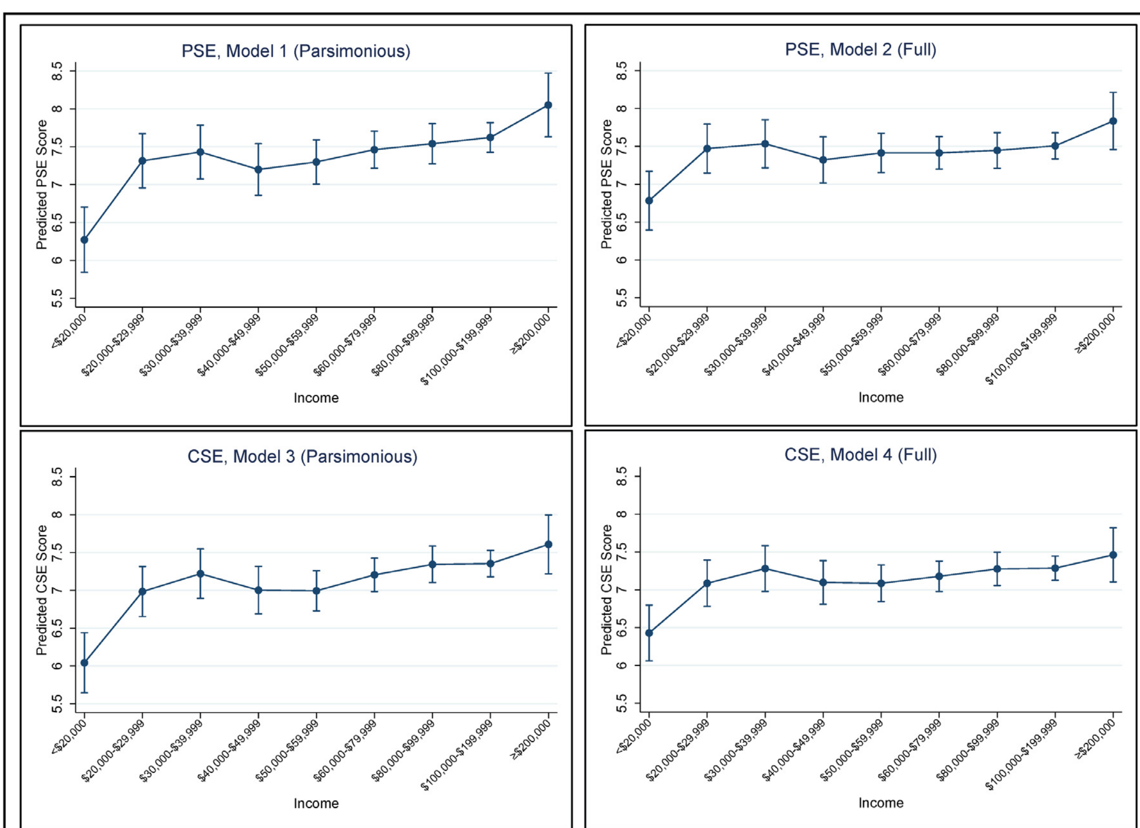

Fig 1. *Predicted average scores for pain self-efficacy (PSE) and coping self-efficacy (CSE) based on income among patients with chronic low back pain (N = 1364). The average predicted scores (marginal effects) depicted are based on the linear mixed effects models shown in Table 2. Model 1 (PSE) and model 3 (CSE) controlled for age and sex, as well as clustering at the clinic level. Model 2 (PSE) and model 4 (CSE) controlled for age, sex, education, CNP comorbidity, catastrophizing score and insurance status, as well as clustering at the clinic level.*

or CSE. However, catastrophizing score was significantly and negatively related to both PSE (model 2) and CSE (model 4). In these models, an increase of 1 point in the catastrophizing score (scale of 0-12) was associated with a decrease of about 0.3 points in the PSE and CSE scores.

Effect Size

The effect size (Cohen's d) for the unadjusted difference in PSE scores between the 2 most extreme income categories, income less than $20 000 and income of $200 000 or more, was 0.94, whereas the effect size of the difference between PSE scores in the second lowest ($20 000-$29 999) and second highest ($100 000-$199 999) categories was 0.18. The effect size for the difference in average PSE scores between the 2 lowest income groups was 0.49, and for the difference between the 2 highest groups, 0.31.

For CSE, the effect size of the difference between the lowest and highest categories was 0.84, and for the second-lowest compared to the second-highest categories it was 0.22. For the comparison between the 2 lowest-income groups, effect size was 0.22, and between the 2 highest income groups, 0.49.

Sensitivity Analysis

In the models that took into account the number of individuals in the household (not shown), the relationship between income and both types of chronic pain self-efficacy was consistent with what we have reported above.

Discussion

Key Findings

To our knowledge, this is the first study to examine the relationship between income and chronic pain-related self-efficacy, particularly among chiropractic patients in the United States. Among n = 1364 chiropractic patients with CLBP, patients had on average high levels of PSE and CSE. Income was positively associated with both types of self-efficacy even after controlling for education, health insurance, and other potential confounders.

Average self-efficacy scores increased in tandem with income, and the most prominent differences in self-efficacy scores were between the lowest and highest income levels. This was underscored in the effect size comparisons, where effect sizes for comparisons of either type of self-efficacy were large when the lowest and highest income groups were compared, while comparisons of the second-lowest and second-highest income categories resulted in small effect sizes. For PSE, the bigger change in effect size occurred at the low end of the income spectrum rather than at the high end, while for CSE, the opposite was true. Overall, patients with very low income were more likely to have lower self-efficacy, and in multivariate models that controlled for potential confounders, health insurance status did not explain the disparity. These findings are relevant for clinicians and public health practitioners who want to intervene to improve patients' self-efficacy for coping with chronic conditions.[3,49]

The relationship between income and both types of chronic pain-related self-efficacy was statistically significant, if smaller in magnitude, even in models that controlled for education, catastrophizing, health insurance, and other potential confounders. Neither education nor health insurance status was a significant predictor of PSE or CSE when included with income, even though education was significantly associated when included alone in the models (data not shown). This supports the idea that the income and resources pathway is the more salient link between SES and pain self-efficacy in this population, rather than the education and problem-solving pathway or the health insurance pathway.[25]

Connection to Prior Research

Our findings are consistent with a study of patients with CLBP in Brazil wherein income, but not education, was positively associated with chronic pain self-efficacy.[31] We are not aware of other studies on SES and chronic pain-related self-efficacy for patients with CLBP in the United States, but our results align with research on US populations dealing with other health topics.[25] For instance, income and education were both positively associated with asthma care self-efficacy,[41] but after health insurance status, access to care, and quality of asthma care were added to the models, education, but not income, remained a significant predictor of asthma self-efficacy. In contrast, in our study health insurance did not have significant explanatory power, and education was not a significant predictor of PSE and CSE after accounting for income. These differences may indicate that SES relates distinctly to different types of health-related self-efficacy. Perhaps education, information-seeking, and health care are relevant pathways from SES to asthma self-efficacy,[41] whereas financial resources for coping are the salient pathways from SES to pain-related self-efficacy.

Our findings help expand on existing pain-related self-efficacy research. One study found that employment, compared to unemployment, was associated with higher functional self-efficacy among US patients with musculoskeletal pain, but income was not taken into account.[42] Given our findings, income may have mediated the relationship between employment and pain self-efficacy. Alternatively, employment could have had a separate effect on self-efficacy, perhaps by increasing participants' sense of self-worth.[50]

Limitations

A limitation of this study was that 313 eligible participants (who had CLBP and completed the questionnaire) had to be excluded from analysis because of nonresponse to some survey items. We tested for statistically significant differences between our analytic sample and the sample excluded, and across the sociodemographic and health-related variables, only age was different. Thus, we do not believe selection effects influenced our results.

Further, because our patient sample was composed of chiropractic patients with CLBP, our findings may not be generalizable to the broader CLBP population. Although it is estimated that nearly half of patients with low back pain have received chiropractic care,[19] and chiropractic utilization is comparable among patients from different racial and ethnic groups,[51] the chiropractic patient population is slightly older, has higher income, and has somewhat better physical and mental health than patients with CLBP recruited from medical settings.[52] The present study did not include respondents from chiropractic clinical settings that focus on serving impoverished communities,[53] but our findings may be particularly applicable to providers and administrators in such settings.

There are limitations to the way that income was assessed in this survey. Self-reported income, especially as it represents individual's wages and salaries, is acceptably reliable,[54] but the use of a single item rather than multiple items to assess household income may have led to inaccuracies for households with complicated income situations and to subestimates of income for those at the lowest end of the income spectrum.[55,56] Financial well-being is a complicated construct, and annual household income, which does not account for savings, debt, or the reliability of one's income from one year to the next, is a simplification.[57]

Self-efficacy scores were higher in this study population than in other CLBP populations,[7,46] and this more limited range in self-efficacy scores may have reduced our ability to detect relationships with income or other predictors. Also, to our knowledge there are no estimates for minimal clinically important differences for this self-efficacy measure in the existing literature,[58,59] and this makes it difficult to appreciate the clinical relevance of a difference in self-efficacy of any given amount. We provided effect size calculations to give a sense of the magnitude.

Additionally, we did not find that insurance status explained the disparities in pain-related self-efficacy, but the fact that the majority of the sample was insured may have hindered our ability to detect differences due to insurance. The survey item that assessed insurance coverage was limited and could not capture all the complexities in how much chiropractic care may be covered by one's insurance, such as co-payments and number of visits permitted. A more detailed item about insurance may have yielded different results.

Also, the present study was cross-sectional in nature, and our conclusions are limited by temporal ambiguity. Although we believe it is more likely that respondents' income preceded their pain-related self-efficacy, it is possible that self-efficacy impacted their income, perhaps via their ability to work. Longitudinal studies that control for changes in pain-related self-efficacy and SES over time would provide stronger evidence for a causal relationship.

Areas for Future Research

Future research should examine other social structures related to SES and pain-related self-efficacy. For instance, occupational exposures can lead to low back pain[60] and may relate to self-efficacy for health behavior change independent of education or income.[25] Also, race could moderate the relationship such that higher SES leads to higher self-efficacy for White patients but not for Black and Latino patients, given evidence about diminished health returns of socioeconomic assets for Black Americans compared to White Americans.[61] Lastly, researchers should explore everyday pain management experiences among people with CLBP to better explain the pathways by which poverty and financial resources relate to coping and self-efficacy.

Moreover, our findings are relevant in light of the ongoing opioid addiction epidemic. It is recommended that providers use nonpharmacologic therapies such as exercise, cognitive behavioral therapy, or spinal manipulation for patients with chronic pain whenever possible, and that patients actively engage in their own pain management process.[62] Involving patients with CLBP more in the management of their pain will require stronger patient self-efficacy, and more awareness among providers about how self-efficacy varies among patients. Per our findings, lower-income patients may need more support to build confidence for managing their condition through patient-engaged, nonpharmacological approaches; future research should focus on developing and evaluating such interventions.

Strengths

This study's focus on self-efficacy for pain management and coping with symptoms make a unique contribution that contrasts from prior research focusing on self-efficacy for physical function[42,49] or general self-efficacy.[63] Self-efficacy, and in particular the PSE and CSE subdomains, are infrequent outcomes in low back pain research, but we consider them intuitive and useful for understanding which patients cope better with their CLBP and why. Also, PSE and CSE are distinct yet interrelated constructs,[5] and because we modeled each outcome separately, we have demonstrated that income relates similarly with both types of self-efficacy.

These findings address the call to bring chiropractic care into the broader conversation about the social determinants of health and the "upstream" interventions needed to address them.[64,65] The findings also contribute to knowledge around barriers and facilitators of self-care and self-reliance among LBP patients, a topic relevant to many practitioners who treat low back pain.[66] The mechanisms behind health disparities by SES have been differentiated into, on the one hand, the deleterious effects of poverty, and on the other, inequality across the whole SES continuum.[67] Although our results were consistent with both mechanisms, they particularly supported the former. The lowest-income group (those below federal poverty level) had a notable disadvantage in self-efficacy outcomes, with scores at least half a point lower than other groups in most instances, while the differences among the middle- and higher-income groups were subtler.

Implications

Our findings indicate that providers may need to provide additional guidance to low-income patients with CLBP to increase confidence for managing pain. This could include guidance in identifying lower-cost options for exercise or over-the-counter medications,[15] referrals to pain management educational programs,[29] or behavioral health care to increase self-efficacy.[68] Moreover, because income was the strongest predictor of chronic pain-related self-efficacy, while education and health insurance had limited or no explanatory power, it is key that practitioners assess financial barriers (eg, asking if following through on a self-care plan will be feasible cost-wise for the patient) and not rely solely on patient educational attainment or health insurance status as sufficient indicators of SES barriers to coping and pain management. This builds on existing literature encouraging providers to consider the full range of biopsychosocial influences on health, including socioeconomic influences.[69] Addressing these issues is complicated by the fact that clinicians may have limited time during appointments and that assessing patients' resources for coping may be burdensome, particularly for providers serving many patients from low-income communities. Empowering communication approaches like motivational interviewing[70] have been identified as a useful tool for chiropractors and others to assess the broad range of potential obstacles to behavior change.[69]

Most chiropractors regularly provide some amount of care at reduced or no cost to patients in need,[71] and some chiropractic clinics focus entirely on impoverished populations with high medical need.[53] Thus, many chiropractors are already caring for some patients who, based on the present findings, are likely to have lower perceived ability to cope with their pain. Furthermore, we believe that individual practitioners should not have to shoulder this burden alone, and that policy changes are necessary to enable all patients with CLBP, regardless of income, to adequately cope with their pain condition.

On a policy level, health insurance was not a significant predictor of PSE or CSE, neither alone (data not shown) nor in a multivariate model, while income remained a consistent predictor across all models tested. Aside from addressing the root problem of income inequality, policy solutions are needed to make it easier and less costly to engage in the abovementioned CLBP coping behaviors.[15] For example, improving policy around medical leave and compensation for workplace injuries could be particularly beneficial for low-wage workers with CLBP.[60]

In summary, optimal management of CLBP requires that patients constantly adapt their life to their condition and modify their adaption approaches as their condition evolves. Individuals with strong chronic pain-related self-efficacy tend to manage their conditions more effectively and enjoy improved health outcomes,[72] and the present study has described a disparity by income in self-efficacy for pain management and for coping with symptoms. This suggests that lower-income patients with CLBP may be vulnerable to less effective self-management of their pain and other symptoms.

Conclusion

Our findings indicate that people with lower income perceive themselves as less able to manage their pain, and that this relationship exists even after taking into account factors like health insurance and educational attainment.

Contributorship Information

Concept development (provided idea for the research): M.D.W., I.D.C., G.W.R., C.D.S.
Design (planned the methods to generate the results): M.D.W., P.M.H., G.R.A.
Supervision (provided oversight, responsible for organization and implementation, writing of the manuscript): M.D.W., I.D.C., P.M.H.
Data collection/processing (responsible for experiments, patient management, organization, or reporting data): M.D.W., G.R.A., G.W.R., I.D.C.
Analysis/interpretation (responsible for statistical analysis, evaluation, and presentation of the results): M.D.W., G.R.A., P.M.H., C.D.S.
Literature search (performed the literature search): M.D.W., I.D.C.
Writing (responsible for writing a substantive part of the manuscript): M.D.W., P.M.H.

Critical review (revised manuscript for intellectual content, this does not relate to spelling and grammar checking): P.M.H., C.D.S., I.D.C.

Funding Sources and Conflicts of Interest

This study was funded by a cooperative agreement with the National Center for Complementary and Integrative Health (agreement number 1U19AT007912-01). No conflicts of interest were reported for this study.

Practical Applications

- Lower income is associated with lower self-efficacy for pain management and coping among patients with chronic low back pain, even after controlling for health insurance and education.
- The findings of this study bolsters prior research that showed income was associated with self-efficacy for other health behaviors. Providers may need to provide low-income patients with extra support to help them identify coping approaches that will work for them.
- Policy solutions are needed to help patients bear the costs of coping with chronic low back pain.

Acknowledgments

The authors thank Annie Ro for valuable feedback on an early draft. We also acknowledge Judy Bearer for assistance in preparing the manuscript and throughout the data collection process.

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