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# Pain, psychological symptoms and prescription drug misuse in HIV: A literature review

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## Abstract

**Background—**Pain is a common problem among persons living with HIV. In this population, pain often co-occurs with psychological symptoms, as well as illicit drug abuse. Recently, the misuse of prescription drugs, including the misuse of opioid medications for pain relief, has emerged as a significant public health problem. The purpose of this article is to review the literature on the associations among pain, illicit drug use, and symptoms of depression and anxiety in the misuse of prescription medications in HIV disease.

**Results and Conclusions—**Although relatively little attention has centered on the management of pain, psychological symptoms and other distressing, yet treatable symptoms in HIV, the fact that drug abuse behaviors now constitute a primary risk factor for HIV infection requires a shift in focus for clinicians and researchers alike. There is currently little agreement regarding the medical provision of opioids to persons with a history of illicit drug use. Thus, additional research is required to ensure adequate treatment of pain and psychological symptoms in persons living with HIV while minimizing the risk of prescription drug misuse.

### Keywords

prescription drug abuse; opioids; pain medications; pain management; anxiety; depression

## Introduction

Pain and commonly co-occurring psychological symptoms of anxiety and depression are sources of considerable distress and disability among HIV+ persons (1). Of special concern among HIV+ persons is the high prevalence of painful peripheral neuropathy, which is associated with the long-term use of neurotoxic antiretroviral therapy. Neuropathic pain is especially difficult to treat, and patients may misuse prescription drugs such as opioids and psychoactive medications to seek relief. Despite guidelines recommending the use of opioids for pain management and psychoactive medications for psychological symptoms, the risk factors for the misuse of these medications among HIV+ persons are poorly understood. Existing research aimed at identifying predictors of prescription drug misuse has been limited. Given these mitigating concerns this gap has hampered efforts to balance the need to treat distressing and disabling symptoms of pain, anxiety, and depression. According to the White House Office of National Drug Control Policy (ONDCP), the

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misuse of prescription drugs ranks second only to marijuana use as the most prevalent drug problem in the United States (US). Understanding why HIV+ persons with pain misuse drugs is the first step toward preventing unnecessary suffering while reducing risk of drug abuse and associated disability. Although the presence of illicit drug use has been identified as a risk factor for opioid misuse in HIV, the extent to which the association between illicit drug use and misuse of opioids may be explained by other factors such as unrelieved symptoms of pain, anxiety, or depression remains unclear.

The purpose of this article is to review the literature on the complex relationships among pain, illicit drug use, and symptoms of depression and anxiety in the misuse of prescription medications in HIV disease. This area of research, though largely neglected, has become increasingly important as HIV disease has transitioned from an almost-certainly fatal disease in the early years of the epidemic to current long-term survival. Given the initial focus on disease treatment, relatively little attention has been centered on the management of pain, psychological symptoms and other distressing, yet treatable symptoms in HIV. In fact, drug abuse behaviors now constitute a primary risk factor for HIV infection and antiretroviral treatment non-adherence in the US, suggesting that interventions for HIV should ideally take place within the context of a broader treatment approach that addresses key physical and mental co-morbidities among persons living with HIV.

## Pain and Disability in HIV

Pain has been characterized as the most significant disability in HIV+ persons [see for example, (2)]. In a representative sample of persons living with HIV in the US, it was found that 67% of HIV+ persons reported experiencing pain in the previous month (3). These data were derived from the HIV Cost and Services Utilization Study (HCSUS), a nationally representative sample of persons receiving medical care for HIV. Estimates of the prevalence of pain among persons living with HIV vary from 25% to 80% depending on the characteristics of the sample, how the respondents were recruited, and the study methodology (4–6). Pain in HIV disease is associated with reduced quality of life (QOL) (1, 7–9). Pain impacts QOL indirectly through the physical and psychological symptoms that are associated with pain. Studies of persons living with HIV found that 60% of patients with moderate to severe pain reported impairment in functional ability (1, 7). One survey found that pain typically impaired activities of daily living (a measure of physical functioning) and quality of life, including ability to walk, work, sleep, interact with others, and overall enjoyment (7). Another study that evaluated both pain and fatigue found that pain had a significant impact on both physical functioning and quality of life, while fatigue impacted only physical functioning (5).

According to the most widely accepted model of chronic pain, the biopsychosocial model, pain is conceptualized as a complex, multidimensional construct, incorporating biological and psychosocial aspects. The experience of pain, irrespective of its etiology, is thought to comprise certain common dimensions. Thus, although pain in HIV disease may arise from various sources including the direct effects of HIV on the central or peripheral nervous system, disorders associated with HIV, or treatment for HIV (e.g., antiretroviral medications), pain is conceptualized as an entity with its own significant sequelae (1, 7, 10).

Data on the demographic correlates of pain in HIV have been mixed. Three studies (11–13) found no differences in the experience of pain between HIV-infected men and women. One study (14) reported that being female was not associated with pain symptoms or pain distress although women reported more frequent anticipation of pain compared to men. On the other hand, positive associations between being female and the presence of pain in HIV have been reported (15). One investigation found that women reported higher levels of pain

intensity compared to men (7). In an analysis using HCSUS data, women exposed to HIV via intravenous drug use reported more pain then men who had sex with men (MSM). Similarly, a different study found that female intravenous drug users (IDUs) reported more pain sites compared to male IDUs, but no such differences among non-IDUs (16). A subsequent report with the HCSUS sample found that women reported more pain than men regardless of mode of HIV transmission or prior drug use history (17).

Few investigations have examined racial/ethnic differences in pain among persons living with HIV. No differences in the experience of pain between African-Americans and Latinos were reported in one study (7). A more recent study of HIV-infected women also found no racial/ethnic differences in pain frequency or pain severity in a sample that included Caucasian, African-American and Latino women (18). In contrast, a nationally representative study of HIV-infected persons found that African Americans reported less pain than Caucasians (3). Differences in the sample characteristics, the measures of pain, and the stage of HIV illness may have led to the divergent findings.

## Pain and Co-Occurring Psychological Symptoms

Persons living with HIV evidence a higher prevalence of psychological disorders compared to the general population. For example, the lifetime prevalence of major depressive disorder among persons living with HIV is estimated to be 5% to 45%. Anxiety disorders, including generalized anxiety disorder, panic disorder, and posttraumatic stress disorder (PTSD) are also prevalent among persons living with HIV with estimated prevalence rates as high as 20% (19). In a representative US sample of HIV-infected persons, 26–36% screened positive for clinical depression and 10–16% screened positive for clinical anxiety (20). Moreover, additional work in this representative sample found that anxiety disorders and major depression were strongly associated with pain (21). Distressing symptoms of depression and anxiety that may not reach the threshold of “psychological disorder” have been shown to adversely impact QOL in HIV disease (22). Depression and anxiety symptoms often co-occur and may represent partially independent manifestations of a common psychological vulnerability.

Existing research has uncovered notable links between pain and anxiety/depressive disorders in HIV. Major Depression in particular, has often been associated with the presence and intensity of pain in HIV (23). PTSD has also been linked to greater pain intensity and pain-related interference among HIV-seropositive persons (24). Another investigation (13) found that HIV-infected patients with more lifetime trauma, stressful events, and PTSD symptoms reported more bodily pain, and poorer physical, role, and cognitive functioning than those without such trauma. However, in a study with the nationally representative HCSUS sample (21), it was reported that the presence of panic disorder was more strongly associated with increasing pain over time compared to either major depression or PTSD. The researchers suggested that the relationship between panic disorder and pain may be related to a tendency of persons with panic disorder to catastrophize about physical symptoms and bodily sensations, leading to increased panic and more intense pain.

Investigators have posited many possible causes that may underlie the increased prevalence of psychological disorders among persons living with HIV. For example, it has been suggested that stigma plays a role in creating psychological distress among persons living with HIV. Other factors may include limited social support, and the overall health burden of being HIV-infected and coping with health complications associated with the disease. In particular, pain related to HIV has been shown to be associated with a number of symptoms that are commonly found in depression, including hopelessness, negativism, anhedonia, difficulty sleeping, and loss of appetite, suggesting that careful assessment of such patients

is warranted. Pain may also exacerbate existing psychological disorders or other health conditions, or may lead directly to the development of depression and anxiety. For instance, increasing severity of pain may worsen the symptoms of depression and lead to declines in quality of life (1).

## Pain and Misuse of Illicit and Prescription Drugs

Over a third of HIV infections in the US are a result of injection drug use and the rate is higher among women and adolescents. Persons living with HIV who use illicit substances report more pain and have a greater burden of HIV illness (21), although current drug use is more strongly related to experiencing pain than is a history of past substance use (8). There are data to suggest that healthcare providers may find it more difficult to manage patients with chronic pain who have a history of substance use (25). These persons may be more prone to what has been termed “aberrant drug-taking behaviors”. The risk of such behaviors may lead some healthcare providers to be more reticent to provide adequate pain management and may make this population more prone to undertreatment of pain (discussed below).

Existing research on the relationship between pain and aberrant use of prescription analgesics in persons living with HIV is more limited compared to research on illicit drug abuse. A recent study (9) examined the associations among pain, aberrant use of prescription pain medications, and illicit drug use history in a sample drawn from the HCSUS. This analysis found that persons with a history of problematic illicit drug use reported more pain, and were more likely to report aberrant use of prescription analgesics, even after controlling for key demographic and socioeconomic characteristics. In addition, those with a history of problematic illicit drug use reported more use of prescription medications specifically for pain, compared to patients without such history. The study also found a trend toward greater stability of aberrant prescription analgesic use over time in illicit drug users compared with non-users. The investigators suggested that their findings indicated a persistent pattern of inappropriate prescription drug use in the former group. More troubling, although persons with a history of problematic illicit drug use reported on-going patterns of using prescription analgesics specifically for pain, these patients continued to experience persistently higher levels of pain over time relative to non-users.

A subsequent investigation examined sex differences in pain, the use of prescription analgesics specifically for pain, and the misuse of such medications in the nationally representative HCSUS sample (17). The results indicated that after controlling for key sociodemographic variables as well as prior history of problematic illicit drug use, women reported more pain than men regardless of the mode of HIV transmission. However, men acknowledged more misuse of prescription pain medications compared to women, after taking into account pain, use of analgesics specifically for pain and history of problematic illicit drug use. These findings suggest that despite increased pain that persisted over time and irrespective of prior drug use history, women were less likely than men to engage in misuse of prescription pain medications. Compared to women, men evidenced stronger relationships between pain and the use of prescription analgesics specifically for pain. That is, even though women reported more pain than men, women did *not* report greater use of pain medications specifically to manage pain. The weaker association between pain and pain-specific analgesic use among women is consistent with prior work indicating greater undertreatment of pain anong HIV-infected women compared to HIV-infected men (26). Thus, women may have either received inadequate treatment for pain and/or may have chosen not to take sufficient analgesics for their pain. Because the HCSUS did not include prescription records, it is unclear whether women were less likely than men to be prescribed

analgesics or, whether women were prescribed analgesics at the same rates as men but chose not to take them.

Existing work has also found that peripheral neuropathy is associated with both prescription and illicit drug use. Peripheral neuropathy is the most common HIV-related neurologic disorder among HIV-infected individuals. Distal sensory neuropathy (DSP) is the most common form of neuropathy, afflicting 15–50% of patients, of which 50–60% have painful neuropathy (16). Although the pathophysiology of DSP is unknown, recent findings indicate that older age, severe prior immunosuppression and the combined use of zalcitabine (ddC), stavudine (d4T) and didanosine (ddI) are important risk factors. New research indicates that among HIV-infected patients with peripheral neuropathy, 15% reported using marijuana and 7% reported using street drugs to manage their symptoms (27); highly symptomatic persons reported increased use of amphetamines and injection drug use. Another report found that DSP was associated with depression as well as with sedative and opioid use disorders in a highly active antiretroviral treatment (HAART)-era cohort (28).

## Pain in HIV+ persons with Co-morbid psychological and substance use disorders

Complicating the picture, use of a range of illicit drugs, not just injection drug use is strongly linked with anxiety and depression symptoms in HIV disease (29). Moreover, earlier research has shown robust associations between illicit drug use and pain among HIV-infected persons (8). Despite the high prevalence of co-morbid psychological and substance use disorders in HIV, there a paucity of research on the experience of pain in HIV-seropositive individuals with both co-morbid substance use disorders and psychological disorders. “Triply diagnosed” HIV-infected persons (i.e., those with both psychological and substance use disorders) are reported to have poorer health outcomes, lower medication adherence rates, and lower treatment and retention rates compared to the general HIV population (22).

Recent work in a sample HIV-infected persons with diagnosed co-morbid psychological and substance use disorders found that such persons reported high levels of bodily pain that were substantially greater than the general US population (30). These triply diagnosed individuals also reported more bodily pain scores than a sample of HIV-infected persons who screened negative for anxiety disorders, depressive disorders or substance dependence. Additional analyses in this sample indicated that the presence of a mood disorder, low CD4+ cell counts (below 200 cells/mm3), older age, and more days of illicit drug use (all drugs) in the past month were associated with increased pain. All of these correlates except for days of drug use were significantly associated with pain in multivariate analyses. Notably, the presence of a mood disorder explained the largest share of unique variance in bodily pain scores, followed by age and CD4+ cell counts. These findings are consistent with prior work indicating a strong relationship between pain and depressive symptoms among HIV-infected persons (1, 6, 23).

## Inadequate Pain Treatment: A Potential Risk Factor for Opioid Misuse

Despite the prominent role of pain in HIV disease, existing research indicates that pain is undertreated among HIV-infected persons, particularly with the context of substance abuse. For example, HIV-infected persons with a history of injection drug use were more likely to receive inadequate analgesic medications for their pain relative to non-injection drug use patients (26). HIV-infected women with a history of injection drug-use reported more intense pain and were less likely to receive analgesia than are men with a similar history (7, 26, 31). In addition, injection drug-users living with HIV are less likely to receive adequate

analgesia than men who have sex with men and other persons living with HIV, after controlling for age, socioeconomic status, and health insurance (31). Some studies suggest that the undertreatment of pain among injection drug-users may relate to physicians' concerns regarding drug-seeking behavior and fears of criminal prosecution (31). Moreover, despite the severity and frequency of pain among hospitalized persons living with HIV, pain reported by these patients may still be underestimated by healthcare providers. This underestimation of pain may also lead to undertreatment.

A potential adverse consequence of poor pain management is that patients may seek pain relief by using illicit drugs and/or alcohol and may be heightened among those with a prior history of substance abuse. For example, HIV-infected injection drug users reported lower levels of pain relief from pain medications and greater psychological distress than non-injection drug users (32). The lack of pain relief and heightened distress in this population may lead to an increased risk of self-medication for pain. Additional previous research found that HIV-infected persons with a problem illicit drug use history, relative to those without such history, reported more pain and were more likely to use prescription pain medications not only for pain relief but also in inappropriate ways (e.g., without a prescription) (9). As noted above, a recent study found that among HIV-infected patients with peripheral neuropathy, substance use for symptom relief was a common strategy with 21% reporting use of alcohol; 18% reporting use of marijuana and 9% reporting use of street drugs for relief of pain (27).

"Pseudoaddiction" is defined as opioid misuse that resolves once pain is adequately treated (33). Pseudoaddiction is distinct from true opioid addiction, which has been defined as a primary neurobiological disease characterized by compulsive use despite harm and craving. Pseudoaddiction is among the various factors proposed to explain opioid misuse (34). These other factors include chaotic lifestyle, psychological and/or physical dependence, or unrelieved co-morbid conditions such as anxiety or depression (34). Prior research has examined pseudoaddiction in patients with sickle cell disease but no equivalent work has been conducted in HIV disease. Nevertheless, HIV patients have expressed willingness to engage in aberrant drug-taking behaviors or excuse them in others if pain management is inadequate (35). These findings suggest that persons living with HIV may be a risk for opioid misuse as a consequence of undertreatment of pain and that additional research is needed to investigate patterns of pain and opioid use over time in this population. Pseudoaddiction may be inferred if pain improves or stabilizes once adequate pain treatment is administered and misuse of opioids subsequently declines.

## Pain and psychological symptoms as predictors of illicit drug use and prescription drug misuse

Among a sample of HIV-uninfected individuals, the most consistently supported risk factors for opioid misuse include personal and family history of substance abuse, history of preadolescent sexual abuse (for females only), and psychological disorders including depression (36). These findings suggest that in addition to inadequate treatment of pain and previous substance abuse, psychological factors may contribute to the risk of prescription drug abuse. In the general population, misuse of opioids and psychotherapeutic drugs are highly related but there is a paucity of such data in the HIV-infected population. As with opioids, clinicians are hesitant to prescribe medications such as benzodiazepines and tranquilizers for anxiety and sleep problems to HIV-infected persons with substance use histories. Complicating the picture, there is growing support for the use of adjuvant medications for pain in HIV disease, including anticonvulsants, antidepressants, anxiolytics, and psychostimulants, particularly for neuropathic pain.

In the largest study of HIV-unifected chronic pain patients to date, it was found that even though prior history of substance abuse was associated with opioid misuse, this relationship was completely mediated by pain medication beliefs and anxiety (37). These medication beliefs included the belief that opioids would improve overall mood and function, as well as the belief in the personal need for higher doses of medications compared to others. Given that such beliefs are modifiable and anxiety is treatable, these risk factors deserve additional study among persons living with HIV.

Edlund and colleagues proposed a model in which pain and psychological symptoms mediate the relationship between substance abuse and prescription drug abuse (38). Thus, instead of substance abuse being a direct predictor of opioid use, Edlund et al. postulated that common factors (i.e., pain and psychological symptoms) predict both opioid use and non-opioid substance abuse. In the Edlund model, pain is associated with both opioid use and non-opioid substance abuse. Psychological problems such as anxiety and depression are associated with both opioid use and non-opioid substance abuse. Thus, pain, anxiety and depression are posited to lead to both opioid use and non-opioid substance abuse. This model proposes that the relationship between use of opioids and non-opioid substance abuse is completely mediated by pain and mental health problems. That is, the relationship between opioid use and non-opioid substance abuse is completely explained by pain, anxiety and depression. However, Edlund et al. found evidence for ***only partial mediation*** in a HIV-uninfected sample (38). Thus, the association between opioid use and non-opioid substance abuse was only partly accounted for by pain, depression and anxiety. Edlund et al. also pointed to an alternative explanation for their findings, i.e., that non-opioid substance abuse increases the risk for mental health problems. Therefore, mental health problems may be a result of substance abuse rather than the cause. Additional longitudinal research is required to test these hypotheses, and to date, this model has not been tested in a sample of persons living with HIV. Such work may assist in improving treatment efforts for pain and psychological symptoms associated with HIV.

## Conclusion

The misuse of prescription drugs including opioids is a serious and growing public health concern. The 2007 National Drug Control Strategy issued by the ONDCP noted that prescription drug abuse led all other drug categories in new initiates in 2004–05. Whereas opioids and psychotherapeutic drugs are indicated for the treatment of chronic pain and psychological symptoms, these medications also have a high potential for misuse and diversion. HIV-infected persons evidence higher rates of chronic pain (31), anxiety and depression (20, 29) relative to the general population, and these symptoms often co-occur (21). Yet, clinicians are wary of prescribing opioids and anxiolytics such as benzodiazepines for these individuals with a history of drug abuse as there is little agreement regarding the medical provision of opioids to persons with such history. Given the high rates of illicit drug use among this population (39, 40), there is a need to balance the treatment of distressing symptoms of pain, anxiety and depression with concerns over misuse. Thus, further research is urgently needed to inform the management of pain and psychological symptoms in persons living with HIV while reducing the likelihood of prescription drug misuse.

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## Bibliography & References Cited


1. Rosenfeld B, Breitbart W, McDonald MV, Passik SD, Thaler H, Portenoy RK. Pain in ambulatory AIDS patients. II: Impact of pain on psychological functioning and quality of life. Pain. 1996; 68:323–8. [PubMed: 9121821]
2. Norval DA. Symptoms and sites of pain experienced by AIDS patients. S Afr Med J. 2004; 94:450–4. [PubMed: 15250459]
3. Dobalian A, Tsao JCI, Duncan RP. Pain and the use of outpatient services among persons with HIV: results from a nationally representative survey. Med Care. 2004; 42:129–38. [PubMed: 14734950]
4. McCormack JP, Li R, Zarowny D, Singer J. Inadequate treatment of pain in ambulatory HIV patients. Clin J Pain. 1993; 9:279–83. [PubMed: 8118093]
5. Simmonds MJ, Novy D, Sandoval R. The differential influence of pain and fatigue on physical performance and health status in ambulatory patients with human immunodeficiency virus. Clin J Pain. 2005; 21:200–6. [PubMed: 15818071]
6. Singer EJ, Zorilla C, Fahy-Chandon B, Chi S, Syndulko K, Tourtellotte WW. Painful symptoms reported by ambulatory HIV-infected men in a longitudinal study. Pain. 1993; 54:15–9. [PubMed: 8378098]
7. Breitbart W, McDonald MV, Rosenfeld B, Passik SD, Hewitt D, Thaler H, et al. Pain in ambulatory AIDS patients. I: Pain characteristics and medical correlates. Pain. 1996; 68:315–21. [PubMed: 9121820]
8. Tsao JCI, Dobalian A, Stein JA. Illness burden mediates the relationship between pain and illicit drug use in persons living with HIV. Pain. 2005; 119:124–32. [PubMed: 16297562]
9. Tsao JCI, Stein JA, Dobalian A. Pain, problem drug use history, and aberrant analgesic use behaviors in persons living with HIV. Pain. 2007; 133:128–37. [PubMed: 17449182]
10. Larue F, Fontaine A, Colleau SM. Underestimation and undertreatment of pain in HIV disease: multicentre study. BMJ. 1997; 314:23–8. [PubMed: 9001475]
11. Del Borgo C, Izzi I, Chiarotti F, Del Forno A, Moscati AM, Cornacchione E, et al. Multidimensional aspects of pain in HIV-infected individuals. AIDS Patient Care STDS. 2001; 15:157–64.
12. Lebovits AH, Smith G, Maignan M, Lefkowitz M. Pain in hospitalized patients with AIDS: analgesic and psychotropic medications. Clin J Pain. 1994; 10:156–61. [PubMed: 8075469]
13. Leserman J, Whetten K, Lowe K, Stangl D, Swartz MS, Thielman NM. How trauma, recent stressful events, and PTSD affect functional health status and health utilization in HIV-infected patients in the South. Psychosomatic Medicine. 2005; 67:500–7. [PubMed: 15911916]
14. Rotheram-Borus MJ. Variations in perceived pain associated with emotional distress and social identity in AIDS. AIDS Patient Care STDS. 2000; 14:659–65. [PubMed: 11119433]
15. Bernard N, Spira R, Ybanez S, Chene G, Morlat P, Lacoste D, et al. Prevalence and underestimation of pain in HIV-infected patients by physicians: a cross-sectional study in a day care hospital. AIDS. 1999; 13:293–5. [PubMed: 10202845]
16. Martin C, Pehrsson P, Osterberg A, Sonnerborg A, Hansson P. Pain in ambulatory HIV-infected patients with and without intravenous drug use. Eur J Pain. 1999; 3:157–64. [PubMed: 10700345]
17. Tsao JCI, Stein JA, Dobalian A. Sex differences in pain and misuse of prescription analgesics among persons with HIV. Pain Med. 2010; 11:815–24. [PubMed: 20456074]
18. Richardson JL, Heikes B, Karim R, Weber K, Anastos K, Young M. Experience of pain among women with advanced HIV disease. AIDS Patient Care STDS. 2009; 23:503–11. [PubMed: 19534600]
19. Vitiello B, Burnam AM, Bing EG, Beckman R, Shapiro MF. Use of psychotropic medications among HIV-infected patients in the United States. Am J Psychiatry. 2003; 160:547–54. [PubMed: 12611837]
20. Tsao JCI, Dobalian A, Moreau C, Dobalian K. Stability of anxiety and depression in a national sample of adults with human immunodeficiency virus. J Nerv Ment Dis. 2004; 192:111–8. [PubMed: 14770055]
21. Tsao JCI, Dobalian A, Naliboff BD. Panic disorder and pain in a national sample of persons living with HIV. Pain. 2004; 109:172–80. [PubMed: 15082139]

22. Sherbourne CD, Hays RD, Fleishman JA, Vitiello B, Magruder KM, Bing EG, et al. Impact of psychiatric conditions on health-related quality of life in persons with HIV infection. Am J Psychiatry. 2000; 157:258–4.
23. Evans S, Ferrando S, Sewell M, Goggin K, Fishman B, Rabkin J. Pain and depression in HIV illness. Psychosomatics. 1998; 39:528–35. [PubMed: 9819953]
24. Smith MY, Egert J, Winkel G, Jacobson J. The impact of PTSD on pain experience in persons with HIV/AIDS. Pain. 2002; 98:9–17. [PubMed: 12098612]
25. Rosenblatt AB, Mekhail NA. Management of pain in addicted/illicit and legal substance abusing patients. Pain Pract. 2005; 5:2–10. [PubMed: 17156112]
26. Breitbart W, Rosenfeld BD, Passik SD, McDonald MV, Thaler H, Portenoy RK. The undertreatment of pain in ambulatory AIDS patients. Pain. 1996; 65:243–9. [PubMed: 8826513]
27. Nicholas PK, Kemppainen JK, Canaval GE, Corless IB, Sefcik EF, Nokes KM, et al. Symptom management and self-care for peripheral neuropathy in HIV/AIDS. AIDS Care. 2007; 19:179–89. [PubMed: 17364396]
28. Morgello S, Estanislao L, Simpson D, Geraci A, DiRocco A, Gerits P, et al. HIV-associated distal sensory polyneuropathy in the era of highly active antiretroviral therapy: the Manhattan HIV Brain Bank. Arch Neurol. 2004; 61:546–51. [PubMed: 15096404]
29. Bing EG, Burnam A, Longshore D, Fleishman JA, Sherbourne CD, London AS, et al. Psychiatric disorders and drug use among human immunodeficiency virus-infected adults in the United States. Arch Gen Psychiatry. 2001; 58:721–8. [PubMed: 11483137]
30. Tsao JCI, Soto T. Pain in persons living with HIV and comorbid psychological and substance use disorders. Clin J Pain. 2009; 25:307–12. [PubMed: 19590479]
31. Dobalian A, Tsao JC, Duncan RP. Pain and the use of outpatient services among persons with HIV: results from a nationally representative survey. Med Care. 2004; 42:129–38. [PubMed: 14734950]
32. Breitbart W, Rosenfeld B, Passik S, Kaim M, Funesti-Esch J, Stein K. A comparison of pain report and adequacy of analgesic therapy in ambulatory AIDS patients with and without a history of substance abuse. Pain. 1997; 72:235–43. [PubMed: 9272808]
33. Weissman DE, Haddox JD. Opioid pseudoaddiction--an iatrogenic syndrome. Pain. 1989; 36:363–6. [PubMed: 2710565]
34. Ballantyne JC, LaForge KS. Opioid dependence and addiction during opioid treatment of chronic pain. Pain. 2007; 129:235–55. [PubMed: 17482363]
35. Passik SD, Kirsh KL, McDonald MV, Ahn S, Russak SM, Martin L, et al. A pilot survey of aberrant drug-taking attitudes and behaviors in samples of cancer and AIDS patients. J Pain Symptom Manage. 2000; 19:274–86. [PubMed: 10799794]
36. Webster LR, Webster RM. Predicting aberrant behaviors in opioid-treated patients: Preliminary validation of the opioid risk tool. Pain Med. 2005; 6:432–42. [PubMed: 16336480]
37. Schieffer BM, Pham Q, Labus J, Baria A, Van Vort W, Davis P, et al. Pain medication beliefs and medication misuse in chronic pain. J Pain. 2005; 6:620–9. [PubMed: 16139781]
38. Edlund MJ, Sullivan M, Steffick D, Harris KM, Wells KB. Do users of regularly prescribed opioids have higher rates of substance use problems than nonusers? Pain Med. 2007; 8:647–56. [PubMed: 18028043]
39. Ostrow, DC.; Stall, R. Alcohol, tobacco, and drug use among gay and bisexual men. In: Wolitski, RJ.; Stall, R.; Valdiserri, RO., editors. Unequal Opportunity: Health Disparities Affecting Gay and Bisexual Men in the United States. New York: Oxford University Press; 2008. p. 121-58.
40. Plankey MW, Ostrow DG, Stall R, Cox C, Li X, Peck JA, et al. The relationship between methamphetamine and popper use and risk of HIV seroconversion in the multicenter AIDS cohort study. J Acquir Immune Defic Syndr. 2007; 45:85–92. [PubMed: 17325605]