



Disparities and inequalities in pain treatment among people with limited English proficiency

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1. Background

Currently, more than 60.6 million Americans over the age of five years speak a language other than English at home. People who speak English less than “very well” are considered to have limited English proficiency (LEP); approximately 24 million people in the US are considered LEP.

LEP people have been shown to be uninsured or underinsured, have limited access to health services, and have communication barriers with healthcare providers resulting in difficulties in receiving good quality healthcare (Choe et al., 2019; Li, Son, Abdulkerim, Jordan, & Son, 2017; Lu & Myerson, 2020). Suarez et al. (2021) found that LEP patients experience suboptimal communication with their healthcare providers. Access to a translator makes it easier for LEP patients to communicate; however, the translation system in healthcare has some drawbacks. According to Lor et al. (2022), the element of intercultural language skills is missing for the translators, which can cause inaccurate translation of the message. Moreover, appropriate translators are not available 24 h a day, and online translating systems are not effective when more than one person is involved in patient care (Lee et al., 2018).

The assessment and treatment of pain is based on patients' self-reporting the location, severity, and quality of pain; therefore, effective doctor and patient communication is necessary for accurate treatment. LEP patients experience language barriers, and as a result have difficulty in communicating their pain (Jimenez, Jackson, Zhou, Ayala, & Ebel, 2014). Given that the LEP population represents 8% of the total US population aged 5 and above (25 million people), and this segment is growing exponentially, understanding their pain treatment regimen is crucial.

Although the opioid crisis has spared minority groups, the appropriate usage of opioids or other pain relievers to manage chronic pain is necessary for people to be productive and function in society. To the best of our knowledge, there are no studies of pain medication use among LEP people. In this study, we hypothesized that LEP people receive fewer pain medications (pain relievers) than English-proficient (EP) people

with similar health status. Given that oxycodone is the most common form of opioid used in the US healthcare system (Cicero, Inciardi, & Muñoz, 2005) we used oxycodone as the main opioid prescribed by healthcare providers to find disparities in pain medications for LEP patients. The results of this study will open a new path in addressing health disparities among LEP individuals and help policymakers to move closer to addressing the Healthy People 2030 objectives.

2. Methods

We analyzed publicly available National Survey on Drug Use and Health (NSDUH) data from 2015 to 2019 to provide the most current estimates. NSDUH is a cross-sectional household survey that measures the prevalence and correlations of substance use and mental health issues in the United States (US). Considering that a question regarding English-language proficiency was only added in 2015 and to exclude the effects of the COVID-19 pandemic, we used data covering the period from 2015 to 2019. To control for confounder effects, we conducted propensity score matching (PSM) between EP and LEP people based on their reported health status.

The number of total samples from the dataset was 278,260, after excluding observations that were missing values for key variables.

2.1. Study measures

The main independent variable was English-language proficiency. In the NSDUH, the question “How well do you speak English?” was asked, and respondents had four options to answer this question: “Very well,” “well,” “not well,” and “not at all.” We defined LEP as people who answered this question with “not well” or “not at all.” In our data set, the proportion of LEP was 3.33% (9246).

2.2. Outcome variables

There were two main outcome variables: 1) any use of pain reliever

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in the past year and 2) any use of oxycodone in the past year. Both were binary variables. For the pain reliever question, almost 30% of the total sample of 282,768 answered that they used any type of pain reliever in the past year. For the oxycodone question, approximately 9% of the total sample responded that they used any type of oxycodone product in the past year (regardless of whether it was misused or not).

2.3. Control variables

We controlled for various characteristics that were available in the NSDUH data. Demographic information, such as age, gender, race, and ethnicity were included, as well as socioeconomic factors such as education level, income, and health insurance status. We also included health-related variables such as self-reported health status (Excellent, Very good, Good, Fair, and Poor), lifetime major depression episode, any treatment for major depression episodes, and alcohol consumption (binge drinking past 30 days) and smoking behavior (ever smoked for 30 days).

2.4. Statistical analysis

First, to estimate the impact of having LEP on the usage of pain relievers, we conducted a logistic regression analysis. However, there were substantial differences between the LEP population and the non-LEP population that might cause biased estimates of LEP effects; therefore, the populations were not very comparable. To show the different characteristics between the two populations, we compared the mean values for independent variables between the two groups using a chi-square test.

PSM can be used to find a more comparable subset of non-LEP samples. By using PSM, we created new sample groups for the non-LEP (EP) group that were more comparable to the LEP sample. To do this, we estimated propensity scores with a logistic regression model, where the LEP was the outcome variable and all control variables mentioned above were the control variables. Based on this process, a propensity score was generated for each person. We then assigned 1:1 non-LEP matching (without replacement) and 1:5 non-LEP matching (with replacement) for each LEP based on the propensity score, which reduced the selection bias between the two groups.

3. Results

We identified 9,246 LEP and 269,014 EP people in our sample data. LEP had lower pain relives use during the past one year than EP people (18.21% vs. 30.35%; $P < 0.05$). EP people reported better health status than LEP people: 25.78% of EP patients reported excellent health compared with 17.97% of LEP ($P < 0.05$). Fewer LEP people (2.36%) than EP people (9.26%) reported using oxycodone in the past one year. Compared with EP people, LEP people had a lower percentage of misusing opioids in the past one year (4.82% vs. 3.48% $P < 0.05$).

As seen in Table 1, LEP people generally belonged to marginalized populations: 83.02% of LEP people in our sample data were Hispanic and 53.70% had less than high school education. In contrast, 16.21% of EP people were Hispanic and 8.25% had education lower than high school. There were more female patients in both the EP and LEP groups than male patients and 60.72% of LEP patients reported having health insurance, compared with 91.21% of EP patients.

Prior to conducting the PSM, the multivariate logistic regression showed lower pain reliever use among LEP within the past year than with EP ($P < 0.05$) (Table 2). Although this model controlled for the effect of other covariates (e.g., health status, age categories, race and ethnicity, insurance, income, and year, depression episode and treatment, cigarette, and alcohol consumption) because the differences between the EP and LEP groups were substantial (as shown in Table 1), we required a better control group for EP. To address the issue, we conducted PSM.

Table 1 Characteristics of LEP and EP patients.

	LEP Population (n = 9246)	%	EP (Unmatched) (N = 269,014)	%	P-value
Any pain reliever use in the past year	1,684	18.21%	81,654	30.35%	0.000
Any oxycodone use in the past year	218	2.36%	24,905	9.26%	0.000
Any opioid misuse in the past year	322	3.48%	12,965	4.82%	0.000
Self-reported health status					0.000
1 Excellent	1664	18.00%	69,365	25.78%	
2 Very good	1,869	20.21%	105,334	39.16%	
3 Good	3,669	39.68%	69,594	25.87%	
4 Fair	1,842	19.92%	20,929	7.78%	
5 Poor	202	2.18%	3792	1.41%	
Age					0.000
12–17	533	5.76%	65,843	24.48%	
18–25	1,334	14.43%	67,573	25.12%	
26–64	6,745	72.95%	117,680	43.74%	
65 and older	634	6.86%	17,918	6.66%	
Sex					0.000
Male	4,065	43.96%	128,311	47.70%	
Female	5,181	56.04%	140,703	52.30%	
Race and Ethnicity					0.000
Hispanic	7,676	83.02%	43,599	16.21%	
Non-Hispanic White	389	4.21%	162,562	60.43%	
Non-Hispanic Black	301	3.26%	35,014	13.02%	
Non-Hispanic Asian	745	8.06%	11,948	4.44%	
Other races	135	1.46%	15,891	5.9%	
Having health insurance	5,614	60.72%	245,355	91.21%	0.000
Having private health insurance	2,674	28.92%	169,893	63.15%	0.000
Education (Except 12–17 yrs old)					0.000
Less than high school	4,965	53.70%	22,194	8.25%	
High school diploma	2,117	22.90%	54,030	20.08%	
Some college/ Assoc Dg	932	10.08%	70,391	26.17%	
College degree	699	7.56%	56,556	21.02%	
Income					0.000
Less than \$20,000	3,139	33.95%	49,418	18.37%	
\$20,000-\$49,999	4,269	46.17%	80,413	29.89%	
\$50,000-\$74,999	965	10.44%	42,288	15.72%	
\$75,000 or more	873	9.44%	96,895	36.02%	
Major depression episode	439	4.75%	47,103	17.51%	0.000
Major depression episode treatment	186	2.01%	22,502	8.36%	0.000
Ever smoked cigarettes	1,246	13.48%	67,526	25.10%	0.000

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Table 1 (continued)

	LEP Population (n = 9246)	%	EP (Unmatched) (N = 269,014)	%	P- value
every day for 30 days Had 4/5 or more drinks past 30 days	1,703	18.42%	65,939	24.51%	0.000

Table 2

Use of pain relievers, opioids, and oxycodone for LEP.

VARIABLES	Any Pain Reliever use in the past year	Any Oxycodone use in the past year	Any Opioid misuse in the past year
LEP	0.499*** (0.0152)	0.288*** (0.0207)	0.933 (0.0592)

After conducting PSM based on the health status of EP and LEP, the results showed that LEP patients had a 10.9% lower use of pain relief than did EP people in the past one year. Moreover, LEP patients had 4.9% lower use of oxycodone than did EP people in the past one year. The results indicated that before PSM and based on health status, LEP patients still received lower oxycodone prescriptions compared with EP patients (6.9%; $P < 0.05$). Opioid misuse in the past one year was 0.4% lower in LEP patients; however, this difference was not statistically significant (Table 3). To control for the effect of oxycodone misuse among LEP patients, we controlled for the effect of oxycodone use in past year. The results (Table 4) show that LEP people were not likely to misuse opioids, even after the model was controlled for oxycodone use.

4. Discussion

Pain is subjective and needs to be fully understood by healthcare providers so they can provide the right treatment regimen. People with LEP have difficulties communicating the type and amount of their pain. Although providing translators (either using smart devices or in person) can ease this problem, an intercultural aspect of pain is usually missing in translation. This study used PSM to compare the use of pain reliever and oxycodone use between two groups with EP or LEP.

Table 3

Results from propensity score matching models.

	LEP	EP	Difference	S.E.	T-stat
Any pain reliever use in the past year					
Unmatched	18.2%	30.4%	-12.1%	.005	-25.09***
No replacement (n = 1)	18.2%	29.1%	-10.9%	.006	-17.54***
With replacement (n = 5)	18.2%	27.5%	-9.3%	.007	-12.78***
Any oxycodone use in the past year					
(before matching)	2.4%	9.3%	-6.9%	.003	-22.78***
Unmatched					
(After matching)	2.4%	7.32%	-4.9%	.003	-15.62***
No replacement (n = 1)					
(After matching)	2.4%	6.4%	-4.0%	.003	-10.25***
With replacement (n = 5)					
Any opioid misuse in the past year					
Unmatched	3.5%	4.8%	-1.3%	.002	-5.93***
No replacement (n = 1)	3.5%	3.9%	-0.4%	.003	-1.52
					Not Statistically sig
With replacement (n = 5)	3.5%	3.5%	-0.1%	.003	-0.19
					Not Statistically sig

Table 4

Control for the effect of oxycodone use among LEP.

Any opioid misuse in the past year (also controlled for the oxycodone use in the past year)	LEP	EP	Difference	S.E.	T-stat
Unmatched	3.5%	4.8%	-1.3%	0.002	-5.93***
No replacement (n = 1)	3.5%	3.1%	0.3%	0.003	1.36
With replacement (n = 5)	3.5%	3.0%	0.5%	0.003	1.56

There are disparities in prescribed pain medications among people with LEP (Meghani et al., 2012). Using NSDUH data, we found that LEP people are less likely to be prescribed pain relievers than EP people with the same health status [10.9%; $P < 0.05$]. Our findings are consistent with recent research that found minorities, in general, receive less pain relievers or analgesics than non-Hispanic whites. (Kennel, Withers, Parsons, & Woo, 2019; Meints, Cortes, Morais, & Edwards, 2019). Similarly, Kennel et al. (2019) analyzed 25,732 Emergency Medical Services encounters from 2015 to 2017 and found that Hispanic patients were 21% and Asian patients 31% less likely than White patients to receive pain medications (Kennel et al., 2019). Another retrospective study of individuals presenting to the emergency department with urolithiasis from 2003 to 2015 (data from the nationally representative premier hospital database) (Berger et al., 2021) found that White patients had the highest median morphine milligram equivalents (20 mg), with Black patients (-3.3 mg) and Hispanic patients (-6.0) receiving less analgesia.

Notably, disparities exist between LEP and EP people in terms of income, education, and insurance status. Our descriptive analysis showed that LEP people have lower education and income level than EP people. Addressing the root causes of health disparities (income, education, insurance, mental health, and smoking/drinking habits) will contribute to better health outcomes for LEP people with respect to managing their pain. This aligns with the goals of Healthy People 2030 to combat health inequities (Hasbrouck, 2021).

Results should be interpreted with caution because retrospective studies always carry a risk of residual confounding. Propensity matching based on health status was used to minimize such an effect. Our study found that LEP people received less pain relievers and oxycodone in the past one year compared with EP people of the same health status; however, it is possible that LEP people are not aware of existing pain reliever medications and do not request them from their healthcare providers (Gianni et al., 2009). Moreover, LEP people may see pain as part of growing older (Hanks-Bell, Halvey, & Paice, 2004); therefore, their desire for treatment is minimal.

To be inclusive we run the analysis with other types of opioids (Hydrocodone, Codeine Products, Hydromorphone Products, Morphine Products, Methadone Products, Oxymorphone Products, Tramadol Products, Zohydro Er), and the results point to the same direction of existing disparities in receiving prescription pain medications among LEP compared to EP individuals (see Table 5 in appendix).

4.1. Public health implications

Approximately 24 million people in the US have LEP. Most LEP people are immigrants, and the number of immigrants in the US has exponentially increased in recent years. Our study highlights the urgent need for more research on the challenges faced by LEP people to address their pain. One of the goals of Healthy People 2030 is to reduce health disparities by addressing the needs of people with low health literacy and to provide them equal access and care; therefore, the results of this study will contribute to understanding the need of LEP people to access pain treatment options (such as opioids or pain procedures).

4.2. Limitations

The NSDUH data did not capture pain severity; therefore, we were unable to account for its effect in our logistic model. Further research is needed to explore pain management options among LEP while accounting for the effect of pain severity. Furthermore, the type of pain reliever was not specified in the data. Although our findings indicate that LEP people are disproportionately treated differently in the US healthcare system, caution is warranted in the interpretation of these results, and a causal interpretation of the study results should be avoided. Future studies should investigate this counterintuitive finding explicitly. In this study, we were unable to control for cancer pain, and this can affect the method of managing pain.

5. Conclusions

The role of patient language in pain management and treatment is understudied, but has important health implications for LEP people. The findings of this study will add to the growing literature on healthcare disparities among the LEP population. We found preliminary evidence that LEP people receive fewer pain relievers compared with EP people with the same health status, after adjusting for potential confounding factors. Future work is needed to identify areas for intervention to increase equity in receiving pain relief medications for LEP patients.

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Availability of data

Data is available online at <https://www.samhsa.gov/data/data-we-collect/nsduh-national-survey-drug-use-and-health>.

Ethics approval

Not applicable.

Consent to participant

Not applicable.

Consent for publication

Not applicable.

Author statements

Sara Imanpour: Conceptualization, Writing a draft, Review/editing the draft, Visualization, Supervision, and Project administration.

Sujeong Park: Methodology, Software, Validation, Formal Analysis, Investigation, and Data curation.

Author contributions

All authors contributed to the study's conception and design. SI drafted the manuscript, SP conducted the data analysis, and wrote the method section. All authors read and approved the final manuscript.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ssmph.2023.101466>.

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