

# Socioeconomic status and high impact chronic pain among adults in the United States: analysis of the 2016 National Health Interview Survey

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## Research Article

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# **Socioeconomic status and high-impact chronic pain among adults in the United States: analysis of the 2016 National Health Interview Survey**

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# 1 I. Abstract

2 **Background:** High-impact chronic pain(HICP) is chronic pain that limits life  
3 activities, affecting about 8% of adults in the United States(U.S.). Nonetheless,  
4 determinants of HICP are not fully understood, particularly regarding socioeconomic  
5 status(SES). It is important to clarify the relationship between SES and HICP.

6 **Objective:** To assess the impact of SES on the presence of HICP among adults in the  
7 U.S.

8 **Methods:** This was a cross-sectional analysis of the 2016 National Health Interview  
9 Survey(NHIS) data targeting adults aged  $\geq 18$  years in the U.S.. Participants  
10 presenting HICP were compared to participants presenting no HICP to describe the  
11 relationship between SES and HICP. HICP was defined as pain occurring regularly  
12 during the past 3 months which limits life activities. The NHIS dataset provided  
13 information on sociodemographic characteristics, socioeconomic characteristics, and  
14 the possible presence of HICP in each individual. Data collected were analysed using  
15 SPSS software V27.0 where crude and adjusted odds ratios (OR) were derived and  
16 used to statistically describe the association. Associations were considered statistically  
17 significant when the 95% confidence interval did not include 1.

18 **Results:** A total of 32,980 participants were included, with females (18,010; 54.01%)  
19 and adults within 18-64 years old (75.72%) comprising the majority. The prevalence  
20 of HICP was 9.42%. After adjustment, lower SES remained independently associated  
21 with higher odds of HICP. Specifically, participants with less than high school

education (aOR 0.12, 95% CI [0.10–0.13]), who had never worked (aOR 0.11, 95% CI [0.09–0.13]), those at <100% Federal Poverty Level (aOR 0.17, 95% CI [0.16–0.19]), and those under public insurance (aOR 0.18, 95% CI [0.16–0.20]) exhibited elevated risk relative to higher SES counterparts.

**Conclusion:** Effective strategies to alleviate the burden of HICP should transcend conventional clinical management, incorporating interventions that address educational inequalities, promote employment stability, mitigate poverty, and ensure access to healthcare insurance.

**Key terms:** High Impact Chronic Pain, Socioeconomic status, National Health Interview Survey

## II. Introduction

Chronic pain constitutes a pressing public health challenge in the United States, affecting nearly one in five adults and exacting a profound burden on individuals, families, and the healthcare system [1,2]. Beyond its high prevalence, chronic pain is associated with significant disability, reduced productivity, and increased healthcare utilization, resulting in considerable economic costs nationwide [3]. The burden of chronic pain is expected to increase as the U.S. population ages, further amplifying its public health and societal impact [4].

Among individuals experiencing chronic pain, a subset suffers from high-impact chronic pain (HICP), defined as chronic pain that frequently limits life or work activities for at least three months [5]. It is estimated that approximately 6-8% of

43 adults in the United States experience HICP [6]. Compared with individuals with  
44 non-limiting chronic pain, those with HICP experience greater functional impairment,  
45 poorer quality of life, and higher risks of mental health conditions such as depression  
46 and anxiety [7]. Consequently, HICP represents one of the most disabling and costly  
47 manifestations of chronic pain. Individuals affected by HICP are significantly more  
48 likely to report limitations in essential daily activities such as mobility, self-care, and  
49 participation in social or occupational roles, leading to substantial reductions in  
50 independence and overall well-being [7]. The persistent functional limitations  
51 associated with HICP also contribute to increased health-care utilization, including  
52 more frequent physician visits, hospitalizations, and long-term use of pain-related  
53 medications [7]. In addition, the economic burden of HICP extends beyond direct  
54 medical costs, as affected individuals often experience reduced productivity, work  
55 absenteeism, and, in severe cases, inability to maintain employment. These combined  
56 health and socioeconomic consequences highlight the profound impact of HICP on  
57 individuals and society, underscoring the importance of identifying vulnerable  
58 populations and addressing the factors associated with its occurrence. Socioeconomic  
59 status (SES), commonly assessed through indicators such as income, education,  
60 poverty level and occupation, has been widely recognized as an important determinant  
61 of health outcomes, including chronic pain [8]. Evidence consistently shows that  
62 individuals with lower socioeconomic status are more likely to report a higher  
63 prevalence of chronic pain, greater pain severity, and increased functional limitations  
64 [9]. These disparities may be explained by several mechanisms, including reduced

access to healthcare services, greater exposure to physically demanding or hazardous occupations, poorer living conditions, and increased psychosocial stressors [10]. Socioeconomic disadvantage may also limit access to effective pain management and rehabilitation services, thereby perpetuating cycles of disability and social inequality [11].

In the United States, national surveys such as the National Health Interview Survey (NHIS) and the Medical Expenditure Panel Survey (MEPS) have documented substantial socioeconomic disparities in pain prevalence and pain-related disability [12–14]. Adults with lower income and educational attainment consistently report higher levels of pain interference and functional limitation compared with those in more advantaged socioeconomic groups [14]. However, much of the existing literature focuses on chronic pain in general and does not specifically examine high-impact chronic pain (HICP), which represents the subgroup of individuals whose pain substantially restricts daily functioning and work capacity [15]. HICP reflects both persistent pain and significant activity limitation, making it a more severe and disabling type of chronic pain. Despite its considerable public health implications, evidence specifically examining the socioeconomic determinants of HICP remains limited [16]. A clearer understanding of how socioeconomic inequalities influence the occurrence of HICP is therefore necessary to guide targeted prevention strategies and reduce disparities in pain-related disability in the United States.

Therefore, this study aimed to describe the prevalence of high-impact chronic pain in the United States and to examine its association with key socioeconomic indicators.

By identifying socioeconomic determinants of HICP, this study seeks to generate evidence that can inform targeted public health interventions and policies aimed at reducing disparities in pain-related disability and improving pain management outcomes in the U.S. population [17].

### **III. Methods**

#### **III.1. Study design and sample**

We conducted a cross-sectional analysis of the 2016 National Health Interview Survey (NHIS) on January 20<sup>th</sup> 2022 to examine the association between SES and HICP. Participants presenting HICP were compared to participants presenting no HICP in the US in the year 2016 in order to explain how SES is related to HICP. The study population consisted of Individuals aged 18years and above who took part in the national health interview survey in the year 2016. The database primarily focused on HICP data obtained from interview, providing information on sociodemographic characteristics, socioeconomic characteristics, and the presence or absence of HICP in each individual interviewed.

#### **III.2. Data sources and outcomes**

The data source used in this analysis was the 2016 NHIS dataset which is a cross-sectional in person household survey with multistage area probability design. The National Health Interview Survey employs a multistage probability sampling design with stratification, clustering, and sampling weights to generate nationally representative estimates of the civilian non-institutionalized U.S. population. NHIS is

conducted by the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), and is publicly available online for secondary analysis. This database contains a wide range of HICP data, including information on the age, sex, geographic location, and other demographic variables, covering a diverse and representative sample of the US population. The NHIS surveys are conducted annually among the civilian non-institutionalized US population.

The High impact chronic pain (HICP) question in the NHIS survey (the primary outcome variable) was collected from adults aged 18 years and above. In the NHIS 2016, participants were selected based on two criteria: Their report of the pain frequency; and those reporting pain most days who confirmed activity limitation. Participants meeting both criteria were classified as HICP. HICP was defined using NHIS 2016 items. Respondents were first asked: ‘In the past 3 months, how often did you have pain?’ Those answering ‘most days’ or ‘every day’ were asked: ‘Over the past 3 months, how often did pain limit your life or work activities?’ Respondents reporting limitation on ‘most days’ or ‘every day’ were classified as having “HICP present”.

### **III.3. Study variables**

We considered the same list of variables used in developing the 2016 NHIS models. Primary exposures were SES indicators: education, employment status, poverty status (FPL categories), and health insurance type. Covariates included age, sex, race/ethnicity, marital status, region, and comorbidities (obesity, arthritis, insomnia,

peptic ulcer disease and Crohn's disease).

#### **III.4. Data extraction**

Data extraction from the NHIS 2016 database was performed using predefined criteria and variables. The information collected included demographic characteristics such as age, sex, race/ethnicity, and geographic location. Additionally, specific details on the SES as well as comorbidities present were also extracted. The data extracted were filled into a Microsoft excel sheet. We conducted a complete-case analysis; participants with missing data for variables included in multivariable models were excluded.

#### **III.5. Data Analysis**

Variables were described using descriptive statistics. The mean (SD) was stated for continuous variables and frequency (percentage) for categorical variables. The prevalence of HICP was calculated as the proportion of respondents meeting the NHIS definition of HICP (pain on most days/every day and activity limitation on most days/every day during the past three months) among all adult respondents included in the analytic sample. Confounding factors were identified from the comparison of socio demographic characteristics and the presence of some comorbidities (obesity, cancer, peptic ulcer, arthritis, crohn's disease and insomnia) within cases and controls using the chi square test. A logistic regression model was then used to explore the association between socioeconomic factors (education, employment status and poverty status) and the occurrence of HICP, by estimating crude and adjusted odds

ratios. Model was adjusted for age, sex, race/ethnicity, marital status, geographic region, and selected comorbidities. Analyses were conducted using SPSS version 27.0 (IBM Corp., Armonk, NY), with crude and adjusted odds ratios (ORs) and corresponding 95% confidence intervals (CIs) estimated to quantify associations. Associations were deemed statistically significant if the 95% confidence interval excluded 1.0. Results were expressed on tables.

### III.6. Ethical considerations

Given that all the data used were publicly available and contained no personally identifiable information, obtaining informed consent and ethics committee approval was therefore not required. Human Ethics and Consent to Participate declarations: not applicable.

## IV. Results

### IV.1. Sociodemographic characteristics of the population

Table 1 presents the sociodemographic characteristics of the participants. A total of 32,980 participants were included; 18,010 (54.01%) were female. The majority of participants were within 18-64 years old (75.72%), most were white non-Hispanic (67.64%) and more than half of them were married (50.07%).

**Table 1:** Sociodemographic characteristics of the participants

| Variables  | Categories | Frequency | Percentage (%) |
|------------|------------|-----------|----------------|
| (n=32,980) |            |           |                |

---

|                  |                    |        |       |
|------------------|--------------------|--------|-------|
| Sex              | Male               | 14,970 | 45.99 |
|                  | Female             | 18,010 | 54.01 |
| Age              | 18-64              | 24,099 | 75.72 |
|                  | ≥65                | 8,881  | 24.28 |
| Race/ethnicity   | White non-hispanic | 23,338 | 67.64 |
|                  | Black non-hispanic | 3,645  | 12.75 |
|                  | Hispanic           | 3,804  | 13.15 |
|                  | Others             | 1,695  | 6.46  |
| Marital status   | Never married      | 7,447  | 24.62 |
|                  | Married            | 16,674 | 50.07 |
|                  | Divorced           | 5,525  | 16.19 |
|                  | Widowed            | 3,268  | 9.11  |
| Region of Origin | Northeast          | 5,582  | 16.93 |
|                  | Midwest            | 7,340  | 22.26 |
|                  | South              | 11,465 | 34.76 |
|                  | West               | 8,593  | 26.06 |

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168

169 **IV.2. Socioeconomic characteristics of the population**

170 Table 2 presents the socioeconomic characteristics of the study participants. It is  
 171 observed that, the largest educational category was some college/college (10,489;  
 172 32.49%). However, 36.6% are no longer working, representing the highest proportion,

173 and more than half of the participants (62.43%) are covered by a private insurance. A  
 174 poverty status of 400%+FPL is however highly represented in the population  
 175 (38.79%)

176 **Table 2:** Socioeconomic characteristics of the study participants

| Variables         | Categories                  | Frequency<br>(n=32,980) | Percentage (%) |
|-------------------|-----------------------------|-------------------------|----------------|
| Educational level | Less than high school       | 3,898                   | 11.82          |
|                   | High school                 | 7,965                   | 24.15          |
|                   | College                     | 10,715                  | 32.49          |
|                   | Bachelor's degree or higher | 10,405                  | 31.55          |
|                   |                             |                         |                |
| Employment status | Employed hourly             | 10,637                  | 33.05          |
|                   | Employed non hourly         | 8,091                   | 25.62          |
|                   | Worked previously           | 12,671                  | 36.56          |
|                   | Never worked                | 1,469                   | 4.78           |
|                   |                             |                         |                |
| Poverty status    | <100FPL                     | 4,632                   | 15.19          |
|                   | 100-200% FPL                | 5,796                   | 18.43          |
|                   | 200%-400% FPL               | 8,677                   | 27.59          |
|                   | 400%+FPL                    | 11,700                  | 38.79          |

|                           |           |        |       |
|---------------------------|-----------|--------|-------|
| Health insurance coverage | Uninsured | 2,767  | 8.69  |
|                           | Public    | 7,618  | 23.03 |
|                           | Private   | 20,384 | 62.43 |
|                           | Other     | 2,055  | 5.85  |

**FPL:** Federal Poverty Level

### **IV.3. Clinical characteristics of the population (Comorbidities present)**

Several comorbidities were common in the study population. Table 3 presents some comorbidities observed among the study participants. The highest percentage is represented by insomnia (36.87%).

**Table 3:** Clinical characteristics of the study participants (Comorbidities present)

| Variables       | Frequency (n=32,980) | Percentage (%) |
|-----------------|----------------------|----------------|
| Insomnia        | 11,924               | 36.87          |
| Peptic ulcer    | 2,312                | 6.57           |
| Obesity         | 10,728               | 32.17          |
| Arthritis       | 9,163                | 26.03          |
| Crohn's disease | 496                  | 1.39           |

#### IV.4. Prevalence of HICP in the US

The unweighted prevalence of HICP was 9.42% (3,107 cases among 32,980 participants).

#### IV.5. Comparison of the distribution of sociodemographic and clinical characteristics (comorbidities) among participants presenting HICP and those presenting no HICP

**Table 4:** Distribution of sociodemographic and clinical characteristics among participants according to the presence or absence of HICP.

| Variables      | Categories    | Frequency n(%) |                |
|----------------|---------------|----------------|----------------|
|                |               | HICP present   | HICP absent    |
| Sex            | Male          | 1,233 (39.46)  | 13737          |
|                | Female        | 1,874 (60.54)  | 16136          |
| Age            | 18-64         | 2,018 (66.91)  | 22,081 (76.59) |
|                | ≥65           | 1,089 (33.09)  | 7,792 (23.41)  |
| Race/ethnicity | White         | 2,247 (69.01)  | 21,091 (67.50) |
|                | non-hispanic  |                |                |
|                | Black         | 397 (14.03)    | 3,248 (12.62)  |
|                | non-hispanic  |                |                |
|                | Hispanic      | 311 (12.20)    | 3,493 (13.25)  |
|                | Others        | 152 (4.75)     | 2,041 (6.63)   |
| Marital status | Never married | 457 (16.25)    | 6,990 (25.45)  |

|                       |              |               |                |
|-----------------------|--------------|---------------|----------------|
|                       | Married      | 1,317 (42.83) | 15,357 (50.78) |
|                       | Divorced     | 816 (24.62)   | 4,709 (15.37)  |
|                       | Widowed      | 510 (16.30)   | 2,758 (8.41)   |
| Region of Origin      | Northeast    | 494 (16.85)   | 5,088 (18.40)  |
|                       | Midwest      | 673 (23.14)   | 6,667 (23.46)  |
|                       | South        | 1,158 (37.65) | 10,307 (35.39) |
|                       | West         | 782 (22.36)   | 7,811 (22.75)  |
| Comorbidities present | Insomnia     | 1,773 (61.24) | 10,151 (34.50) |
|                       | Peptic ulcer | 564 (17.84)   | 1,748 (5.46)   |
|                       | Obesity      | 1,456 (47.77) | 9,272 (30.63)  |
|                       | Arthritis    | 2,102 (66.67) | 7,061 (22.04)  |

194

#### 195 **IV.6. Association between SES and the presence of HICP**

196 Table 5 presents the association between SES and the presence of HICP. Results of  
197 multivariate analysis show that all the socioeconomic factors were found associated to  
198 the presence of HICP among adults in the US. A pronounced socioeconomic gradient  
199 emerged across all indicators. Lower educational attainment (aOR 0.12, 95% CI  
200 0.10-0.13 for HICP absence), prior unemployment or never having worked (aOR 0.11,  
201 95% CI 0.09-0.13), poverty status <100% FPL (aOR 0.17, 95% CI 0.16-0.19), and  
202 public insurance coverage (aOR 0.18, 95% CI 0.16-0.20) were each independently  
203 associated with markedly elevated odds of HICP following adjustment for

sociodemographic characteristics and selected comorbidities. Odds ratios are presented for the absence of HICP (reference: presence of HICP); thus, ORs <1 indicate higher odds of HICP presence in the specified category relative to the reference.

**Table 5:** Multivariate analysis grid

| Variables              | Modalities                                     | cOR [95% CI]      | aOR [95% CI]      |
|------------------------|------------------------------------------------|-------------------|-------------------|
| <b>Absence of HICP</b> |                                                |                   |                   |
| Educational level      | Less than high school                          | 0.14 [0.12- 0.15] | 0.12 [0.10-0.13]  |
|                        | High school                                    | 0.09 [0.09-0.10]  | 0.09 [0.08-0.10]  |
|                        | College                                        | 0.09 [0.07-0.09]  | 0.087 [0.08-0.09] |
|                        | <b>Bachelor's degree or higher (reference)</b> |                   |                   |
| Employment status      | Never worked                                   | 0.09 [0.08-0.11]  | 0.11 [0.09-0.13]  |
|                        | Worked previously                              | 0.163 [0.15-0.17] | 0.161 [0.15-0.17] |
|                        | <b>Employed (reference)</b>                    |                   |                   |

|                           |                    |                  |                   |
|---------------------------|--------------------|------------------|-------------------|
| Poverty status            | <100FPL            | 0.15 [0.14-0.16] | 0.17 [0.16-0.19]  |
|                           | 100-200% FPL       | 0.12 [0.11-0.14] | 0.12 [0.11-0.13]  |
|                           | 200%-400%          | 0.07 [0.06-0.08] | 0.07 [0.06-0.08]  |
|                           | FPL                |                  |                   |
|                           | <b>400%+FPL</b>    |                  |                   |
|                           | <b>(reference)</b> |                  |                   |
| Health insurance coverage | Uninsured          | <0.01            | <0.01             |
|                           | Public             | 0.17 [0.16-0.19] | 0.18 [0.16-0.20]  |
|                           | Other              | 0.14 [0.11-0.17] | 0.143 [0.11-0.17] |
|                           | <b>Private</b>     |                  |                   |
|                           | <b>(reference)</b> |                  |                   |

209    **cOR:** Crude Odds ratio      CI: Confidence Interval      **aOR:** Adjusted Odds ratio.

210

## 211      **V. Discussion**

212    The aim of this study was to determine the prevalence of HICP among adults in the  
213    US, and to evaluate the association between SES and the occurrence of HICP. This  
214    study revealed, the prevalence of HICP in 2016 is 9.42%. Analysis showed that all  
215    socioeconomic indicators (education, income, poverty level and insurance type)  
216    remained independently associated with high-impact chronic pain (HICP) after

adjustment for confounders. The persistence of these associations across education, employment, poverty status, and insurance coverage shows the structural nature of chronic pain inequalities.

National U.S. data indicate that HICP disproportionately affects socially and economically disadvantaged populations [17,18]. Similar prevalence patterns have been reported in recent national estimates, reinforcing that HICP is socially stratified rather than randomly distributed [19,20]. The consistency of these findings with international epidemiological evidence suggests that socioeconomic disadvantage is not merely a correlate but a central determinant of disabling chronic pain [21,23].

A clear inverse educational gradient was observed, with progressively higher odds of HICP among individuals with lower educational attainment. Adults with less than a high school education exhibited the highest likelihood of HICP, compared to bachelor's degree holders [19]. Furthermore, education has been described as a fundamental determinant of health inequality because it shapes access to resources, occupational trajectories, income stability, and health literacy [24]. Individuals with lower education are more likely to work in physically demanding occupations, experience workplace injuries, and have limited access to preventive care, all of which increase vulnerability to HICP. This concords with a study carried out in the US in 2008, which emphasises on the fact that individuals with lower SES are more likely to be exposed to hazardous working conditions, thus higher rates of occupational injuries and pain [22]. Lower educational attainment is associated with reduced capacity to navigate healthcare systems and engage in adaptive coping

strategies, potentially contributing to greater pain-related disability [23]. These findings support policy and public health approaches that address educational inequities and access to effective pain management.

Employment status remained significantly associated with HICP. Previously employed and never-employed individuals had higher odds of HICP compared with currently employed adults, suggesting a protective effect of employment. Population-based studies have long documented the reciprocal relationship between chronic pain and labor force participation [25,26]. Chronic pain is associated with reduced workforce participation, increased risk of unemployment and early retirement, while unemployment itself possibly predicts worsening pain outcomes over time, therefore progressing to HICP [26]. Prospective data demonstrate that individuals outside the workforce are more likely to report persistent and disabling pain at follow-up, even after controlling for baseline health status [27]. Employment provides financial stability, structured daily activity, social integration, and access to employer-sponsored health benefits. The broader societal burden of pain-related work disability is substantial, as highlighted in European and North American analysis [28,29]. Thus, our findings support the conceptualization of HICP not only as a clinical condition but also as a major determinant of economic productivity and social participation. Policies that support occupational health and workforce participation may help reduce pain-related disability.

Individuals below 100% of the Federal Poverty Level (FPL) had the highest odds of HICP, with progressively elevated risk observed across the 100-200% and 200-400%

FPL categories relative to  $\geq 400\%$  FPL. This stepwise gradient indicates that HICP follows a classic social gradient pattern. Large multicohort analysis further show that lower socioeconomic status is associated with higher premature morbidity and mortality, independent of conventional risk factors [25]. Financial barriers may delay early treatment and limit access to multidisciplinary pain care, increasing the likelihood that pain transitions into a disabling form [17]. Chronic psychosocial stress, hazardous living and working conditions, and reduced access to healthcare likely mediate this relationship. The Institute of Medicine emphasized that social and economic inequities significantly influence access to effective pain prevention and management strategies [29]. There is therefore the need to implement poverty-sensitive public health approaches in the health sector.

Insurance type was as well associated with HICP. Compared with privately insured adults, those with public or other insurance coverage had significantly higher odds of experiencing HICP. National reports indicate that publicly insured populations bear a disproportionate burden of chronic pain and comorbidity disability [17]. Differences in coverage for non-pharmacological therapies, access to specialists, and continuity of care may contribute to these disparities. Persistent pain prevalence studies in the U.S. show that individuals with limited healthcare access report more severe and disabling pain [30]. Insurance-related disparities may intersect with broader socioeconomic inequalities in pain treatment and outcomes [31]. Thus, insurance coverage may influence access to pain care, which could contribute to disparities in HICP. Other insurance bodies particularly the public ones, should therefore ameliorate their

services in order to cover up damage, especially health-related, in the best ways possible.

The convergence of socioeconomic gradients across education, employment, income, and insurance coverage strengthens the inference that HICP is socially determined. Epidemiological reviews consistently conclude that HICP disproportionately affects individuals of lower socioeconomic position across high-income countries [21]. The theoretical framework of fundamental cause theory further supports the interpretation that the availability of socioeconomic resources such as light level of education, high income and being properly insured shape exposure to risk, access to protective factors, and resilience against disease progression [24]. Taken together, our findings position HICP within the broader discourse on social determinants of health. The observed gradients suggest that HICP is not merely a clinical condition but also a social phenomenon embedded within structural inequalities. Effective strategies to reduce the burden of HICP must therefore extend beyond clinical management to include structural interventions targeting educational inequities, employment stability, poverty reduction, and equitable healthcare access. From a public health perspective, targeting lower-income and lower-education populations for early screening, preventive interventions, and multidisciplinary pain management may help reduce progression to HICP. Policies aimed at improving insurance coverage quality and access to non-pharmacologic pain therapies may also help mitigate disparities.

## **VI. Strengths and Interpretation Considerations**

The persistence of associations across all socioeconomic indicators strengthens confidence in the robustness of the findings, and further supports the plausibility of a true socioeconomic effect on HICP. However, these results should be used in the light of certain limitations. The cross-sectional design prevents causal inference and raises the possibility of reverse causation (for example; pain influencing employment or insurance, or HICP influencing the SES). Pain measures were self-reported, which may introduce reporting bias. The NHIS excludes institutionalized populations, potentially underestimating the burden of severe chronic pain. The analysis did not apply weighting; this may affect the generalizability of the results obtained. The study however, highlights the burden of HICP in the US and leverages a high importance on SES in relation to HICP that should not be left aside.

## **VII. Conclusion**

The prevalence of HICP in 2016 is 9.42%. All main socioeconomic indicators (education, income, poverty level and insurance type) are independently associated with the presence of High-Impact Chronic Pain (HICP). The consistency of these findings across all SES indicators suggests that socioeconomic disadvantage operates as a multidimensional determinant of severe pain-related disability. These findings imply that HICP is not merely a biomedical condition, but also a socially patterned health outcome.

Public health authorities should therefore: (i) prioritize community-based interventions for populations with lower educational attainment and income levels; (ii)

implement programs to enhance pain management literacy and healthcare navigation within clinical settings, ensuring equitable access to information; and (iii) enact workplace policies and interventions designed to prevent occupational strain and support employees with chronic pain, thereby mitigating progression to high-impact chronic pain.

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