

# Characterizing Acute Low Back Pain in a Community-Based Cohort: Results from a Feasibility Cohort Study

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**Introduction:** Acute low back pain (LBP) is a common experience; however, the associated pain severity, pain frequency, and characteristics of individuals with acute LBP in community settings have yet to be well understood. In this manuscript, two acute-LBP severity categorization definitions were developed: 1) pain impact frequency (impact-based) and 2) pain intensity (intensity-based) severity categories. The purpose of this manuscript is to describe and then compare these acute-LBP severity groups in the following characteristics: 1) sociodemographic, 2) general and physical health, and 3) psychological using a feasibility cohort study.

**Methods:** This cross-sectional study used baseline data from 131 community-based participants with acute LBP (<4 weeks duration before screening and  $\geq 30$  pain-free days before acute LBP onset). Descriptive associations were calculated as prevalence ratios of categorical variables and Hedges'  $g$  for continuous variables.

**Results:** Our analyses identified several large associations for impact-based and intensity-based categories with global mental health, global physical health, STarT Back Screening Tool risk category, and general health. Larger associations were found with social constructs (racially and ethnically minoritized, performance of social roles, and isolation) when using the intensity-based versus impact-based categorization.

**Discussion:** This study adds to the literature by providing standard ways to characterize community-based individuals experiencing acute-LBP. The robust differences observed between these categorization approaches suggest that how we define acute-LBP severity is consequential; these different approaches may be used to improve the early identification of factors potentially contributing to the development of chronic-LBP.

**Keywords:** low back pain, acute pain, cohort study, community

## Introduction

Up to 25% of individuals experience acute low back pain (LBP) annually.<sup>1,2</sup> Despite being relatively common, acute LBP receives little attention due to perceived favorable long-term outcome relative to chronic LBP.<sup>3,4</sup> However, the transition from acute to chronic LBP may be higher than previously thought, with 32% in a large care-seeking cohort of US adults.<sup>5</sup> Additionally, it is typical for studies estimating chronic LBP incidence to use cohorts restricted to patients seeking healthcare, yet a large proportion (42%) of individuals experiencing LBP do not seek care.<sup>6</sup> Thus, results from care-seeking cohorts may not be broadly generalizable to adults with acute LBP.

Cohorts recruited directly from the community (ie, not limited to individuals seeking care) play an essential role in understanding the full spectrum of health and disease processes regardless of healthcare access or utilization. For example, a recent Australian community-based cohort study indicated that acute LBP's prognosis is far better than in clinical populations.<sup>7</sup> However, the same may not be accurate in the US, given the differences between these countries (eg, demographic makeup, sociopolitical, and healthcare characteristics). The limited US community-based studies available also indicate that chronic LBP incidence is higher than previously thought (approximately 25%).<sup>1,8</sup>

More studies enrolling participants directly from the community are needed to understand acute LBP, and ultimately, how characteristics of acute LBP contribute to chronic LBP through the transition from acute to chronic LBP. Recently developed measures to characterize chronic LBP focus on frequency-based questions to better understand high-impact chronic pain.<sup>9</sup> Prior studies discussing pain distributions have focused exclusively on categorizing the severity of chronic pain and examining the natural history of chronic pain.<sup>10,11</sup> Various cutoffs for pain intensity (eg, >4/10 on an 11-point scale) have been proposed to determine eligibility for LBP studies with the rationale that excluding individuals with lower pain intensity may provide greater scope for meaningful change in pain scores.<sup>12</sup> However, studies applying such restrictions may miss important information regarding characteristics of the overall group of acute LBP sufferers such as key sociodemographic, general health/clinical characteristics, health behaviors, social health, and psychological factors.<sup>12,13</sup> Recently, Eccleston et al proposed a framework for the examination of acute and chronic pain as well as the transition between states of pain.<sup>14</sup> However, to our knowledge, the empirical description of acute LBP subgroups of severity using concepts from this recently proposed framework has not been reported in the literature. To fill these gaps, we proposed three definitions to categorize the acute LBP experience that align with the recently proposed framework,<sup>14</sup> in a US community-based cohort study. By evaluating acute LBP subgroup characteristics and quantifying effect sizes, we may provide further support for such a framework and improve the prediction of chronic LBP or the identification of factors that contribute to its development. The purpose of this manuscript is to categorize the severity of acute LBP and examine differences by 1) sociodemographic factors, 2) general health and physical characteristics, and 3) psychological aspects both within and between the three proposed acute LBP severity definitions.

## Material and Methods

### Design and Aim

We used baseline data from a feasibility cohort study of adults investigating the biopsychosocial factors related to transitioning from new-onset acute LBP to chronic LBP to compare ways to assess baseline levels of pain severity.

### Participants

Study participants were recruited from communities in and around Durham, NC, and Kannapolis, NC, from February to November 2022. We utilized a community-based approach to recruit potential participants at both sites, including advertisements on social media, newspaper articles, volunteer registries, emails distributed through university networks, flyers posted in or around the communities, and word of mouth. Recruitment in Kannapolis was primarily based on the MURDOCK Study,<sup>15</sup> a 12,526-participant community-based longitudinal cohort recruited from 2007 to 2013 centralized in Cabarrus County. In Durham, the Duke Health Volunteer Registry was queried for inclusion and exclusion criteria related to age, comorbidities (cancer/autoimmune conditions), and recent surgery/trauma. This study was reviewed and approved by the Duke University School of Medicine's institutional review board.

Individuals interested in participating contacted research coordinators, who explained the study and initiated a telephone script for screening. Eligible individuals had to be adults ( $\geq 18$  years old) with acute LBP (ie, LBP that started <4 weeks before screening and  $\geq 30$  days without LBP prior to the date of acute onset). Exclusion criteria included current or previous history of systemic inflammatory or autoimmune conditions, cancer (other than skin cancer), lumbar spine surgery, low back trauma (eg, motor vehicle accident, falls), and congenital or acquired spinal defect (eg, scoliosis). We also excluded individuals who were pregnant. Eligible individuals provided informed consent electronically via Research Electronic Data Capture (REDCap)<sup>16–18</sup> or in person. All participants were provided with a copy of their signed consent form and scheduled for a baseline in-person visit no later than 6 weeks from the date of LBP onset. The

procedures for this study were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association. Before in-person data collection, participants completed study questionnaires to assess pain characteristics; depression, anxiety, and social measures via an online questionnaire using REDCap or, if the participant preferred, by phone. Study staff reviewed procedures with participants at the start of the in-person data collection visit. Participants were compensated for each in-person data collection visit and completion of electronic questionnaires.

## Defining Acute Low Back Pain Categories

We operationalized acute LBP severity categories using two different definitions, similar to those definitions recently proposed for high-and-low impact chronic LBP,<sup>14</sup> that relied on LBP frequency combined with either 1) pain impact frequency (impact-based) or 2) pain intensity (intensity-based). A third definition based only on measures of pain interference (interference-based) is presented in the Supplemental Material. The impact-based acute LBP severity categorization was based on the definition used by the Population Research working group of the US National Pain Strategy to determine high-impact,<sup>19</sup> adapting questions for an acute LBP population. Participants responded to the following questions about their LBP: 1) “Since the onset of your pain, how often have you had pain? Would you say Never, Some Days, Most Days, or Every Day?” and 2) “Since the onset of your low back pain, how often has pain limited your life or work activities? Would you say Never, Some Days, Most Days, or Every Day?” We categorized participants who answered “Most Days” or “Every Day” to both questions as having high-impact acute LBP. [Figure 1A](#) illustrates how we used the same questions to categorize participants who did not fall into the high-impact acute LBP group into either medium- or low-impact categories.

The intensity-based definition was based on a combination of LBP frequency with LBP intensity using the 0–100 Visual Analogue Scale (VAS). Participants were categorized as having strong intensity acute LBP if they reported pain frequency as “Most Days” or “Every Day” and reported pain intensity  $\geq 30/100$ . [Figure 1B](#) illustrates how we categorized participants who did not fall into the strong-intensity acute LBP group into either moderate- or weak-intensity category. Two alternative cut-points were tested for pain intensity  $\geq 20/100$  and pain intensity  $\geq 40/100$ , which are included in [Supplementary Figure 1](#).

## Acute Low Back Pain History and Sensory Characteristics

Beyond the questions used to categorize acute LBP severity, we collected information regarding other pains and LBP treatments used since the onset of current LBP (adapted from the NIH recommended minimum dataset for chronic LBP),<sup>20</sup> personal history of prior LBP episodes, and family history of LBP and chronic pain. We also collected the STarT Back Screening Tool (SBT),<sup>21</sup> a 9-item questionnaire that stratifies individuals into low-, medium- and high-risk

A. Impact-Based Definition		Since the onset of your pain, how often have you had pain?	
		Most Days or Every Day	Some Days
Since the onset of your low back pain, how often has your pain limited your life or work activities?	Most Days or Every Day	High Impact	Medium Impact
	Some Days or Never	Medium Impact	Low Impact

B. Intensity-Based Definition		Since the onset of your pain, how often have you had pain?	
		Most Days or Every Day	Some Days
Low Back Pain Intensity	$\geq 30 / 100$	Strong Intensity	Moderate Intensity
	$< 30 / 100$	Moderate Intensity	Weak Intensity

**Figure 1** Acute Low Back Pain Severity Categorization Definitions (A) Impact-based definition based on the frequency of low back pain (B) Intensity-based definition based on the intensity of low back pain.

categories based on their predicted LBP prognosis. Pain interference with enjoyment of life and pain interference with general activities (from the PEG)<sup>22</sup> were also collected.

We measured pain pressure threshold (PPT) at the upper trapezius (PPT-UT) and posterior superior iliac spine (PPT-PSIS) bilaterally using a standard rubber-tip algometer. Pressure was applied until the participant's PPT was reached up to a maximum of 10.1 kgf. Three measurements for PPT-UT and PPT-PSIS were recorded on each side (alternating between left and right); we present the mean value (in kgf) of the PPT-UT and PPT-PSIS measurements.

## Sociodemographic Characteristics

We collected self-reported sociodemographic characteristics, including age, sex at birth (female/male), gender identity, racial identity, Hispanic ethnicity (yes/no), highest educational attainment, insurance type, marital status, and employment status. Participants could indicate one or more racial identities out of the following categories: American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, or White. Participants also had the option to select "other" and provide a write-in racial category option or select "unknown" or "choose not to respond." To assess racialized pain inequities, we grouped participants into two groups based on racialized sociopolitical positions: 1) "racially minoritized", which included participants who identified as (regardless of ethnicity) Asian, Black or African American, and those who had selected more than one race category (there were no participants who identified as American Indian or Alaska Native, or Native Hawaiian or Other Pacific Islander), and 2) "racially advantaged", which included participants who identified as (regardless of ethnicity) White only.<sup>23</sup> Ethnically minoritized pain inequities were examined based on whether participants indicated self-identifying as having Hispanic ethnicity or not. Participants reported gender identity (cisgender, transgender, non-binary, genderqueer, agender, or gender fluid) using standardized items.<sup>24</sup>

## Social Health and Wellbeing

We captured two components of social health: social isolation and the ability to perform social roles. We ascertained social isolation using the Social Network Index (SNI)<sup>25</sup>, as recommended by the Institute of Medicine (IOM, currently known as the National Academy of Medicine, [NAM]).<sup>26,27</sup> The SNI classifies individuals into one of the four groups ranging from most isolated to not isolated.<sup>27,28</sup> We used an item assessing the performance of social activities and roles collected from the Patient Reported Outcomes Measurement Information System (PROMIS) Scale v1.2 – Global Health to measure social function on a scale of 1–5 (where 1 = Poor and 5 = Excellent).<sup>28</sup>

## General Health, Clinical Characteristics, Health Behavior

The General Health Item from the PROMIS Scale v1.2 – Global Health<sup>28</sup> captured self-reported health status. Additionally, we asked participants about prior infections with the novel coronavirus disease of 2019 (COVID-19). Participants who indicated any known previous COVID-19 infections were also asked about the cumulative number of separate COVID-19 infections experienced and whether they considered their back pain to be related to a prior COVID-19 infection. Participant height and weight were collected at the study visit with a standard electronic scale and used to calculate body mass index (BMI).

We classified participants into three mutually exclusive physical activity groups (0 min/week = inactive, 1–149 min/week = insufficiently active, and  $\geq 150$  min/week = sufficiently active) based on self-report<sup>27,29</sup> We captured sleep disturbance using the PROMIS Short Form v1.0 – Sleep Disturbance 4a, where lower scores indicate better sleep (lowest possible raw score = 4; the highest possible raw score = 16).<sup>30</sup> We also captured smoking status and history of drug/alcohol use.

## Psychological Characteristics

To capture depressive symptoms, we collected the PROMIS Short Form v1.0 – Depression 4a.<sup>31,32</sup> We collected stress symptoms using an IOM-recommended validated single-item question and categorized patients based on their response.<sup>27,33</sup> We used the Optimal Screening for Prediction of Referral and Outcome Yellow Flags (OSPRO-YF) 10-

item questionnaire measured psychological distress. The OSPRO-YF is a validated tool that provides estimated scores on the following measures: Fear-Avoidance Beliefs Questionnaire (both physical activity and work subscales; FABQ-PA and FABQ-W), Pain Anxiety Symptoms Scale (PASS-20), Pain Catastrophizing Scale (PCS), Patient Health Questionnaire-9 (PHQ-9), Pain Self-Efficacy Questionnaire (PSEQ), State-Trait Anxiety Inventory (STAI), State-Trait Anger Expression Inventory (STAXI), and Tampa Scale of Kinesiophobia (TSK-11).<sup>34–36</sup>

## Statistical Analysis

We summarized individual-level characteristics stratified by acute LBP severity categories for each categorization approach (ie, impact-based and intensity-based). Using low-impact acute LBP and weak-intensity acute LBP as the reference groups, we present the relative magnitude of differences using prevalence ratios (PR) for categorical variables and Hedges'  $g$  for continuous variables with their respective 95% confidence intervals (CI). Prevalence ratios were calculated as the proportion of the population in each category, divided by the total reference population. Prevalence ratios were presented by comparing impact-based vs intensity-based definitions to one another. Hedge's  $g$  was used to quantify the effect sizes between different severity definitions of acute LBP, providing insights into the magnitude of differences between these groups. Hedges'  $g$  effect sizes were presented for each severity definition individually as well as compared to the reference severity definition (ie, low-impact and weak-intensity). Interpretation of Hedges'  $g$  is like Cohen's  $d$  – with values around 0.2, 0.5, and 0.8 or more interpreted as small, moderate, and large differences between acute LBP groups.<sup>37</sup> We conducted all analyses in SAS 9.4 (Cary, NC) and used RStudio for data visualization.<sup>38–40</sup>

## Results

We screened 384 potential participants, 184 of whom met the study criteria. The most common reason for non-eligibility 158/200 (79%) was not meeting the study definition of acute LBP (ie, duration of LBP >4 weeks at screening or reported LBP within 30 days before the current LBP episode). Of those who screened eligible, 143/184 (77.7%) enrolled in the study, and 131/143 (91.6%) of those enrolled provided baseline data. No significant differences in the distribution of age, racial identity, or sex at birth were found between those eligible and did not enroll and those that did enroll in the study or those that did and did not provide baseline data. We present sociodemographic characteristics for the overall sample in Table 1.

**Table 1** Sociodemographic Characteristics of the Cohort

	<b>Total (N=131)</b>
<b>Age Category (years), n (%)</b>	
18–24	3 (2.3%)
25–34	6 (4.6%)
35–44	14 (10.7%)
45–54	30 (22.9%)
55–64	36 (27.5%)
65–74	29 (22.1%)
75+	13 (9.9%)

(Continued)

**Table 1** (Continued).

	<b>Total (N=131)</b>
<b>Female Sex At Birth, n (%)</b>	77 (58.8%)
<b>Hispanic Ethnicity (yes), n (%)</b>	8 (6.1%)
<b>Racial Identity, n (%)</b>	
Asian	3 (2.3%)
Black or African American	30 (22.9%)
White	89 (67.9%)
Multiple Races	6 (4.6%)
Unknown	3 (2.3%)
<b>Employment Status, n (%)</b>	
Working now, full-time	56 (42.7%)
Working now, part-time	18 (13.7%)
Looking for work, unemployed	1 (0.8%)
Sick leave or maternity leave	1 (0.8%)
Disabled for reasons other than back pain	4 (3.1%)
Student	3 (2.3%)
Retired	40 (30.5%)
Keeping house	3 (2.3%)
Other	3 (2.3%)
Choose Not to Answer	2 (1.5%)
<b>Highest Educational Attainment, n (%)</b>	
High School Graduate, GED, or less	9 (6.9%)
Limited College Education, Trade / Technical School Training, or Associates Degree	55 (42.0%)
Bachelor's Degree or Some Graduate School but No Degree	36 (27.5%)
Graduate Degree	31 (23.7%)
<b>Marital Status, n (%)</b>	
Single Never Married	21 (16.0%)
Divorced	19 (14.5%)
Separated	4 (3.1%)
Widowed	4 (3.1%)
Married / Living with Partner	83 (63.4%)

When considering the intersection between impact-based and intensity-based categorization approaches, 28.2% (95% CI: 20.5% to 36.0%) of participants were in both the low-impact and the weak-intensity categories, while 11.5% (95% CI: 6.0% to 16.9%) were in both the medium-impact and moderate-intensity categories and 5.3% (95% CI: 1.5% to

9.2%) were in both the high-impact and strong-intensity categories. The remaining 55% of the participants had different combinations of acute LBP categories across the two approaches, typically with a higher-tier intensity-based category than their impact-based category.

### Impact-Based Definition

The proportion of individuals in each impact-based acute LBP severity category decreased in a stepwise fashion from low-impact to high-impact acute LBP, with 52.7% (95% CI: 44.1% to 61.2%), 38.9% (95% CI: 30.6% to 47.3%), and 8.4% (95% CI: 3.6% to 13.1%) of our sample falling into low-, medium-, and high-impact acute LBP categories, respectively. We present results for differences in continuous variables in Figure 2 comparing the medium- and high-impact acute LBP groups to the low-impact acute LBP group; PRs comparing the same groups to the low-impact acute LBP group are displayed in the next section along with PRs comparing strong- and moderate-intensity acute LBP groups to the weak-intensity acute LBP group in Figure 3. Compared to low-impact acute LBP, individuals with high-impact acute LBP were more likely to be racially minoritized and individuals with medium-impact acute LBP were more likely to be female and less likely to report Hispanic ethnicity. Both high- and medium-impact acute LBP groups were more likely to have associated leg pain, and pain tolerance was higher for those in the low-impact group compared to both high- and medium-impact acute LBP.

### Intensity-Based Definition

The proportion of our sample in the intensity-based acute LBP categories was more evenly distributed, with 33.6% (95% CI: 25.5% to 41.7%), 37.4% (95% CI: 29.1% to 45.7%), and 29.0% (95% CI: 21.2% to 36.8%) of our sample being in the strong-, moderate-, and weak-intensity acute LBP categories. For comparisons across intensity-based categories, we present the differences for continuous variables in Figure 4, comparing the moderate- and strong-intensity acute LBP groups to the weak-intensity acute LBP group; PRs comparing the same groups to the weak-intensity acute LBP group are in Figure 3 (displayed alongside the medium- and high-impact acute LBP groups compared to the low-impact acute LBP group). Compared to the weak-intensity acute LBP group, both the high- and the moderate-intensity acute LBP groups were more likely to be racially minoritized, report worse health, lesser ability to fulfill their usual social roles and activities, and medium risk of poor long-term outcomes on the SBT. Similar to the impact-based definition, pain tolerance

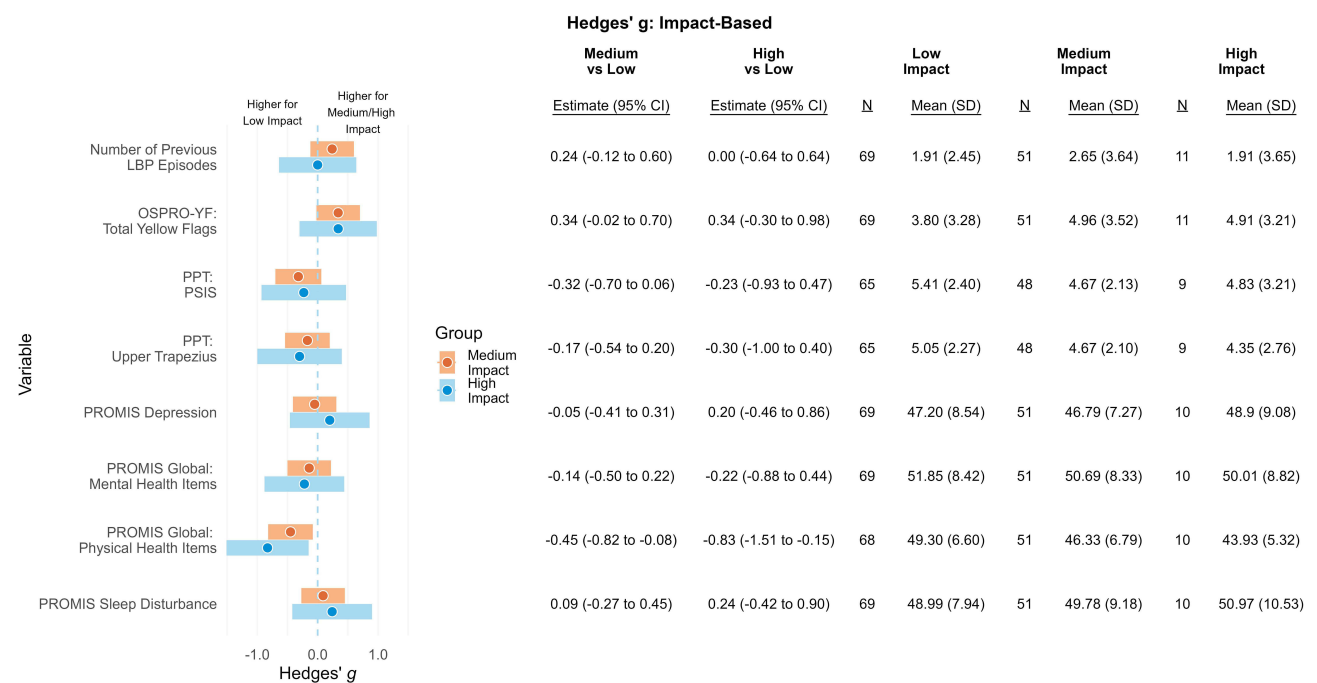
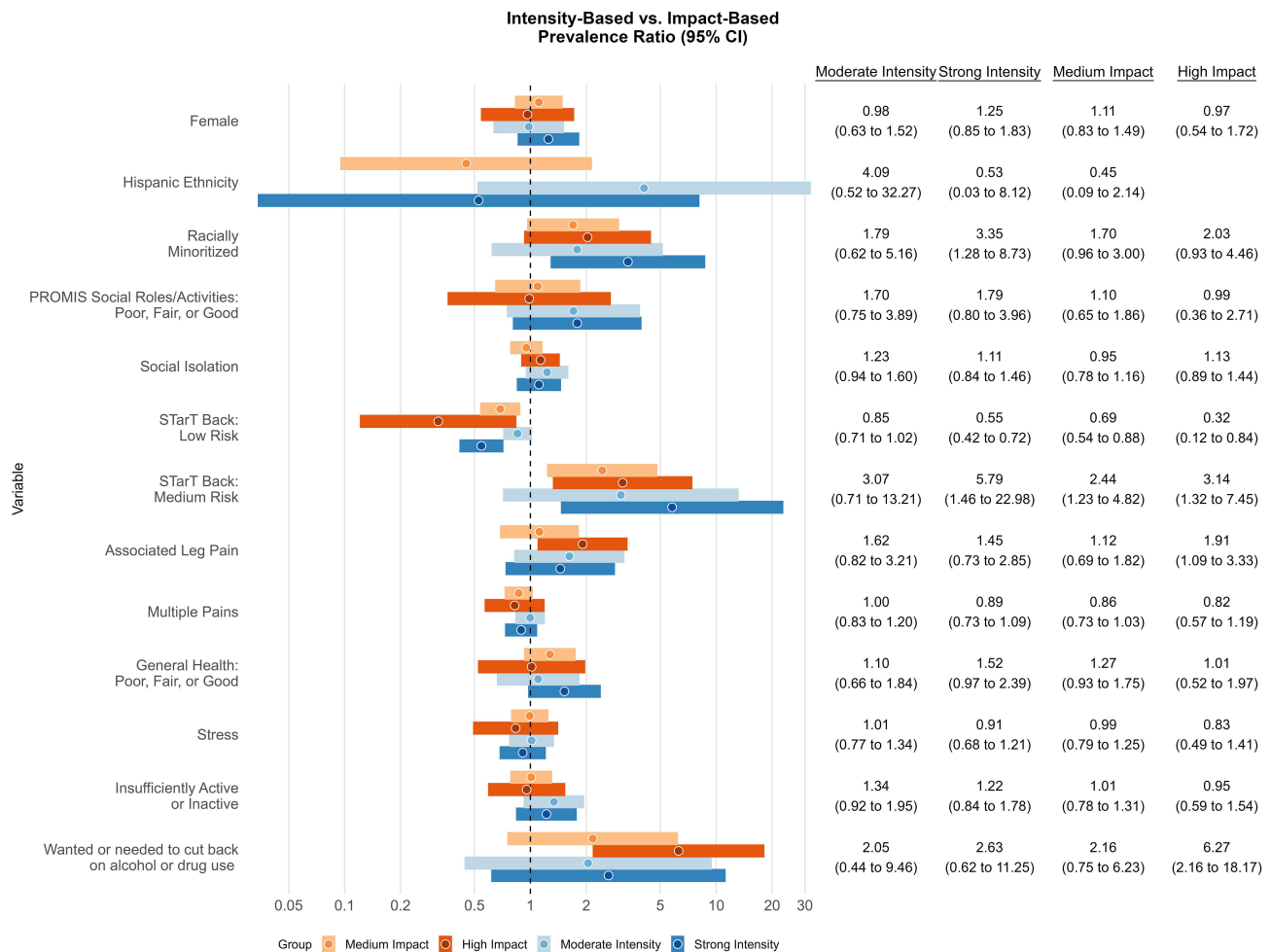


Figure 2 Hedges' g for continuous variables comparing medium- and high-impacts to low-impact acute LBP categories.



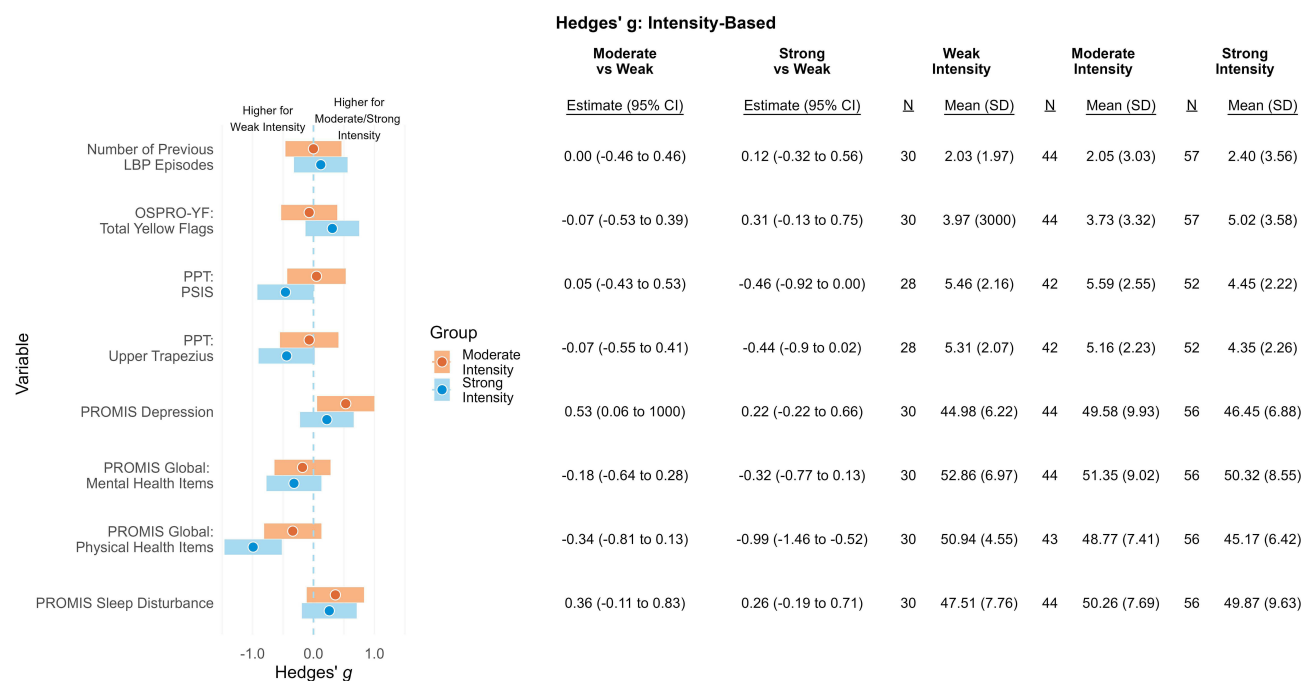
**Figure 3** Prevalence ratios for categorical variables, comparing impact-based and intensity-based (with VAS-30/100 cut off) acute LBP severity categories. \*Note each category is compared to its own definition’s referent category (ie, moderate- vs weak-intensity, strong- vs weak-intensity, medium- vs low-impact, and high- vs low-impact).

was found to be higher for those in the weak-intensity group than for those in the moderate- and strong-intensity groups. Hedges g and Prevalence Ratio results for the alternative intensity-based (VAS-20 and VAS-40) and interference-based definitions are presented in [Supplemental Figures 2–10](#).

## Discussion

In this study, we have shifted from theoretical frameworks into empirical testing of different characterization approaches of acute LBP severity. We characterized acute LBP severity with participants from a community setting according to an impact-based definition and an intensity-based definition, which provide a better understanding of domains that may contribute to or predict the development of chronic LBP. The currently widely used characteristic for defining acute LBP is duration, with most studies indicating a duration of <6 weeks.<sup>41–43</sup> Some have used LBP intensity as an exclusion criterion, with individuals reporting intensities of <4/10 considered ineligible.<sup>12</sup> These cut-offs are commonly used to exclude participants due to the potential inability to show important improvements in pain. This type of exclusion can lead to potential selection biases and an inability to characterize acute LBP accurately due to ceiling effects.<sup>12,44</sup> Identifying new ways to define acute LBP severity systematically may help identify specific sub-groups for tailored treatments or groups at high risk for the transition to chronic LBP. To our knowledge, such a characterization of acute LBP severity has never been published, and this study provides support for classifying acute LBP to capture differences among individuals with LBP. We recognize that our acute LBP impact-based definition was derived from a similar operational definition approach designed to measure the impact of activity-limiting chronic pain. While prior studies have





**Figure 4** Hedges' g for continuous variables comparing moderate- and strong-intensity to weak-intensity acute LBP categories.

proposed frameworks for characterizing acute pain,<sup>14</sup> we are unaware of other studies that have examined the distribution of characteristics within proposed definitions for acute pain categorization. As such, one of our goals was to assess differences in sociodemographic, general, and physical health and psychological characteristics in acute LBP. Categorizing acute LBP severity using one or both proposed approaches may provide opportunities to assess their value in risk stratification and predict the transition to chronic LBP. This stratification could help inform interventions that improve care access and/or utilization for those who may be at the highest risk of chronic LBP but may not have accessed care.

Interestingly, there was little overlap in the across-category differences of participant characteristics between impact-based and intensity-based acute LBP categorization approaches, suggesting that impact-based and intensity-based categorizations identified unique constructs associated with acute LBP. Differences were primarily observed regarding their relationships to social constructs (ie, sociodemographics, social roles, and social isolation). To our knowledge, reporting social constructs in acute LBP is relatively rare. Social factors are highly complex and can be challenging to measure, which may contribute to the limited understanding of how social factors contribute to an individual's experience with acute LBP. Two components of social health<sup>45</sup> (social isolation and the ability to perform social roles/activities) were more likely to be higher among participants in the stronger intensity-based categories. This suggests differences in how various social constructs relate to individuals' experiences with acute LBP and may elucidate differences between the two acute LBP severity categorization approaches. It may also indicate the disruptive nature of LBP, especially in the acute stage, on social roles especially, when examined through the intensity-based categories. Racialized and ethnicized inequities exist related to chronic LBP (eg, inequities in pain severity, frequency, and pain-related disability).<sup>46–49</sup> They are driven by intersecting systems and practices of racial and ethnic minoritization, discrimination, and socioeconomic/sociopolitical disadvantage that can negatively impact the health and well-being of racially and ethnically minoritized groups over lifetimes and across generations.<sup>50–52</sup> In both categorizations, being racially minoritized was associated with being in the higher severity categories for acute LBP (ie, medium- or high-impact and/or moderate- or strong-intensity). Conversely, self-report of Hispanic ethnicity was associated with lower severity categorization for LBP on the intensity-based definition and could therefore be a protective factor. The same can be seen in the impact-based definition; no one identifying as Hispanic ethnicity was categorized in the highest group (ie, high-impact), although the overall proportion of participants of Hispanic ethnicity was lower than the state estimate.<sup>53</sup> These findings underscore the importance of

considering the impact that social factors, especially racialized and ethnicized identities, have on acute and chronic LBP outcomes.

The differences found in our subgroup approaches present opportunities for standardization of acute LBP severity categorization based on specific populations and consistency for defining acute LBP severity for future pooling of results. For example, when investigating social factors such as social isolation, ethnicity, and possibly social networks or culture, it may be more appropriate to utilize the intensity-based definition since this categorization demonstrated differences between the various intensity-based category's effect sizes. This demonstrates the need for special consideration of the representation of specific social factors when studying acute LBP. Understanding how social constructs relate to acute LBP severity and our acute LBP severity categorization approaches (intensity-based and impact-based) help provide a more complete characterization of adults experiencing acute LBP and may help better predict the transition to chronic LBP in future research.<sup>1,5,54</sup>

Although differences were noted in participant characteristics between the two primary proposed categorizations, several important similarities were observed in the strength of effect sizes between categorization approaches. Current acute LBP intensity was consistently higher, and pain tolerance was lower among participants in worse categories when using the intensity- or impact-based approach, which indicates that these categorizations may adequately capture differences seen in pain factors. In particular, higher acute LBP intensity has previously been identified as a predictor of transitioning to chronic LBP.<sup>55</sup> SBT scores that indicate a medium risk also showed similarly strong relationships with worse categories across categorization approaches. Previous research among individuals seeking care for LBP has indicated that SBT provides clinically relevant stratification of individuals with a higher risk of persistent chronic symptoms.<sup>21,56</sup> A recent large observational study of care-seeking individuals found that SBT accurately identified those who transitioned to chronic LBP,<sup>5</sup> similar to our findings suggesting that psychological burden on community-based acute LBP participants may facilitate stratification for chronic LBP risk.

This study has several strengths, including comprehensive psychosocial measurements and a community-based cohort sample. However, there are limitations to this study. First, the primary purpose of this study was to collect preliminary data to assess the feasibility and acceptability of collecting a comprehensive set of measures from acute LBP participants within the community and follow these participants longitudinally. Our sample size was limited, impacting the precision of our Hedges' *g* and PR estimates, especially when comparing the high-impact acute LBP category to the low-impact category because of the relatively low number of participants in the high-impact category. Second, we relied on self-reported physical activity for these analyses, which may misclassify physical activity measurement relative to accelerometry. Third, although we excluded participants who did not have 30 consecutive days without LBP before the onset of their current LBP episode to restrict our cohort from those with potential recurrent acute LBP, some participants reported other LBP episodes within the past year (which resolved  $\geq 30$  days before the current LBP episode) in the full data collection. As such, some participants may meet the consensus definition for recurrent LBP.<sup>57</sup> This study is cross-sectional in design, which does not allow us to fully investigate which of these categorization approaches is most helpful for predicting the transition to chronic LBP. In addition, due to our small sample size and the potential selection of participants into community-based studies that may differ from care-seeking individuals, generalizability may be limited to and future larger studies are needed to better understand these pain characteristics. Despite these limitations, our study comprehensively characterizes acute LBP severity and participant characteristics within the community, an understudied but potentially important area of LBP.

## Conclusion

This study used two primary severity approaches to categorize and describe community-based adults experiencing acute LBP. Both impact-based and intensity-based categorization approaches had similar measures with consistent within-approach differences, including low- and medium-risk categories on the SBT. However, there were higher between-category differences in social isolation, social roles, and stress in the intensity-based definition compared to the impact-based definition. These data allow investigators to tailor their acute LBP severity subgroups to the needs of a given research question and provide the opportunity for standard definitions to be applied in future studies that are not solely reliant on temporal definitions of acute LBP.

## Data Sharing Statement

The data that support the findings of this study are available from the corresponding author [AG], upon reasonable request.

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## Disclosure

The author reports no conflicts of interest in this work. This paper has been uploaded to *medRxiv* server as a preprint: <https://doi.org/10.1101/2023.10.02.23296149>

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