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The undertreatment of pain in ambulatory AIDS patients [1]

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Summary Pain is highly prevalent in individuals with HIV disease, yet is often overlooked as a symptom requiring clinical intervention. We evaluated the adequacy of analgesic management for pain and identified predictors of pain undertreatment in a sample of 366 ambulatory AIDS patients using a prospective cross-sectional survey design. Two hundred and twenty-six of the 366 ambulatory AIDS patients surveyed reported "persistent or frequent" pain over the 2 week period prior to the survey. Adequacy of analgesic therapy was assessed using the Pain Management Index (PMI - a measure derived from the Brief Pain Inventory) and the type and frequency of analgesic medications prescribed for pain. Results indicated that nearly 85% of patients were classified as receiving inadequate analgesic therapy based on the PMI. Less than 8% of the 110 patients who reported "severe" pain were prescribed a "strong" opioid (e.g., morphine), as suggested by published guidelines. Adjuvant analgesic drugs (e.g., antidepressant medications) were prescribed in only 10% of the patients. Women, less educated patients, and patients who reported injection drug use as their HIV transmission risk factor were most likely to have received inadequate analgesic therapy. These results demonstrate the alarming degree of undertreatment of pain in ambulatory patients with AIDS, and indicates the need to improve the management of AIDS-related pain in this underserved population. Future research should elucidate the factors that impede adequate pain management in order to overcome obstacles to adequate treatment.

Key words: Pain; AIDS; HIV; Analgesic therapy; Undertreatment; Pain Management Index

Introduction

Pain has recently been recognized as a highly prevalent and clinically important symptom in individuals with HIV disease. (Lebovits et al. 1989; O'Neill and Sherrard 1993; Singer et al. 1993; Lebovits et al. 1994). While the prevalence of pain in HIV disease varies with stage of disease, care setting, and study methodology, estimates of the prevalence of persistent pain in patients with AIDS generally range from 40% to 60% (Lebovits et al. 1989, 1994; Schofferman and Brody 1990; Breitbart et al. 1991; Singer et al. 1993). The prevalence and intensity of AIDS-related pain appears to be comparable to, or even exceed, that experienced by cancer patients (Lefkowitz and Breitbart 1992; O'Neill and Sherrard 1993; Larue et al. 1994). While preliminary in nature, several recent reports suggest that pain is inadequately treated in patients with AIDS, and that opioid analgesics, in particular, are underutilized (McCormack et al. 1993; Singer et al. 1993; Lebovits et al. 1994).

In 1994, the United States Agency for Health Care Policy and Research (AHCPR) published federal guidelines for the management of pain in patients with cancer and HIV disease (Jacox et al. 1994). These guidelines promote the use of the World Health Organization (1990) "analgesic ladder" approach for both populations (Jacox et al. 1994). According to this approach, which has been well validated for cancer pain (Ventafridda et al. 1990; Grond et al. 1991), selection of analgesics should be based primarily on the severity of reported pain. Non-opioid analgesics (e.g., non-

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steroidal anti-inflammatory drugs or NSAIDS) are recommended for mild pain and opioid analgesics are recommended for moderate to severe pain. Opioids traditionally recommended for pain of moderate intensity include drugs such as codeine or oxycodone (often termed "weak" opioids), while opioids recommended for severe pain include drugs such as morphine or hydromorphone (often termed "strong" opioids). Adjuvant analgesic drugs, such as the antidepressants (e.g., amitriptyline), may be combined with any of the traditional analgesics to treat residual pain or in the management of neuropathic pain.

Thus, published guidelines indicate a consensus among pain specialists in the United States that the treatment of pain in the patient with HIV disease should be fundamentally similar to the treatment of cancer pain. From this perspective, it is now possible to evaluate the adequacy of current pain management approaches for HIV-infected patients. While it is well documented that cancer pain continues to be undertreated (Cleeland et al. 1994), there have been only limited efforts to empirically assess the adequacy of pain treatment in HIV disease (McCormack et al. 1993; Singer et al. 1993; Lebovits et al. 1994). The present study evaluated the adequacy of analgesic management in a large sample of ambulatory AIDS patients with pain, and identified predictors of undertreatment.

Method

Subjects

Ambulatory AIDS patients were recruited primarily from three hospitals in New York City: Memorial Sloan-Kettering Cancer Center (Infectious Disease and Immunology clinics), New York Hospital (Center for Special Studies, methadone maintenance treatment program, and affiliated physicians), and St. Clare's Hospital and Health Center (Spellman Center and HIV methadone maintenance treatment program). Additional study participants were recruited through advertisements posted in sites serving HIV infected individuals throughout the metropolitan New York City area. The advertisements indicated that the study was dedicated to investigating the impact of physical symptoms on the quality of life in people with AIDS. Data were collected as part of a larger study of pain in ambulatory AIDS patients, which was approved by the Institutional Review Board of Memorial Sloan-Kettering Cancer Center. All patients provided written informed consent prior to participation.

Subjects were 18 years of age or older, spoke English fluently, met the case definition criteria for AIDS (categories A3, B3, C1, C2, C3 of the 1993 Centers for Disease Control HIV classification system, 1992), and were receiving ambulatory medical care at the time of the assessment. Patients were excluded if they were unable to understand the informed consent form or survey instruments.

Study measures

All patients consenting to participate in the study were asked the following question: "During the past 2 weeks, have you experienced persistent or frequent pain of any type?" All patients who endorsed this question were classified as having pain, and administered the Brief Pain Inventory. The severity and impact of pain were measured with the Brief Pain Inventory (BPI, Cleeland, 1989). This instrument has been well validated in cancer patients, and asks patients to rate pain intensity during the prior week ("pain at its worst", "pain on the average", "pain at its least", and "pain right now") using a series of 0 to 10 numerical rating scales. Patients are also asked to rate the degree of pain relief obtained from pain treatment using a percent scale. In addition, patients rate pain interference with various aspects of functioning and well-being (e.g., mood, sleep, work, ability to walk, etc.) on 0 to 10 numerical rating scales. The pain interference subscales may be averaged to provide an overall measure of pain-related functional interference. A subsample (N = 151) of patients who reported pain were also asked to undergo a comprehensive neurological/pain assessment performed by a neurologist/pain specialist (supervised by R.P.), the results of which are briefly described here with plans for a more complete report to follow.

Patients were also administered a series of self-report and clinician-rated measures of psychological distress (Beck Depression Inventory (Beck et al. 1979) and Brief Symptom Inventory (Derogatis and Melisaratos 1983)), physical impairment (Karnofsky Patient Performance Rating Scale (Coscarelli-Schag et al. 1984)), and quality of life (Functional Living Inventory - Cancer, modified for AIDS, (Schipper et al.1984)). In addition, medical information (e.g., CD4+ cell count, 1993 CDC HIV clinical category classification), medications (including analgesics prescribed and purchased over-the-counter), and demographic data were recorded from patients' medical records or elicited using a structured interview developed by the principal investigator (W.B.).

Patients were interviewed and then completed the above questionnaires in the presence of a research assistant. Questions were read to patients if required by visual impairment, fatigue, or poor reading skills. Following completion of the study, all patients were paid $25 for their participation. Although no treatment was provided in connection with this study, pertinent information (e.g., suicidal intent or uncontrolled severe pain) was made available to a patient's primary health care providers (if the patient approved) and appropriate referrals for specialized medical care were offered when indicated.

Adequacy of analgesic therapy

In addition to descriptive data regarding analgesic medications prescribed or purchased over-the-counter, we utilized the Pain Management Index (PMI) as a measure of the adequacy of analgesic therapy. The PMI, as described by Cleeland and colleagues (Zelman et al. 1987; Cleeland et al. 1994), compares the potency of analgesics prescribed with the severity of pain intensity reported by the patient. When there is congruence between the potency of analgesic prescribed and the level of pain reported, adequate analgesic therapy is being provided according to WHO guidelines (1990). To construct the index, the patient's rating on the "pain at its worst" item of the BPI and the potency of analgesic prescribed are both assigned scores. Patients reporting pain intensity of 8 or more are considered to have "severe" pain and coded a "3". Patients with pain intensity between 4 and 7 are rated as "moderate" and coded a "2". Patients with pain intensity less than 4 are rated as "mild" and coded "1" and patients without pain are coded "0".

Using a similar procedure, the potency of analgesic received by each patient is classified according to the WHO analgesic ladder (1990; Cleeland et al. 1994). Patients prescribed opioids conventionally used on the 3rd step of the analgesic ladder for severe pain ("strong" opioids, e.g., morphine, hydromorphone) are assigned a score of "3". Those prescribed opioids conventionally used on the 2nd step of the analgesic ladder for moderate pain ("weak" opioids,

e.g., codeine) are assigned a score of "2". Those receiving (either by prescription or over-the-counter) only non-opioid analgesics (e.g., NSAIDS) are assigned a score of "1". If no analgesics were prescribed or purchased over-the-counter, the patient was assigned a score of "0".

Although the PMI, as originally described, does not incorporate adjuvant analgesics into the index, we chose to categorize adjuvant analgesics (e.g., antidepressants, anticonvulsants) as non-opioid analgesics (i.e., assigned a score of "1"). Patients were assigned the score corresponding to the highest potency of analgesic prescribed (i.e., patients receiving both a "weak" opioid and an adjuvant analgesic were assigned a score of "2"). In addition, patients who received methadone once daily as part of their substance abuse treatment (methadone maintenance), but did not receive any other analgesic medications, were classified as taking no medications for pain (assigned a score of "0"). Similarly, patients who reported taking antidepressant medications prescribed for depression (but not intended for analgesic purposes), with no medications prescribed or taken for pain, were assigned a score of "0".

The PMI is computed by subtracting the assigned pain intensity score from the assigned score for prescribed analgesic. The index ranges from −3 (a patient with severe pain who is prescribed no analgesic) to +3 (a patient who does not report pain and is prescribed morphine). Scores of 0 and above indicate adequate analgesic therapy according to WHO guidelines, whereas scores in the negative range indicate inadequate analgesic therapy. In this study, however, we also utilized a more conservative index of undertreatment in which only patients with PMI scores of −2 or −3 were classified as receiving inadequate analgesic therapy. This method classifies patients with "severe" pain who received no analgesics or only non-opioid or adjuvant analgesics, or patients with "moderate" pain who received no analgesics as receiving inadequate analgesic therapy. PMI scores were recoded into a dichotomous classification of adequate or inadequate analgesic therapy using this, more conservative cut-off score, for subsequent analyses.

Statistical analyses

Data analyses were based on the subset of patients who reported pain. Descriptive statistics were tabulated for pain intensity, analgesic drugs, and the frequency of inadequate analgesic therapy (based on PMI scores). Correlational analyses (coefficient alpha) were used to asess the reliability of the BPI in HIV infected patients. Frequency analyses (chi-square and Fisher's Exact Test statistics) and t-tests were used to determine whether demographic, medical, and other clinical variables were significantly associated ($P < 0.05$) with adequate or inadequate analgesic therapy (using our more conservative PMI index). Statistically significant variables were then entered into a stepwise logistic regression to determine the most parsimonious set of predictor variables. Variables were added sequentially until the improvement in overall model fit was no longer statistically significant using the chi-square statistic, which compares the change in overall goodness-of-fit (the log of the likelihood ratio) to the change in degrees of freedom.

Sample characteristics

Of the 366 ambulatory AIDS patients who consented to the study and completed the questionnaire packet, 226 (61.7%) reported "frequent or persistent pain during the past 2 weeks" and were included in all subsequent analyses. This sample was predominantly male (73.9%) and had an average age of 39.1 years (range: 18-63 years). There were 39.4% Caucasians, 37.2% African-Americans, 21.2% Hispanics, and 2.2% other racial backgrounds. The average level of education was 13.1 years (range: 7-20). HIV transmission factors included men who have sex with men (31.9%), injection drug use (IDU, 55.7%), heterosexual contact (8.8%), transfusion (1.3%), and unknown (2.2%). The average current CD4+ cell count was 186.6 (range: 0-800) and average Karnofsky Performance Status scale score was 73.1 (range: 40-100). The average Beck Depression Inventory (BDI) score was 19.7 (range: 3–52) and the average Brief Symptom Inventory (BSI) Global Distress Index score was 2.3 (range: 1.1–4.9). The average score on the Functional Living Inventory -Cancer (FLIC, modified for HIV) was 3.02 (range: 1.56-7.0).

TABLE I

SAMPLE CHARACTERISTICS (N = 226)

	Mean (SD) or N (% of total)
Age	39.13 (7.1)
Years of education	13.06 (2.8)
Gender	
Male	167 (73.9%)
Female	59 (26.1%)
Race	
Caucasian	89 (39.4%)
African-American	84 (37.2%)
Hispanic/other	53 (23.4%)
HIV transmission factor:	
MSWM	72 (31.9%)
IDU	126 (55.7%)
Other/unknown	28 (12.3%)
Religious affiliation	
Catholic	107 (47.6%)
Protestant	75 (33.3%)
Other/none	43 (19.1%)

Results

Two hundred and twenty-six of the 366 ambulatory AIDS patients surveyed reported "persistent or frequent" pain over the 2 week period prior to the survey. Patients with pain described an average number of 2.5 concurrent pains. Of the 151 patients in the subsample that underwent a pain/neurologic physical examination, 71% had at least one somatic pain, 46% had one or more neuropathic pains, and 29% had one or more visceral pains. The most common pain syndromes identified include: joint pains (37%, e.g., arthritis, arthralgia, articular syndrome), peripheral neuropathy (28%), muscular pain (27%, e.g., myositis, myopathy), headaches (25%), skin pain (15%, e.g., Kaposi's sarcoma, infection), and radiculopathy (12%). Nearly 50% of the sample ($N = 110$, 48.7%) reported pain intensity "at its worst" to be in the "severe" range (8–10 on the BPI numerical rating scale) and an additional 45.6% of patients ($N = 103$) reported "moderate" pain intensity (4–7 on the BPI). Only 5.8% of patients ($N = 13$) reported that their worst pain was in the "mild" range (1–3 on the BPI). Overall, mean pain intensity "at its worst" was 7.3 (range: 1–10), and the mean pain intensity "on average" was 5.2 (range: 0–10). The average pain relief was 60% of "complete relief" (range: 0-

TABLE II

PREDICTORS OF SEVERE UNDERTREATMENT (PMI SCORES OF −2 OR −3):

Variable	% of Total N	% w/ PMI −2 or −3	Wald chi-square	Odds ratio	*P* value
Gender *					
Female	26.1	63	5.79	2.11	0.02
Male	73.9	44			
Age					
Under 35	28.3		0.02	1.04	0.90
35 to 45	56.2		0.01	1.03	0.94
Over 45	15.5				
Race					
Caucasian	39.4	45	1.02	0.76	0.31
Black	37.2	49	0.01	0.98	0.94
Hispanic	21.2	59	2.05	1.6	0.15
Other	2.2	40			
Education *					
Low ($\leq$ 12 years)	50.9	57	5.10	1.84	0.03
High ($>$ 12 years)	49.1	41			
HIV transmission factor *					
MSWM	31.9	42	2.33	0.64	0.13
IDU	55.7	56	4.69	1.80	0.04
Other	12.3	39			
Religious affiliation * *					
Catholic	47.6	51	0.52	1.21	0.47
Protestant	33.3	59	4.26	1.81	0.04
Other/None	19.1	26			
Karnofsky Performance Status					
Good ($\geq$ = 70)	71.9	51	0.43	1.22	0.51
Poor ($<$ 70)	28.1	46			

* $P < 0.05$; * * $P < 0.002$.
Odds-Ratio estimates generated using dummy-coded variables.

100%). The average pain-related functional impairment, as measured by the BPI, was 6.1 (range: 0-10). Reliability analyses with this sample generated an alpha coefficient of 0.79 for the 4 pain intensity items and 0.87 for the 7 pain interference items (the alpha coefficient for the combined 11 item scale was 0.88), supporting the utility of this measure for assessment of HIV-related pain.

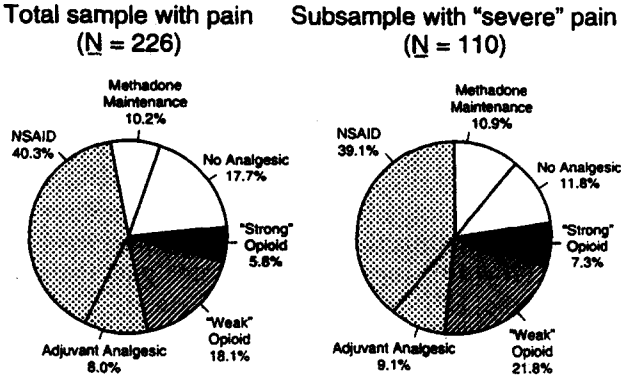

Fig. 1. Analgesic medications prescribed for pain in ambulatory patients with AIDS.

Frequency and type of analgesics prescribed

No analgesics were prescribed for, or consumed by, 40 of the 226 (17.7%) patients who had pain. Ninety-one patients (40.3%) were prescribed only non-opioid analgesics or purchased these medications over-the-counter (Fig. 1). Forty-one patients (18.1%) were prescribed opioids conventionally used for "moderate" pain (e.g., codeine) and only 13 patients (5.8%) were prescribed opioids conventionally used for "severe" pain (e.g., morphine). An additional 18 patients (8.0%) were prescribed adjuvant analgesics (only antidepressant medications were reported) as their primary analgesic medication and 5 patients (2.2%) received adjuvant analgesics (i.e., antidepressants) in addition to an opioid. Twenty-three patients (10.2%) reported taking methadone once daily as part of their drug rehabilitation program, but no additional medications for pain relief.

Of the subset of patients reporting "severe" pain ($N = 110$) only 7.3% ($N = 8$) were prescribed opioid analgesics recommended for "severe" pain (e.g., morphine) and an additional 21.8% ($N = 24$) were prescribed opioid analgesics recommended for "moderate" pain (e.g., codeine). Forty-eight percent of patients

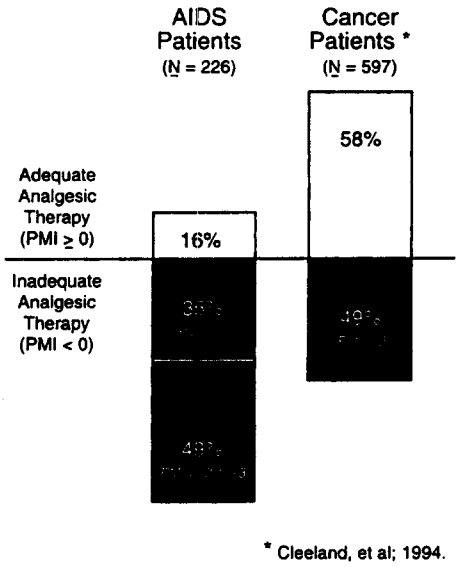

Fig. 2. Proportion of ambulatory patients with AIDS receiving adequate/inadequate analgesic therapy based on the Pain Management Index (PMI): A comparison with published cancer pain data.

($N = 53$) who reported "severe" pain received only non-opioid analgesics and 22.7% ($N = 25$) indicated that they received no analgesic whatsoever (Fig. 1).

Adequacy of analgesic therapy

One hundred and ninety patients (84.1%) had negative PMI scores indicating inadequate analgesic therapy according to WHO guidelines (Fig. 2). Only 36 patients (15.9%) had PMI scores greater or equal to 0, indicating adequate analgesic therapy. Using our more conservative classification of analgesic therapy adequacy (PMI = −2 or −3), 49.1% of patients ($N = 111$) had inadequate analgesic therapy.

There were significant associations between adequacy of analgesic therapy (PMI = −2 or −3) and gender, HIV risk transmission factor, level of education, and religion. Women were more than twice as likely to receive inadequate analgesic therapy than were men (Fisher's Exact Test, $P = 0.016$, Table II) and less educated patients were nearly twice as likely to receive inadequate analgesics than those with more education (Fisher's Exact Test, $P = 0.025$). Patients reporting injection drug use as their HIV transmission risk factor were 1.8 times more likely than other patients to receive inadequate analgesic therapy (Fisher's Exact Test, $P = 0.033$). Religious affiliation was also significantly associated with adequacy of analgesic therapy (chi-square = 12.49, $df = 2$, $P < 0.002$). Race, age, current CD4 + count, and Karnofsky Performance Score were not significantly associated with adequacy of analgesic therapy (Table II).

A stepwise logistic regression analysis incorporating gender, level of education, religion, and IDU transmission risk factor generated a model in which female gender, lower levels of education, and Protestant or Catholic religious affiliation significantly predicted inadequate analgesic therapy (chi-square = 18.82, $df = 4$, $P < 0.001$, Table III). The addition of IDU transmission risk factor to this prediction model did not significantly improve the prediction of inadequate analgesic therapy (chi-square = 1.4, DF = 1, P = NS). IDU transmission risk factor was significantly associated with gender (women were significantly more likely than men to report injection drug use as their risk transmission factor, chi-square = 11.47, DF = 1, $P < 0.001$) and education (patients reporting IDU as their risk transmission factor reported significantly lower levels of education, chi-square = 22.96, DF = 1, $P < 0.001$). The addition of IDU as a predictor variable was therefore redundant in this multivariate model.

Compared to subjects with PMI scores > −2, those with PMI scores = −2 or −3 were significantly more distressed on the Global Distress Index of the BSI ($t(222) = 2.01$, $P < 0.05$). There was no difference between these groups, however, on other measures of psychosocial functioning including the BDI ($t(223) = 1.42$, P = N.S.), the FLIC ($t(224) = 1.30$, P = N.S.), or the functional inteference scale from the BPI ($t(222) = 0.01$, P = N.S.).

Discussion

This study suggests that pain is dramatically undertreated in ambulatory patients with AIDS. Of patients who reported that their pain intensity was in the "severe" range (8–10 on the BPI "pain at its worst" numerical rating scale; nearly 50% of our sample), only 7.3% received opioid analgesics recommended in published guidelines for pain of this severity (e.g., morphine, hydromorphone). Approximately 75% of patients who reported "severe" pain received no opioid analgesic whatsoever. Only 10% received an adjuvant analgesic drug (e.g., an antidepressant) despite a diagnosis of neuropathic pain in nearly 50% of the sample (Hewitt et al. 1994; pain diagnoses and etiology have been reported elsewhere).

Nearly 85% of our sample received inadequate analgesic therapy based on WHO guidelines (PMI scores < 0). Even using a more conservative PMI cut-off for determining adequacy of analgesic therapy (PMI = −2 or −3), almost 50% of ambulatory AIDS patients with pain received inadequate analgesic therapy. This degree of undertreatment of pain in patients with AIDS exceeds published reports of undermedication of pain in cancer populations (Cleeland et al. 1994; Fig. 2).

Similar to cancer patients, women and less educated patients with AIDS were more likely to have their pain undertreated (Cleeland et al. 1994). Our data also suggest that substance abuse history and religious/cultural factors may be important influences on the undertreatment of AIDS-related pain.

These results must be interpreted cautiously. Our methodology relied primarily on self-report data at a single point in time, and did not include confirmation of reported medication regimens through independent chart review or physician contact. Patients may have been offered (or prescribed) stronger analgesic medications than they reported, or may not have communicated the severity of their pain to their doctor, despite acknowledging pain in our survey. The likelihood of purposeful misrepresentation by patients was minimized by the lack of any financial or medical incentive to exaggerate pain or the extent of undertreatment (i.e., no treatment was offered in connection with this study), however the possibility of selection bias and recall bias cannot be excluded.

The limitations of the PMI as an index of analgesic adequacy must also be acknowledged. The PMI reflects a relatively simple approach to assessing adequacy of analgesic therapy and does not address many of the complexities inherent in pain management (such as risks or contraindications to specific drug therapies). The PMI incorporates only the class of analgesic prescribed, not the dosage, and therefore judgments of analgesic adequacy based on this index may underestimate the actual proportion of patients receiving inadequate analgesia (i.e., patients may have received the "proper" medication at sub-therapeutic dosages). Conversely, the PMI may overestimate the proportion of patients receiving inadequate analgesic therapy if many patients used non-pharmacologic analgesic interventions (e.g., hypnosis, acupuncture, transcutaneous electrical nerve stimulation).

Another potential methodological limitation in the PMI, as originally described, is the failure to incorporate adjuvant analgesics (e.g., antidepressant medications) in calculating the index. We classified adjuvant analgesic medications (i.e., antidepressant medications) as non-opioid drugs (step 1 of the WHO analgesic ladder) for this study. Despite the frequent use of adjuvant analgesics as primary analgesics for neuropathic pain (e.g., postherpetic neuralgia, Max 1992), WHO and AHCPR guidelines (WHO 1990; Jacox et al. 1994) suggest the use of opioids in addition to adjuvant analgesics for "moderate" to "severe" neuropathic pain. Since only 10% of our sample received adjuvant analgesics for pain, it is unlikely that our decision to classify adjuvant analgesics as non-opioids substantially altered our findings of undertreatment. In addition, the undertreatment or pain reported here does not appear to be limited to reluctance to prescribe opioid medications, since adjuvant analgesic medications were also underutilized.

Because of the above noted concerns, the present study used a conservative cutoff for the PMI to designate inadequate analgesic treatment (PMI = -2 or -3) for use in statistical analyses. A PMI in this range indicates that patients reported "severe" pain yet received only non-opioid or adjuvant analgesic medications, or reported "moderate" pain yet received no analgesic medication at all. The use of this conservative index gives confidence to the designation of inadequate analgesic therapy in our analyses.

A history of injection drug use was associated with undertreatment in bivariate analyses, suggesting that physicians may be reluctant to prescribe opioid analgesics in managing pain in this population. Although a history of injection drug use may necessitate more caution in prescribing opioid analgesic medications, it is not a contraindication to this therapy, particularly among patients with relatively advanced disease (Jacox et al. 1994). The high rate of inadequate analgesic therapy among patients without a history of injection drug use indicates that substance abuse history alone is not sufficient to explain the magnitude of undertreatment found in our sample.

Although patients who received inadequate analgesic therapy scored significantly higher than patients receiving adequate analgesic therapy on the BSI Global Distress Index (a measure of overall symptom distress), we found no association between treatment adequacy and depression, overall quality of life, and pain interference with functioning. The latter findings may relate to the high levels of depressive symptoms and poor quality of life experienced by most patients in our sample. If pain and adequacy of pain management are but two of many factors that diminish quality of life in patients with AIDS, and perhaps not even the most salient, the expected associations between adequacy of pain treatment and psychological distress variables may not materialize. Further analysis of the relationships among pain, its treatment, and psychosocial factors are needed to better understand these complex relationships.

Proper management of AIDS-related pain is a complex task, particularly given the severity and diversity of the medical problems, and psychiatric comorbidity experienced by these patients (e.g., the high proportion of patients with past or current substance abuse disorders). Nevertheless, our data suggest a striking degree of undertreatment. Although our study does not identify the causes of this undertreatment, our clinical experience suggests several potential barriers to adequate pain management. These barriers include lack of physician knowledge regarding pain and pain management in HIV disease, the stigma and discrimination associated with HIV disease, as well as patient related

barriers to adequate treatment (i.e., ethnic or cultural biases, preference for non-pharmacological interventions, Passik et al. 1994). Regardless of the basis for pain undertreatment, our data clearly indicate the need to improve the management of AIDS-related pain in this underserved population. Future research should elucidate the factors (physician, systemic, and patient-related) that impede adequate pain management in order to overcome such obstacles to adequate treatment.

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