

Opioid Medication Use Among Chronic Non-Cancer Pain Patients Assessed with a Modified Drug Effects Questionnaire and the Association with Opioid Use Disorder

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Purpose: Identifying opioid use disorder (OUD) in patients prescribed opioid therapy for chronic pain is challenging but critically important. Patients may have multiple reasons for taking medications, which they may not reveal if not properly interviewed. In this study, modified Drug Effects Questionnaires (DEQ) were used to assess the liking of and desire to take prescription opioids both for reasons of pain relief and for reasons excluding pain relief. We hypothesized patients would more strongly endorse their medications for reasons of pain relief compared to reasons excluding pain relief, and patients who endorse medications for reasons excluding pain relief may be at higher risk of developing OUD.

Patients and Methods: A cross-sectional telephone survey was administered to 200 adult outpatients currently being prescribed opioids. A two-year retrospective analysis of electronic health records supplemented survey findings.

Results: Based on DSM-5 criteria, 9.0% (n = 18) of patients had moderate or severe OUD. The mean (SD) for drug-liking was 54 (33.4) on a 0 to 100 scale. When liking for pain relief was specified, the mean (SD) was significantly higher compared to when excluding pain relief was specified, 70 (27.8) vs 24 (31.2), $p < 0.001$. A similar pattern was observed for patients' ratings of desire to take their medication again, and "feel good effects" of their medications. Higher scores on items that excluded pain relief were associated with other indications of drug misuse.

Conclusion: The observed rate of OUD in this patient sample was consistent with findings from other recent research. A better understanding of patients' reasons for using opioid medication may help researchers and health care providers identify those at greatest risk for developing OUD.

Keywords: opioids, chronic pain, nonmedical opioid use, tolerance and withdrawal criteria, DSM-5

Introduction

Chronic pain is a public health issue affecting an estimated 20.4% of US adults in 2016.¹ Opioids are among one treatment option for chronic pain, and while some patients benefit from pharmacological treatment with opioids, these treatments are associated with serious adverse events such as abuse, opioid use disorder (OUD) and fatal overdoses.² Appropriately managing chronic pain while also effectively identifying patients who develop OUD, and taking appropriate actions with those

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individuals, is of critical importance. However, identifying OUD in patients prescribed long-term opioid therapy for chronic pain is challenging.³ Various studies examining the problematic use of opioids among patients prescribed opioids have reported rates ranging from less than 1% to 81%.⁴ This variance may be due, in part, to inconsistent definitions of opioid-related adverse events. For example, terms such as misuse, abuse, addiction, aberrant use, dependence, and nonmedical use sometimes have overlapping or vague definitions and are used interchangeably or imprecisely, especially prior to the Fifth Edition of The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) published in 2013.⁵

The DSM-5 defines OUD as a problematic pattern of opioid use leading to clinically significant impairment or distress manifested by up to eleven criteria. Opioid use disorder exists as a continuum ranging from a mild form to a severe state of chronically relapsing, compulsive drug taking. The severity of OUD (mild, moderate, or severe) is determined by the number of symptom criteria the patient meets.⁵ Counseling service on an outpatient basis may be sufficient for some patients with mild OUD, while more intensive treatment may be necessary for people with a more severe disorder.⁶

The DSM-5 acknowledges that the standard used to assess OUD among people with nonmedical opioid use should not be applied to patients with no nonmedical use. Two of the eleven criteria, those pertaining to withdrawal and tolerance, are not applied when assessing OUD among patients who use opioids only under medical supervision.⁵ Some researchers have argued that this adjustment is not adequate to address the realities of health care professionals diagnosing OUD among pain patients because behaviors and attitudes associated with OUD may also be associated with reasons other than abuse, such as the need for pain relief. For example, Gorfinkel and colleagues (2018) point out that DSM-5 criteria such as “opioids are often taken in a larger amount or over a longer period of time than intended” and “craving or a strong desire to use opioids” may be associated with escalating or unabating pain.⁷ Other criteria may be similarly ambiguous when applied to pain patients, especially if additional probing as to the reasons for their answer does not occur.

The DSM-5 criteria are not unique in this regard. In the previous research, items on the Severity of Dependence Scale (SDS) such as “How difficult did you find it to stop or go without opioids?” and “Did you wish you could stop?” were confusing to some patients taking opioids

for pain relief.⁸ Additionally, items from the Drug Effects Questionnaire (DEQ)⁹ utilized in previous research demonstrated respondents’ comprehension improved when the items were modified to separately assess a patient’s desire to take opioids for pain relief from their desire to take opioids for reasons other than pain relief.⁸

The DEQ is a patient-reported outcome (PRO) assessment validated with recreational opioid users that has been utilized extensively in evaluating the human abuse potential of opioids with potentially abuse-deterrent properties.¹⁰ The DEQ measures concepts such as the subject’s “drug-liking,” “desire to take drug again,” and “feeling good drug effects.” The modified items link these concepts to the desire for pain relief (eg, “I would take this drug again for pain relief,” “my liking for this drug for pain relief is . . .”) or to reasons excluding pain relief (eg, “Excluding pain relief, my liking for this drug is . . .” “Excluding pain relief, I would take this drug again”), with an understanding that patients’ desire for medication may be driven by either of these motivations or a combination of both.⁸

This current research uses these modified DEQ items to explore the possibility that separately assessing the extent to which patients take opioids for pain relief versus for reasons other than pain relief (eg, euphoric effects or as a sleeping aid) may assist health care providers to identify patients at risk for developing OUD while prescribed opioids.

Survey instruments, including the original and modified DEQ items, were administered to a randomly selected sample of patients currently being prescribed opioid medication. The DSM-5 criteria were used to estimate the rate of OUD among this group of patients and sensitivity analyses estimated the impact of the DMS-5 criteria for tolerance and withdrawal on this rate. Based on previous research,⁸ the goals of the study were to test the following hypotheses regarding the DEQ items. First, patients would respond differently to items when they specify pain relief or excluded pain relief. Second, patients would more strongly endorse items that specified pain relief compared to those that excluded pain relief. Third, patients who more strongly endorsed items that excluded pain relief would have other indications of drug misuse such as the use of illicit drugs and recreational use of prescription medications.

Patients and Methods Design

A cross-sectional survey was administered via telephone to 200 adult outpatients prescribed opioids at the Geisinger

Clinic facilities in Pennsylvania. A two-year retrospective analysis of electronic health records (EHR) was completed to supplement survey findings and further characterize demographic and clinical characteristic of the survey participants.

Participants

Individuals were eligible for participation in the study if they met the following inclusion criteria: (i) a patient in the Geisinger Clinic system, (ii) between 18 and 75 years of age, and (iii) prescribed 4 or more orders of Schedule II opioid agonists in oral tablet or capsule formulation within the past 12 months, which could include any combination of immediate-release (IR) or extended-release (ER) formulations. Persons recruited for or enrolled into this study were excluded if they met any of the following exclusion criteria: (i) patients who took none of their prescribed medications, (ii) an ICD-10 malignant cancer diagnosis within the past 12 months, (iii) currently residing in a nursing home, prison, or other institutional residences, (iv) unwilling to participate in a confidential interview, (v) inability to communicate in spoken English, or (vi) cognitive deficiencies that prohibit the participant from understanding the informed consent information and/or completing the interview, as determined by the survey interviewer. Patients were eligible for enrollment regardless of having a current or previous diagnosis for a substance use disorder (SUD).

Procedures

A sample of potential participants was created by selecting individuals at random from the Geisinger Clinic EHR who met inclusion and exclusion criteria. Identification numbers were assigned to each potential subject, and, to control survey administration, random batches of approximately 100 individuals were created. The first randomly chosen batch of patients were mailed a letter from the Geisinger Survey Center that informed patients of the study and the possibility that they will be contacted regarding study participation. Survey Center staff called patients approximately one week later, unless the patient had previously indicated a desire to be excluded from research studies. This process was repeated until enrollment was completed.

During the telephone call, eligible patients were enrolled to participate in the 30-minute survey after informed consent was reviewed and participants indicated their understanding of the study procedures, risks, and

potential benefits, and permitted access to a 2-year retrospective review of their EHR. Inclusion and exclusion criteria were confirmed via screening at the start of the survey interview. Each participant received a remuneration of US \$20 following their participation in the survey interview. Participants were informed that they would receive remuneration regardless of the completion of the interview. Each patient was called up to 10 times, including times during the day, evening, and on weekends, in order to complete an interview. This research was performed in accordance with the principles stated in the Declaration of Helsinki. Prior to starting the study, ethical approval was granted by the Geisinger Institutional Review Board (GIRB) on December 13, 2018; Geisinger Medical Center, 100 N. Academy Avenue Danville, PA 17822. GIRB reference number: 2018–0630.

A pilot test was executed among 14 patients, which resulted in minor adjustments to improve survey comprehension and administration. These pilot surveys were not included in the final survey results. The final survey was in the field from March 11 to May 15, 2019.

Measures and Outcomes

Items from the DEQ that assessed drug-liking, the desire to take a drug again, and feeling good effects of a drug were administered. The “drug” in reference was defined as the patients’ opioid medications taken during the previous 12 months. Scale responses ranged from 0 (“strong disliking” or “definitely not take again”) to 100 (“strong liking” or “definitely take again”). Also administered were the modified DEQ items developed to attribute responses to either reasons of “pain relief” or for reasons “excluding pain relief.” Because items on the original DEQ items were presented as visual analog scales, which would be difficult to administer via a phone survey, the response format was altered for telephone survey administration.

ODU was assessed by administering a series of items based on the 11 DSM-5 criteria for OUD.^{5,11,12} Following DSM-5 guidelines, patients were classified as having severe OUD if they had six or more positive responses to the DSM-5 items, moderate OUD if they had four or five positive responses, mild OUD if they had two or three positive responses, and no OUD with zero or one positive responses.

Also included in the survey were self-reported measures of pain (average pain over the previous 30 days), nonmedical use of prescription opioids, depression, mental health and substance use histories, illicit drug use,

marijuana use, and demographic questions related to education and work status.^{11,13} Participants also indicated if they have recently taken (within 12 months) any medications for mental health disorders or received any mental health counseling.^{11,13} A 2-year retrospective search of the patients' EHR was used to identify any SUD diagnoses, depression, anxiety, or sleep disorders.

Statistical Methods

Descriptive statistics (means and standard deviations or percentages, as appropriate) were used to describe sample demographics and patient characteristics. Responses to the three modified DEQ items that specified "excluding pain relief" were summed to create an index. Paired *t*-tests were used to compare mean score differences of the DEQ index across patient characteristics.

Results

Sample Characteristics

A total of 760 patients were initially identified for survey participation, of which 414 were contacted by phone and were eligible for the survey. Among those contacted, 200 completed the survey, for a study response/cooperation rate of approximately 48%.¹⁴ The majority of participants were women (127, 63.5%), identified as Caucasian (191, 96%), and currently married (102, 51%). Average age (SD) was 53 (13.3) years. A total of 53 participants (26.5%) were currently employed, and 49 (24.5%) had college degrees (Table 1).

Participants reported an average pain score over the previous 30 days of 4.4 out of 10 (SD = 2.6). Most patients (71.5%) were prescribed only IR opioids within the past 12 months, and the remaining patients were prescribed both IR and ER opioids (28.5%) (Table 1).

Lifetime nonmedical opioid use was defined by a patient responding that they had ever used an opioid nonmedically or used an opioid to get high. A total of 18 patients (9.0%) indicated lifetime nonmedical use; 14 (7.0%) of whom reported using opioids not as directed, and 13 (6.5%) specifically reported using opioids to get high (9 patients reported both). Eight patients (4%) reported ever using heroin/opium, 43 (21.5%) reported ever using cocaine, and 118 (59%) marijuana (Table 1).

Based on a 2-year retrospective analysis of ICD-10 codes within the EHR, 25 patients (12.5%) had a substance disorder diagnosis excluding nicotine dependence, 59 (29.5%) had a depression diagnosis, 73 (36.5%)

Table 1 Demographic and Medical Profile of Study Sample (N=200)

| | |
|--|-------------|
| Demographics | |
| Age in years [mean (SD)] | 53.4 (13.3) |
| Female [% (n)] | 63.5 (127) |
| Caucasian [% (n)] | 95.5 (191) |
| Currently Married [% (n)] | 51.0 (102) |
| Currently Employed [% (n)] | 26.5 (53) |
| College Graduate [% (n)] | 24.5 (49) |
| Pain, self-report | |
| 30-day average pain score [mean (SD)] | 4.4 (2.6) |
| Opioid Prescriptions, EHR search | |
| IR opioids only [% (n)] | 71.5 (143) |
| ER opioids only [% (n)] | 0.0 (0) |
| IR and ER opioid [% (n)] | 28.5 (57) |
| Opioid nonmedical use, self-report | |
| Ever used nonmedically [% (n)] | 7.0 (14) |
| Ever used specifically to get high [% (n)] | 6.5 (13) |
| Both [% (n)] | 4.5 (9) |
| Lifetime Nonmedical Opioid Use [% (n)] | 9.0 (18) |
| Other drug use, self-report | |
| Heroin/Opium, ever [% (n)] | 4.0 (8) |
| Cocaine, ever [% (n)] | 21.5 (43) |
| Marijuana, ever [% (n)] | 59.0 (118) |
| Marijuana, past year [% (n)] | 18.0 (36) |
| Any psychotropic, past year [% (n)] | 54.0 (108) |
| Select EHR diagnoses | |
| Substance related disorder, excluding nicotine: ICD-10 codes F10, F11, F12, F13, F14, F15, F16, F18, F19 [% (n)] | 12.5 (25) |
| Depression: ICD-10 codes F32, F33, F39 [% (n)] | 29.5 (59) |
| Anxiety: ICD-10 codes F40, F41, F42, F43, F90 [% (n)] | 36.5 (73) |
| Sleep disorder: ICD-10 codes: G47, G25.81 [% (n)] | 25.5 (51) |

Abbreviations: IR, immediate-release; ER, extended-release; EHR, electronic health records.

had anxiety diagnosis, and 51 (25.5%) had a sleep disorder diagnosis. Table 1 includes the ICD-10 codes used to identify a subject's history of these mental health disorders.

OD

OD classifications are presented (Table 2) separately for the 18 patients who reported lifetime nonmedical use versus the 182 patients who reported no lifetime nonmedical use. Aligned with the DSM-5, OD in the lifetime nonmedical use group was assessed using all 11 DSM-5 criteria, whereas OD in the no nonmedical use group was

Table 2 Opioid Use Disorder (OUD) Severity by Lifetime Nonmedical Opioid Use

| OUD Severity | Patient Lifetime Nonmedical Opioid Use | | Total (n) |
|----------------|--|-------------|--------------|
| | No (n)* | Yes (n)† | |
| None (0–1) | 77.5% (141) | 33.3% (6) | 73.5% (147) |
| Mild (2–3) | 16.5% (30) | 27.8% (5) | 17.5% (35) |
| Moderate (4–5) | 3.3% (6) | 22.2% (4) | 5.0% (10) |
| Severe (6+) | 2.7% (5) | 16.7% (3) | 4.0% (8) |
| Total | 100.0% (182) | 100.0% (18) | 100.0% (200) |

Notes: Spearman ordinal correlation for OUD Severity (none, mild, moderate, severe) by lifetime nonmedical opioid use (yes/no) = 0.313; p-value < 0.001. *DSM-5 OUD criteria for withdrawal and tolerance not applied. †All 11 DSM-5 OUD criteria applied

assessed on 9 criteria; tolerance and withdrawal were excluded.

Among this sample of 200 patients, 26.5% (N=53) met the criteria for OUD. When excluding mild OUD, 9.0% (n = 18) of this sample met criteria for moderate or severe OUD with 5.0% (n=10) meeting criteria for moderate OUD and 4.0% (n=8) meeting criteria for severe OUD. The prevalence of OUD varies by patient group. Approximately 6% of the 182 patients in the no nonmedical use group met criteria for moderate or severe OUD, and 39% met criteria among the 18 patients in the lifetime nonmedical use group, a Spearman correlation of 0.313 ($p < 0.001$) supports the conclusion that the presence and severity of OUD (scored none to severe) is significantly associated with lifetime nonmedical use (scored yes/no), with nonmedical use of opioids more strongly associated with greater OUD severity.

A sensitivity analysis was conducted to assess the impact of the tolerance and withdrawal criteria on OUD rates among patients with no nonmedical opioid use. In this analysis, all 11 DSM-5 criteria were (inadvisably) applied to all 200 patients, most of whom had no nonmedical use. The estimated rate of current OUD increased to 34% and moderate or severe OUD increasing to 14.0%, see [Table 3](#).

Drug Effects Questionnaire

Consistent with hypotheses, specifying “for pain relief” or “excluding pain relief” significantly impacted item scores, and patients more strongly endorsed items with the “for pain relief” specification. The mean (SD) score for the original unspecified DEQ drug-liking item was 54 (33.4). The mean (SD) score for the drug-liking item that specified pain relief was significantly higher than the mean (SD) score for the drug-liking item that specified excluding pain relief, 70

Table 3 Opioid Use Disorder (OUD) Severity Based on 11 DSM-5 Criteria by Lifetime Nonmedical Opioid Use

| OUD Severity | Patient Lifetime Nonmedical Opioid Use | | Total (n) |
|----------------|--|-------------|--------------|
| | No (n) | Yes (n) | |
| None (0–1) | 69.2% (126) | 33.3% (6) | 66.0% (132) |
| Mild (2–3) | 19.2% (35) | 27.8% (5) | 20.0% (40) |
| Moderate (4–5) | 6.0% (11) | 22.2% (4) | 7.5% (15) |
| Severe (6+) | 5.5% (10) | 16.7% (3) | 6.5% (13) |
| Total | 100.0% (182) | 100.0% (18) | 100.0% (200) |

Notes: Grey background shading indicates that the DSM-5 does NOT RECOMMEND applying all 11 criteria to calculate OUD among patients with no nonmedical opioid use.

(27.8) vs 24 (31.2), $t=17.4$, $df=199$, $p<0.001$, see [Figure 1](#). The mean (SD) score for the original unspecified DEQ “desire to take the drug again” item was 70 (35.9). When specified for pain relief, the mean (SD) score was significantly higher than the mean (SD) score when specified excluding pain relief, 83 (27.0) vs 12 (25.1), $t=27.5$, $df=199$, $p<0.001$. Finally, the mean (SD) score for “feel good drug effects for pain relief” was significantly higher than for “feel good drug effect excluding pain relief,” 66 (30.6) vs 32 (32.9), $t=12.8$, $df=199$, $p<0.001$ ([Figure 1](#)).

To test the hypothesis that patients who more strongly endorse their opioid medication for reasons other than pain relief may be at higher risk for OUD, scores from the three items that exclude pain relief were summed to create an “Excluding Pain Relief Index” (mean = 68, SD = 72.9, range 0 to 300 with a negative skew), see [Figure 2](#). The 18 patients who reported lifetime nonmedical use had a significantly higher mean Excluding Pain Relief Index (111.9, SD = 103.9) compared to the 182 who reported no nonmedical use (63.5, SD = 67.9, $p = 0.007$) ([Table 4](#)). [Table 4](#) also presents mean Index scores for a variety of key patient subgroups. Index scores were significantly higher among patients who have ever used heroin/opium or cocaine, were unmarried, or who recently received mental health counseling or psychiatric medications. Scores were higher but only marginally significant among unemployed patients, college non-graduates, and those with a substance-related disorder or anxiety disorder diagnosis ([Table 4](#)).

Discussion

Most participants in this cross-section survey were women, Caucasian, and were currently unemployed. Participants reported an average pain score over the previous 30 days

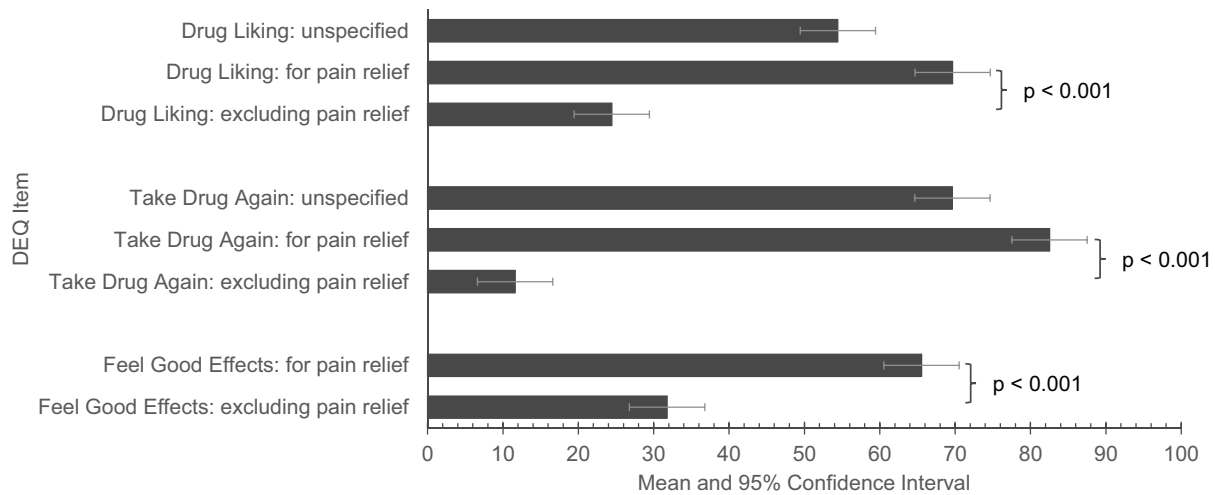


Figure 1 Paired t-tests on select DEQ Items.

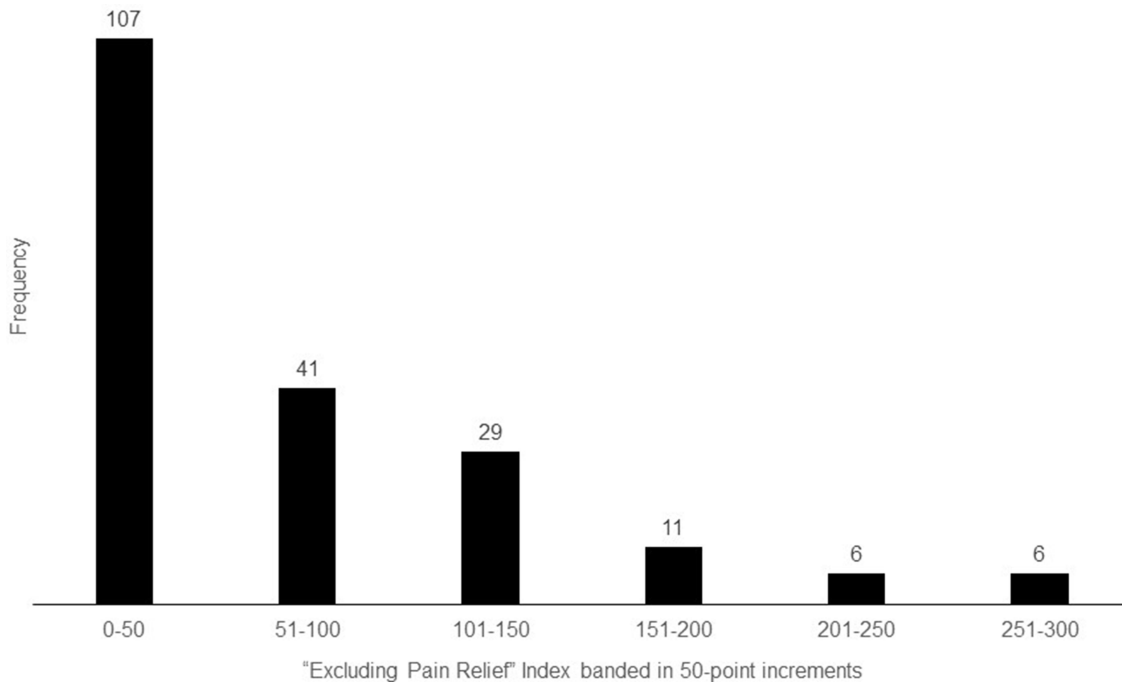


Figure 2 Frequency Distribution of "Excluding Pain Relief" Index (mean = 67.8, SD =72.9, range 0–300).

of 4.4 out of 10. This population displayed similar or higher rates of comorbid psychiatric disorders such as substance-related disorders excluding nicotine dependence, depression, anxiety disorders, and sleep disorders compared to a previous study within the chronic pain population.^{15,16}

Results found 26.5% of patients met the criteria for OUD with 9.0% of patients meeting the criteria for moderate or severe OUD. This rate aligns with the estimates of a 2015 systematic review and data synthesis that stated in patients with chronic pain, addiction averaged between 8%

and 12%.⁴ Additionally, a recent cross-sectional questionnaire study evaluating OUD among patients in Germany with chronic non-cancer pain produced similar results.¹⁷

The sensitivity analysis demonstrated that the DSM-5 criteria related to tolerance and withdrawal will have an impact on the observed rate of OUD among patients with no nonmedical opioid use. The rate of moderate or severe OUD among patients with no nonmedical opioid use increases from 6% when tolerance and withdrawal criteria are not applied (Table 2) to 11.5% when tolerance and

Table 4 Mean “Excluding Pain Relief” Index Score by Key Study Variables

| Study Variables | N | Mean Score | SD | p-value |
|---|-----------|---------------|---------------|---------|
| Lifetime nonmedical use No nonmedical use | 18 182 | 111.9 63.5 | 103.9 67.9 | 0.007 |
| Male Female | 73 127 | 71.2 65.9 | 81.0 68.0 | 0.626 |
| Currently Married Not Currently Married | 102 98 | 55.3 80.8 | 64.9 78.6 | 0.013 |
| Currently Employed Not Currently Employed | 53 147 | 53.6 73.0 | 68.0 74.1 | 0.097 |
| College Graduate Not College Graduate | 49 151 | 53.7 72.4 | 70.8 73.1 | 0.119 |
| Ever Heroin/Opium use Never Heroin/Opium use | 8 192 | 123.1 65.5 | 115.2 70.1 | 0.028 |
| Ever Cocaine use Never Cocaine use | 43 157 | 88.1 62.3 | 85.6 68.2 | 0.039 |
| Ever Marijuana use Never Marijuana use | 118 82 | 66.8 69.3 | 74.6 70.6 | 0.818 |
| Psychotropic Rx use in past 12 months No psychotropic Rx use in past 12 months | 108 92 | 79.0 54.8 | 79.7 61.9 | 0.019 |
| Substance-Related Disorder in EHR No Substance-Related Disorder in EHR | 25 175 | 92.9 64.3 | 90.9 69.5 | 0.066 |
| Depression Dx in EHR No Depression Dx in EHR | 59 141 | 89.9 58.6 | 80.9 67.4 | 0.005 |
| Anxiety Dx in EHR No Anxiety Dx in EHR | 73 127 | 78.0 62.0 | 76.9 70.1 | 0.135 |
| Sleep Disorder Dx in EHR No Sleep Disorder Dx in EHR | 51 149 | 73.7 65.8 | 77.0 71.5 | 0.507 |
| Mental counseling visit in past 12 months No mental counseling visit in past 12 months | 46 154 | 93.5 60.2 | 77.4 69.9 | 0.006 |

Abbreviations: EHR, electronic health records; Rx, prescription; Dx, diagnosis.

withdrawal criteria are inadvisably applied (Table 3), an increase of 92%. This variation in rates underscores the importance of consistently defining criteria for the assessment of opioid use disorder, especially in the context of patients prescribed opioids for chronic pain. Diagnostic tools such as the Psychiatric Research Interview for

Substance & Mental Disorders (PRISM)¹⁸ have helped to standardize how researchers characterize opioid use disorder based on DSM-IV criteria, and could be a useful tool when updated to reflect DSM-5 criteria.¹⁹

This study used a modified version of the DEQ to examine patients' reasons for using opioids. When assessing concepts of “drug liking,” “desire to take drug again,” and “feel good effects of a drug,” participant responses differed based on whether the question specified a motivation or was non-specific. Participants were significantly more likely to agree with items that specified pain relief compared to items that excluded pain relief or made no specifications. Additionally, participants who scored relatively high on the three items that excluded pain relief were more likely to indicate the previous misuse of prescription opioids, and to have risk factors more commonly associated with drug misuse.³

While this study did not seek to validate a modified version of the DEQ for use in the population of patients using opioids for chronic pain, it does highlight the difficulty of evaluating the presence of opioid use disorder in patients who use opioids for chronic pain. Patients' understanding of the questions being asked during the diagnostic process and the motivation behind their answers are of much importance when researchers or healthcare providers are interpreting patient responses. With these findings in mind, further research is needed to develop and validate scales that may assist in evaluating patients for opioid use disorder who are prescribed opioids for chronic pain.

Study findings are limited by the self-reported survey data. The EHR data used in this study were collected for treatment and not research purposes. Generalizability of the findings may be limited given the sample was drawn from a patient population (in central Pennsylvania). The Visual Analog Scales used for pain assessment in the current study were developed for personal administration in clinical settings,⁸ not telephone survey administration. This limited our study results and hampered our statistical analyses, as did our sample size of N=200. Future studies should also assess these pain questions using scales better suited for telephone administration and a larger sample size.

Additionally, the DSM-5 specifies that the criteria occur within a 12-month period. Within this survey, the nonmedical use of opioids was not temporally determined. Therefore, when the rate of OUD was calculated, patients who self-reported lifetime nonmedical use were classified as having used opioids outside of medical supervision and the full DSM-5 criteria were applied.

In the previous work with the Geisinger patient population, Boscarino reported in 2010 that 26% (95% CI=22-30) of pain patients taking prescription opioids in the past year were classified as opioid dependent, based on then-current DSM-IV criteria.¹³ Within the now-current DSM-5, it has been suggested that moderate or severe OUD is more aligned with the DSM-IV dependence diagnosis.²⁰ Under this assumption, the previous estimates (26% opioid dependent) are higher than what is reported in this work (9% moderate or severe OUD), but direct comparison of the two rates may be challenging. Aside from changes in DSM-5 diagnostic criteria,²¹ there have been a number of initiatives launched in the past 10 years aimed at reducing abuse, misuse, and OUD among pain patients at both the state and national levels and within Geisinger. For example, starting in 2016, Pennsylvania mandated all prescribers to query the state's Prescription Drug Monitoring Program each time a controlled substance was prescribed.^{22,23} Additionally, changes have occurred in Geisinger's opioid policy with better treatments and with stricter patient management of pain patients receiving opioid medications.²⁴

Conclusion

In summary, the observed rate of OUD in this patient sample was consistent with findings from other recent research. OUD rates are, however, sensitive to the DSM-5 tolerance and withdrawal criteria, as well as other DSM-5 changes. The choice to include these criteria can be unclear when examining patient populations and may require extensive probing of the patient's use of opioids outside of medical supervision. A better understanding of patient motivation for using opioid medication may help researchers and health care providers identify those at greatest risk for developing OUD. Additional research would be needed to fully validate the modified DEQ items in the population of patient being prescribed opioid medications.

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