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Pilot Study to Identify Correlates of Intentional Versus Unintentional Nonadherence to Analgesic Treatment for Cancer Pain

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Abstract

Existing studies of medication adherence treat “nonadherence” as a monolithic concept. The goal of this study was to isolate correlates of intentional versus unintentional nonadherence for analgesic treatment for cancer pain. Patients were recruited from outpatient oncology clinics in the middle Atlantic region, 18 years old, and diagnosed with solid tumors, and had an active prescription of at least one around-the-clock analgesic. The Morisky Medication Adherence Scale (MMAS) was used to assesses “unintentional” (forgetfulness/carelessness) and “intentional” (stopping use of medication if feeling better or worse) dimensions of analgesic nonadherence. A visual analog scale was used to assess the percentage of analgesic doses taken in the preceding month. A majority of participants (85.5%) took prescribed analgesics in the index period. However, 51% reported taking only up to 60% of the analgesic doses prescribed to them. Stopping taking analgesics when feeling better was the most commonly reported nonadherence behavior (74%); those reporting “intentional” nonadherence when feeling better were more likely to report not using analgesics in the index week (100% vs. 67.7%; $p = .029$) and agree that pain medication can keep you from knowing what is going on in your body ($p = .029$) and were less likely to need stronger pain medication (33.3% vs. 81.5%; $p = .003$). “Unintentional” nonadherence, i.e., forgetfulness/carelessness, though associated with many analgesic beliefs, was not associated with measures of analgesic use in the index period. These preliminary data indicate that different heuristics underlie intentional versus unintentional nonadherence to analgesia and that intentional and unintentional nonadherence behaviors may have different implications for pain treatment outcomes.

Pain imposes significant emotional and physical burden on cancer patients, complicating an already stressful disease trajectory. Analgesics remain a cornerstone for the management of cancer pain, backed up by the World Health Organization (WHO) guidelines (World Health Organization, 1986, 1996) and longitudinal evidence that most cancer pain can be adequately treated by analgesics alone (Zech, Grond, Lynch, Hertel, & Lehmann, 1995). Although a number of complementary and alternative treatments (CAM) are available, their role in cancer pain management is complementary rather than alternative owing to evidence of short-term relief only. The overt simplicity of the WHO analgesic ladder and subsequent treatment guidelines for cancer pain has not been sufficient to improve a culture of guideline-recommended analgesic prescription by providers or adherence to the prescribed regimen by the patients.

Lack of adherence to analgesic treatment has been identified as a significant barrier to pain management in cancer patients (Miaskowski, Dodd, West, Paul, Tripathy, Koo, & Schumacher, 2001). Although studies of analgesic adherence for cancer pain are generally lacking, existing studies have identified barriers that are multifactorial and include analgesic beliefs and concerns (Gunnarsdottir, Donovan, Serlin, Voge, & Ward, 2002; Jacobsen et al., 2010; Tzeng, Chang, Chang, & Lin, 2008), psychocognitive factors such as self-efficacy and satisfaction with pain treatment (Tzeng et al., 2008; Valeberg, Miaskowski, Hanestad, Bjordal, Moum, & Rustoen, 2008), pain and pain treatment factors (pain intensity, pain impact, pain relief, and stated need for analgesics) (Tzeng et al., 2008; Valeberg et al., 2008), and sociodemographic correlates, including age (Tzeng et al., 2008), gender, (Tzeng et al., 2008; Valeberg et al., 2008), educational level (Tzeng et al., 2008), and insurance and payment type (Bryan, De La Rosa, Hill, Amadio, & Wieder, 2008).

The existing studies point to varying levels of reported adherences. In one of the few longitudinal studies of analgesic adherence in patients with advanced cancer, Miaskowski, et al. (2001) reported adherence rates ranging from 85%–91% for around-the-clock (ATC) to 22%–27% for as-needed analgesics (Miaskowski et al., 2001). Adherence appears to vary by type of analgesics being prescribed. A large non-USA study with 915 cancer outpatients found that patients adherent to ATC analgesics varied from 59% for tramadol to 91% for WHO step 3 opioids (Enting, Oldenmenger, Van Gool, van der Rijt, & Sillevs Smitt, 2007). Similarly, adherence rates vary by type of adherence being investigated; for instance a prospective study comparing medication diary and medication electronic monitoring system found analgesic-taking adherence (amount of analgesics taken as prescribed) to be 87% although the timing adherence (taking medication on a scheduled basis) was only 53% (Oldenmenger, Echteld, de Wit, Sillevs Smitt, van der Rijt, 2007). Analgesic adherence rates for cancer pain are much lower in cross-sectional studies using subjective measures. A descriptive study of self-reported adherence among oncology outpatients found that only 41% of patients were adherent to their prescribed analgesic regimen (Valeberg et al., 2008). Similarly, in another study of self-reported adherence to analgesia for cancer pain, a majority (51%) reported lower levels of adherence; only 8.9% of patients were in the high–analgesic adherence group (Tzeng et al., 2008).

Those findings underscores that analgesic adherence is a heterogeneous construct that lends itself to varied results and interpretations based on the measures used or dimension studied. It has been hypothesized that conscious and unconscious processes feed into different dimensions of medication adherence; two distinct mechanisms, intentional nonadherence and unintentional nonadherence potentially contribute to observed patterns of adherence behaviors (Clifford, Barber, & Horne, 2008; Morisky, Green, & Levine, 1986; Wroe, 2002). Intentional nonadherence represents an active process in which the individual makes a choice to deviate from a prescribed treatment regimen. Unintentional nonadherence, on the other hand, is a passive process in which patients may be careless or forgetful about properly following the prescribed regimen (Morisky et al., 1986). These distinct mechanisms may have varied motivational factors associated with them that may be amenable to different interventions. Earlier studies of analgesic adherence have not attempted to isolate the correlates of intentional and unintentional nonadherence in the setting of cancer pain treatment. The purpose of the present cross-sectional correlational study was to generate pilot data to identify if intentional and unintentional dimensions of analgesic adherence are associated with distinct analgesic beliefs and concerns, pain severity, pain management, and demographic correlates. Any intervention to address barriers to medication-taking behavior must generate understanding of factors associated with distinct components of adherence.

METHODS

A convenience sample was recruited from an outpatient medical oncology clinic of a large not-for-profit university health system in the middle Atlantic region. Self-identified African Americans and Whites >18 years of age, diagnosed with solid tumors with the exception of multiple myelomas, and with at least one active prescription of ATC analgesic were invited to participate.

Data Collection Procedures

The study protocol was approved by the Institutional Review Board of the University of Pennsylvania. Providers (oncologists/nurse practitioners) were contacted for their permission to contact their patients. Patients were contacted via telephone to introduce the study and elicit interest. If interested, a brief eligibility checklist was completed and an appointment was set up for consenting and data collection during their next scheduled office visit. An online method of data collection was also available for patients who identified themselves as computer literate, had internet access at home, and had no physical limitations precluding them from completing the survey online. No identifiable personal information was gathered as part of data collection, and patients were identified only using a unique identifier. Each participant received compensation of \$25 for their time and participation.

Study Measures

Morisky Medication Adherence Scale—The Morisky Medication Adherence Scale (MMAS) (Morisky et al., 1986) is a structured 4-item self-report measure of medication adherence with an established concurrent and predictive validity; its Cronbach alpha in different studies have ranged from 0.61 (Morisky et al., 1986) to 0.86 (Erickson et al., 2001). The MMAS allows the investigators to distinguish between intentional and unintentional dimensions of adherence, which, based on the existing science, are separate and distinct phenomena (Bosworth, 2006; Lowry et al., 2005). Statements corresponding to unintentional nonadherence include “I sometimes forget to take my pain medicine” and “I am sometimes careless about taking my pain medicine.” Statements that correspond to intentional nonadherence include “When I feel better I sometimes stop taking my pain medicine” and “If I feel worse when I take the pain medicine, sometimes I stop taking it.” The participants are asked to indicate whether they agree or disagree with each statement. Since its psychometrics were established more than two decades ago (Morisky et al., 1986), the MMAS has been used widely in studying medication adherence in a range of chronic disease settings, including asthma (Schneider, Wensing, Quinzler, Bieber, & Szecsenyi, 2007) hypertension (Ogedegbe, Schoenthaler, Richardson, Lewis, Belue, Charlson, 2007) Parkinson disease (Elm et al., 2007), diabetes (Krapek et al., 2004), cardiovascular disease (Afonso et al., 2006), and chronic multiple medication use (Phatak & Thomas, 2006). In addition, its psychometrics have been established in the cancer pain setting (Tzeng et al., 2008). MMAS is a valid and reliable tool with good concurrent reliability and predictive validity. It has been found to correlate moderately with the standard and more objective measure of pill count (Interclass Coefficient 0.40) (Elm et al., 2007). One study of adherence to antidiabetic medications reported a linear inverse relationship between the objectively measured glycated hemoglobin levels and MMAS scores. A good self-reported adherence on the Morisky nonadherence scale was associated with a 10% decrease in total glycated hemoglobin ($p = .000$) (Krapek et al., 2004).

Visual Analog Scale of Medication Adherence—A single-item visual analog scale (VAS_{DOSE}) (Walsh, Mandalia, & Gazzard, 2002) was used to assess the percentage of ATC analgesic doses taken in the preceding month. This simple horizontal line scale ranges from

0% to 100% in increments of 10%. The patients were instructed to “Identify a number below, showing your best guess about how much medication you have taken in the past month. We would be surprised if this was 100% for most people. 0% means you have taken no medication; 50% means you have taken half your medication; 100% means you have taken every single dose of medication” (Walsh et al., 2002). Despite its simplicity, a number of studies have reported a high correlation between VAS and more objective methods of medication adherence assessment. In a study of adherence to antiretroviral therapy, Walsh et al. (2002) found that the mean self-reported adherence as measured by the VAS over the preceding month was strongly associated with both pill count ($r = 0.75$; $p < .001$) and MEMS TrackCap, a medication event monitoring system ($r = 0.63$; $p < .001$). Furthermore, the VAS was inversely associated with viral load in that study ($p = 0.01$). Similarly, other studies have reported a high level of correlation between 30-day VAS and medication adherence measured through an electronic medication monitoring system ($r = 0.77$; $p < .0001$) and unannounced home pill count ($r = 0.86$; $p < .0001$) (Oyugi et al., 2004).

Pain-Related Variables—The Brief Pain Inventory–Long Form (BPI-LF) was used to gather data on pain and pain treatment variables. The validity and consistency of this instrument is based on the two-factor structure of pain severity and pain impact, and its Cronbach alpha ranges from 0.77 to 0.91 (Cleeland, Nakamura, Mendoza, Edwards, Douglas, & Serlin, 1996; Serlin, Mendoza, Nakamura, Edwards, & Cleeland, 1995). The psychometrics of BPI-LF has been well established with cancer patients (Cleeland et al., 1996; Serlin et al., 1995).

The Medication Side Effects Checklist (MSEC) was used to elicit presence and severity of eight commonly occurring analgesic side effects, including constipation, drowsiness, nausea/vomiting, heartburn, confusion, dry mouth, itching, and nightmares/hallucinations. The participants rated the severity of side effects during the past week on a scale of 0 (no severity) to 10 (extreme severity). The internal consistency of the MSEC has been reported to be 0.81 (Ward et al., 1998).

A Pain Management Index (PMI) was calculated to estimate adequacy of prescribed analgesia. The PMI is based on the WHO analgesic ladder (World Health Organization, 1986, 1996) and takes into account the most potent analgesic prescribed relative to the level of patients’ reported pain. The PMI is estimated by determining which of the three levels of analgesic is prescribed to the patient (1 = nonopioid, e.g., non-steroidal antiinflammatory agents, or acetaminophen; 2 = weak opioid, e.g., codeine and oxycodone or combination agents, such as oxycodone + acetaminophen; and 3 = strong opioid, e.g., morphine, hydromorphone, or fentanyl. Patients’ level of pain was determined by the worst pain item from the BPI-LF (1 = mild pain [0–3]; 2 = moderate pain [4–6]; and 3 = severe pain [7–10]. The index was calculated by subtracting the value of the patient’s reported worst pain level from the value of the WHO most potent analgesic level. A negative score on the PMI indicates inadequately prescribed pain management using analgesics, and scores of 0 indicate acceptably potent analgesic prescription.

Analgesic beliefs and concerns were identified by using the Barriers Questionnaire II (BQ-II) (Gunnarsdottir, Donovan, Serlin, Voge, & Ward, 2002). The BQ-II is a revised version of the original Barriers Questionnaire (Ward et al., 1993) and measures the extent to which patients with cancer reported barriers to pain management. The BQ-II elicits patients’ analgesic beliefs and concerns in eight areas: 1) fear of addiction; 2) fear of tolerance; 3) fear of side effects; 4) fatalism about cancer pain; 5) desire to be a good patient; 6) fear of distracting health provider from treating cancer; 7) fear that the analgesics impair the immune system; and 8) concern that analgesics may mask ability to monitor illness symptoms. The construct validity of BQ-II is established for four factors: physiologic

effects, fatalism, communication, and harmful effects. The Cronbach alpha for the total BQ-II is excellent at 0.89, and the internal consistency for subscales ranges from 0.75 to 0.85 (Gunnarsdottir et al., 2002).

Demographic Variables—A structured investigator-designed questionnaire elicited information on age, gender, self-identified race/ethnicity, marital status, education, income, health insurance, occupation, and employment status. In addition, three brief questions were used for screening patients for inadequate health literacy (Chew, Bradley, & Boyko, 2004). These included: “How often do you have someone help you read hospital materials?” “How confident are you filling out medical forms by yourself?” and “How often do you have problems learning about your medical condition because of difficulty understanding written information?” Responses range from always to never. These questions have been found to be effective (areas under the receiver operating characteristic curve of 0.87, 0.80, and 0.76, respectively) in detecting inadequate health literacy, and the measure performs well compared with the standard validated health literacy measure, the Test of Functional Health Literacy in Adults (Chew et al., 2004).

Because of the small pilot sample, data were analyzed by using nonparametric measures, i.e., Mann-Whitney *U* test for continuous variables and Fisher exact test for categorical variables. Chi-square or *t* test was used if data were normally distributed. All data were analyzed by using Statistical Package for the Social Sciences (SPSS) 16.0.

FINDINGS

Tables 1 and 2 present the distribution of the sample ($n = 76$) by demographic, pain-related, and adherence variables. Median age was 55.5 years (range 31–78), the majority were women (67%), were married (54%), had a college education (51.3%), and had private health insurance (65.8%). The sample comprised about an equal proportion of African Americans (46%) and Whites (54%). The median reported pain levels were 7.0 for “worst pain” and 3.0 for “least pain” (scale 0–10). The PMI was slightly negative at -0.08 , and median pain relief achieved from taking pain medications was only 70%. The sample reported using a median of two CAM modalities.

Reported Adherence to Analgesics

Of the 76 participants, 85.5% took prescribed pain medication in the week before the interview. However, based on VAS_{DOSE}, one in two patients (51%) reported taking only up to 60% of the doses of the analgesics prescribed to them in the previous month. The VAS_{DOSE} adherence was associated with reporting to take pain medications in the week before study participation ($r = 0.435$; $p = .000$) and had a strong negative association with the “intentional nonadherence” subscale of MMAS ($r = -0.530$; $p = .000$). “Unintentional nonadherence” was not associated with either VAS_{DOSE} adherence ($r = 0.024$; $p = .837$) or reporting to use pain medications in the index week ($r = 0.068$; $p = .561$).

Correlates of “Unintentional” Nonadherence. Forgetfulness in Using Analgesics—One in four participants (25.0%) reported being sometimes “forgetful” about taking their prescribed pain medications. Forgetfulness was reported more often in the group that was “concerned” about using too much pain medication (42.9% vs. 18.2%; $p = .038$) and those who believed that it is easier to put up with pain than with side effects of pain medications (16.0 vs. 12.1; $p = .024$). Interestingly, forgetfulness was reported less often by those who needed “stronger” pain medication (0.0% vs. 24.0%; $p = .047$). On further analysis, need for stronger pain medications was associated with significantly higher pain levels [“worst pain” (7.66 vs. 6.31; $p = .026$); “average pain” (5.9 vs. 4.6%; $p = .002$); “pain now” (6.2 vs. 3.5; $p = .001$)] and lower pain relief (“least pain,” 4.7 vs. 3.1; $p = .014$).

Carelessness in Using Analgesics—Fewer than one in five participants (18.4%) reported being sometimes “careless” about taking prescribed pain medications. Similarly to forgetfulness, carelessness was positively associated with “concern” about using too much pain medication (42.9% vs. 9.6%; $p = .003$) as well as need for “stronger” pain medication (22.2% vs. 11.1%; $p = .013$). Also, those reporting carelessness were more likely to report using greater number of CAM modalities for cancer pain (2.86 vs. 1.94; $p = .050$). Compared with Whites, African Americans were more likely to report unintentional nonadherence related to carelessness (28.6% vs. 9.8%; $p = .042$).

Correlates of “Intentional” Nonadherence. Stopping Use of Analgesics When Feeling Better—Of the elicited nonadherence behaviors, stopping taking pain medication when feeling better was the most commonly reported behavior (74%). Patients reporting intentional nonadherence when feeling better were more likely to report not taking pain medication in the index week (100% vs. 67.7%; $p = .029$), less likely to prefer taking pain medications on a regular basis as prescribed (53.9% vs. 83.7%; $p = .006$), and more likely to agree with the statement that pain medication can keep you from knowing what is going on in your body ($p = .029$). Intentional nonadherence when feeling better was associated negatively with the need for stronger pain medication (33.3% vs. 81.5%; $p = .003$) and being prescribed WHO step 3 opioids (0.65 vs. 1.38; $p = .000$). Patients reporting this nonadherence behavior were likely to report lower levels of pain, including worst pain (6.2 vs. 7.4; $p = .010$), least pain (2.9 vs. 4.3; $p = .002$), average pain (4.6 vs. 5.6; $p = .020$), pain now (3.6 vs. 4.8; $p = .040$), and pain-related interference (32.6 vs. 44.5; $p = .001$). Older individuals were more likely to report stopping taking pain medication when feeling better (57 vs. 51 years; $p = .031$).

Stopping Use of Analgesics When Feeling Worse—Over one in three participants (35.5%) reported stopping taking pain medications when feeling “worse”. This reported behavior was associated with the belief that “pain medication can keep you from knowing what is going on in your body” (17.2 vs. 14.0; $p = .043$) and that it is easier to put up with pain than with side effects that come from taking pain medications (16.6 vs. 11.1; $p = .000$). Those reporting to stop taking of pain medications when feeling worse were likely to report more barriers to pain management (BQ-II scores 81.0 vs. 71.3; $p = .035$). Interestingly, patients reporting intentional nonadherence when feeling worse were likely to report significantly lower amount of pain relief obtained from taking analgesics (57% vs. 72%; $p = .012$).

DISCUSSION

The preliminary data indicate that different heuristics may underlie intentional versus unintentional nonadherence to analgesia (Table 3) and that intentional and unintentional nonadherence behaviors may have different implications for pain treatment outcomes. Based on the findings, concern about using too much pain medication was a consistent correlate of unintentional nonadherence and was associated with both forgetfulness and carelessness about using analgesics. Interestingly, patients expressing a need for stronger pain medications were less likely to be “forgetful” but more likely to be “careless” about using pain medications. This association may indicate that one is less likely to ignore analgesics when more pain relief is needed, but may become careless about taking medications if they do not do what they are intended for, i.e., provide adequate relief. Not surprisingly, patients who believed that pain medications can keep you from knowing what is going on in your body were more likely to stop using pain medications when feeling better.

Some earlier evidence in noncancer settings has suggested that certain medication beliefs are more predictive of intentional nonadherence than of unintentional nonadherence. For

instance, in a study of patients with asthma, intentional nonadherence was strongly predicted by patients' appraisal of the "pros and cons" of the medications; however, unintentional nonadherence was not predicted by these beliefs (Wroe, 2002). Our findings also suggest that compared with unintentional nonadherence behaviors, intentional nonadherence behaviors may matter more in patients' use of analgesia, as evidenced in the finding that the intentional nonadherence subscale was strongly associated with both reporting to take pain medication in the index week as well as VAS_{DOSE} adherence in the previous month, whereas the unintentional nonadherence subscale was not associated with either of these reported adherence items.

Stopping the use of pain medications when feeling better was the most common nonadherence behavior in the present study, reported by 3 out of 4 patients. This finding raises the question of whether it is a reasonable decision for a patient to stop or decrease their pain medication when they are experiencing decreasing pain. Is there a reason to argue that patients take their pain medications as prescribed, regardless of decreasing pain? The answer depends on two factors: the motive for stopping use of pain medications when feeling better, and the consequence of this nonadherence behavior. If a patient decreases or stops pain medications and the pain does not get worse, we see no harm in their adjusting of pain medications and negotiating a new plan with their providers. However, some data suggest that inadequate doses of ATC analgesics may exacerbate some cancer pain flares and episodes of breakthrough pain (Hwang et al., 2003). Because this MMAS item elicits only the nonadherence behavior and not the range of consequences, this finding deserves a more complete investigation.

Furthermore, there could be additional motives behind stopping use of analgesics in addition to feeling better, such as underlying concerns about using analgesia, triaging medications because of cost, or concerns for analgesic interaction with other drugs. The latter two reasons in particular may explain the finding that older individuals were more likely to stop using pain medications when feeling better. Evidence suggests that patients may selectively forgo pain medications to be able to afford treatments for other chronic conditions (Kurlander, Kerr, Krein, Heisler, & Piette, 2009). Thus patients may construct a different threshold for what they may consider "feeling better." Furthermore, an underlying conflict in using opioids may predict patients' behavior in adhering to opioids. In a qualitative study with cancer patients, most patients wished they could do without pain medications but resorted to taking them in favor of reduced pain severity and expectation of relief (Meghani & Keane, 2007). Nevertheless, they indicated constant adjusting and tailoring of their pain medications to balance their underlying concerns in using analgesics.

Concerns in using medications are multifactorial, including complexity of medication regimens (such as dosing schedules and frequencies or analgesics and other medications one is taking), medication-related factors (such as side effects), motivational factors (such as amount of relief received from using pain medications, and disease-/drug-specific beliefs, i.e., beliefs surrounding the drug, the disease, or their interactions). For instance, disease/drug beliefs specific to cancer and opioids may include maintaining control and staying ahead of cancer (Flemming, 2010; Meghani & Keane, 2007); this is supported in the present finding that the only belief associated with stopping use of pain medication when feeling better was, "pain medicine can keep you from knowing what's going on in the body."

Carelessness was the least reported nonadherence behavior in this study, but the findings suggested that African Americans were more likely to report "unintentional" nonadherence due to carelessness ($p = .049$). Earlier studies have reported differences in analgesic adherence by race and ethnicity (Dominick, Golightly, & Bosworth, 2005), but to our knowledge no data exist about differences by intentional versus unintentional dimensions.

The present findings must be confirmed in larger studies. Also, our findings were limited owing to small pilot sample, subjective report of adherence, and cross-sectional study design. Because our study pertained to understanding correlates of medication nonadherence, we asked patients to reflect on their prescribed ATC analgesic-taking behaviors. It is possible that although patients were asked specifically to respond about their index pain medications (i.e., ATC analgesics), some patients may have reflected on the analgesic-taking behavior of breakthrough or “as-needed” pain medications. Future studies may clarify if ATC analgesic-taking behaviors may intersect with the use of “as-needed” analgesics as well as adherence to other symptom management medications.

Many questions remain that must be addressed in larger studies about whether belief structures differ between adherers, intentional nonadherers, and unintentional nonadherers. If they do, what beliefs may translate into patients’ actual medication-taking behavior? How do belief structures and corresponding adherence patterns evolve during the course of treatment? For example, beliefs may play a larger role in nonadherence when patients start taking a new medication (Clifford et al., 2008), whereas past experience with pain medications may play a more important role in intentional nonadherence later in the trajectory of treatment. Future studies are needed to understand the role and relative importance of motivational factors (pain levels, degree of pain relief) versus belief structures in intentional and unintentional nonadherence. Also, studies are needed to understand the pathways among intentional and unintentional nonadherence and if they relate to patients’ actual analgesic-taking behavior and pain treatment outcomes.

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Table 1

Demographic and Pain Characteristics (n = 76)

Variable	Median	Range
Age (y)	55.5	31–78
Health literacy (aggregate)	13.0	5–15
Cancer pain duration (mo)	12.0	1–120
Worst pain	7.0	1–9
Least pain	3.0	1–8
Pain interference (aggregate)	37.0	8–63
Relief analgesics provide (%)	70.0	10–90
No. of analgesics prescribed	2.0	0–4
No. of opioids prescribed	1.0	0–3
No. of CAM used	2.0	0–6
Pain Management Index	0.0	–2,+2
BQ-II total (range 0–135)	72.0	42–113
MSEC total (range 0–80)	17.0	8–69
VAS _{DOSE} adherence (%)	60.0	1–100
MMAS total (range 0–4)	1.0	0–4
	n	%
Gender (male)	51	67.1
Marital status		
Married	41	53.9
Never married	15	19.7
Divorced	11	14.5
Widowed	7	9.2
Separated	2	2.6
Race		
White/Caucasian	41	53.9
Black/African American	35	46.1
Income		
<\$30,000	27	35.5
\$30–50,000	16	21.1
\$50–70,000	14	18.4
\$70–90,000	7	9.2
>\$90,000	12	15.8
Education		
Elementary	1	1.3
High school	17	22.4
College/trade school	39	51.3
>College	19	25.0
Insurance *		
Private	50	65.8

Variable	Median	Range
Medicare	22	29.3
Medicaid	11	14.7

BQ-II = Barriers Questionnaire II; MSEC = Medication Side Effects Checklist; CAM = complementary and alternative treatment methods.

* Data do not add to 100% owing to more than one insurance source.

Table 2

Descriptive Data by Intentional and Unintentional Nonadherence

Variable	“Forget” to Take Pain Medicine		“Careless” About Taking Pain Medicine		Stop Taking Pain Medicine If Feel “Better”		Stop Taking Pain Medicine If Feel “Worse”	
	Yes (n = 19)	No (n = 57)	Yes (n = 14)	No (n = 62)	Yes (n = 55)	No (n = 21)	Yes (n = 27)	No (n = 49)
Age (y)	56.0	55.0	56.5	55.0	57.0	54.0	54.0	56.0
Male (%)	47.4	28.1	28.6	33.9	34.5	28.6	25.9	36.7
African American (%)	57.9	42.1	71.4	40.3	43.6	52.4	44.4	46.9
Income \$30,000 (%)	42.2	33.4	42.8	33.9	30.9	33.4	18.5	34.7
Private insurance, (%)	78.9	62.5	78.6	63.9	70.4	57.1	66.7	66.7
Cancer duration (mo)	24.0	16.0	14.5	19.0	24.0	15.0	24.0	16.0
Worst pain (median)	6.0	7.0	6.0	7.0	7.0	7.0	7.0	7.0
Least pain (median)	2.0	3.0	3.5	3.0	3.0	5.0	3.0	3.0
Average pain (median)	4.6	4.9	4.6	4.9	4.6	5.5	4.8	4.8
Pain now (median)	3.0	4.2	3.5	4.0	3.6	4.8	4.0	3.8
Relief with analgesics (%)	70	70	60	70	70	70	60	80
Pain Management Index	−.12	−.07	−.08	−.08	−.09	−.04	−.12	−.06
Pain interference (mean)	27.0	39.0	28.5	39.0	33.0	42.0	35.0	37.0
No. of CAM (mean)	2.0	2.0	2.5	1.0	2.0	1.0	2.0	1.0
BQ-II total (range 0–135)	77.0	68.5	74.5	69.0	72.0	65.0	77.0	67.0
MSEC total (0–80)	19.0	17.0	15.5	17.5	16.0	19.0	17.0	17.0

BQ-II = Barriers Questionnaire II; MSEC = Medication Side Effects Checklist; CAM = complementary and alternative treatment methods; VAS/DOSE = Visual analog scale dose adherence.

Table 3Bivariate Associations^{*} Between Intentional/Unintentional Nonadherence by Demographic and Pain Variables

Unintentional Nonadherence		Intentional Nonadherence	
“Forget” to Take Pain Medicine	“Careless” About Taking Pain Medicine	Medicine If Feel “Better” Stop Taking Pain	Medicine If Feel “Worse” Stop Taking Pain
Positive association			
<ul style="list-style-type: none"> Concern about using too much pain medication ($p = .038$) Easier to put up with pain than with side effects of pain medicine ($p = .024$) 	<ul style="list-style-type: none"> Concern about using too much pain medication ($p = .003$) Need for stronger pain medication ($p = .013$) No. of CAM used ($p = .050$) African American ($p = .042$) 	<ul style="list-style-type: none"> Pain medicine can keep you from knowing what’s going on in the body ($p = .029$) Age ($p = 0.031$) 	<ul style="list-style-type: none"> Pain medicine can keep you from knowing what’s going on in the body ($p = .043$) Easier to put up with pain than with side effects of pain medicine ($p = .000$) BQ-II aggregate score ($p = .035$)
Negative association			
<ul style="list-style-type: none"> Need for stronger pain medication ($p = .047$) 	—	<ul style="list-style-type: none"> Preference to take pain medications on a “regular basis” ($p = .006$) WHO step 3 opioids prescribed ($p = .000$) Need for stronger pain medication ($p = .003$) Pain interference ($p = .001$) Worst pain ($p = .010$) Least pain ($p = .002$) Average pain ($p = .020$) Pain now ($p = .040$) 	<ul style="list-style-type: none"> Amount of “relief” pain medications provide ($p = .012$)

CAM = complementary and alternative treatment methods; BQ-II = Barriers Questionnaire II; WHO = World Health Organization.

^{*} Chi-square/Fisher exact test for categorical variables; t test/Mann-Whitney U test for continuous variables (two-tailed significance).