Factors Associated With Medication Adherence in African American and White Patients With Bipolar Disorder

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Background: African American patients may be less likely than white patients to adhere to maintenance pharmacotherapy for bipolar disorder. The purpose of this study was to examine rates of medication nonadherence, self-perceived reasons for nonadherence, and attitudes associated with nonadherence in these ethnic groups.

Method: 20 African American and 30 white subjects with DSM-IV bipolar I disorder participated in this study. At a single follow-up visit with patients at least 4 months after their first hospitalization for acute mania, we assessed demographics, symptom severity, degrees of adherence, reasons for nonadherence, and self-perceptions regarding factors previously associated with nonadherence using a visual analog scale (VAS). The cross-sectional data that are the subject of this report were obtained from July 1, 2002, through June 30, 2004.

Results: Over 50% of participants in each group were currently either fully or partially nonadherent with medications. Greater than 20% of participants in each group denied having bipolar disorder and described physical side effects from medications as contributing to nonadherence. In principal components analysis of the VAS, 2 components were identified. The first component contained patient-related factors associated with nonadherence, while the second contained a combination of illness- and medication-related factors. African American participants were more likely to endorse patient-related factors associated with nonadherence relative to white participants. Specifically, African Americans self-endorsed a fear of becoming addicted to medications and feeling that medications were symbols of mental illness.

Conclusion: Findings suggest that both African American and white patients with bipolar disorder demonstrate poor medication adherence that they attribute to illness/medication-related factors (denial of illness, physical side effects). However, patient-related factors (fear of addiction, medication as a symbol of illness) accounted for ethnic differences on self-perceived ratings of nonadherence factors. Differences in the reasons for nonadherence relative to culturally biased self-perceptions may help explain nonadherence behaviors in the African American community.

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Adherence with pharmacotherapy for the treatment of bipolar disorder is critical to prevent the recurrence of affective episodes,[1] which have been associated with a cumulative increase in morbidity risks,[1–3] treatment nonresponse,[4] and full syndromal recurrence.[5,6] However, estimates of nonadherence in bipolar disorder are high. They range from 12% to 64%, with longer follow-up intervals accounting for higher nonadherence rates.[1,4,6–9]

Jamison et al.[10] identified a number of factors associated with lithium nonadherence in bipolar disorder and divided them into patient-related, illness-related, and medication-related categories (they also identified a physician-related category that will not be discussed in this report). Many of the patient-related factors associated with nonadherence were demographic in nature (e.g., young age, male sex, lower level of education) and could not be influenced through medical or behavioral interventions. Certain of the nonadherence factors were based on patient self-perceptions and open to cognitive/behavioral or medical remediation (e.g., medication perceived as a symbol of illness, perceived internal locus of control, self-perceived unwanted side effects[10,11]). These remediable factors were the primary focus of this study.

Just how patient-, illness-, and medication-related factors combine to influence adherence in different ethnic groups is largely unknown. Two investigators have reported that white patients with bipolar disorder are more likely than African American patients to maintain full adherence.[12,13] Decreased adherence in African Americans presenting with affective psychosis may be due to patient-perceived increases in side effects associated with greater relative antipsychotic exposure,[13–15] slower antipsychotic metabolizing rates,[16,17] and/or an increased likelihood of misdiagnosis of schizophrenia.[18,19]

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It is also possible that illness-related factors mediate ethnic differences in nonadherence. There is evidence to suggest that unresolved symptoms in African American patients may lead to a poorer course and a greater reliance on psychotropic medications relative to white patients.[20] Lack of insight and a positive regard for manic symptoms, such as euphoria, are illness-related factors of bipolar disorder that may reduce medication adherence.[10,11] In fact, denial of illness is one of the primary reasons given for poor adherence in bipolar disorder by self-report, irrespective of ethnicity.[11,13,21]

Unfortunately, an ethnic comparison of individual self-perceptions with respect to adherence has not been conducted. A better understanding of how ethnicity influences patient-, illness-, and medication-related factors associated with nonadherence is essential to successfully treat multicultural populations with bipolar disorder. Therefore, the aim of this study was to compare not only cross-sectional rates of nonadherence but also the reasons for nonadherence and self-perception about factors previously associated with nonadherence in African American and white participant groups. We predicted that (1) the African American group would be significantly less adherent with medications relative to the white group; (2) the reasons for nonadherence with pharmacotherapy would differ between African American and white groups, with a tendency for the former to endorse medication-related factors (e.g., side effects) and the latter, illness-related factors (e.g., symptoms); and (3) the self-perceptions regarding factors associated with nonadherence would reflect each patient group's reasons.

METHOD

Participants

Participants were recruited for this cross-sectional study as part of the larger, longitudinal University of Cincinnati First-Episode Mania (FEM) study, which is described in detail in previous publications.[22–24] The cross-sectional data that are the subject of this report were obtained from July 1, 2002, through June 30, 2004. This report evaluates 50 patients (20 African American and 30 white) who were assessed at a single follow-up visit regarding medication adherence after completing at least 4 months of follow-up in the FEM study. For the present analysis, inclusion criteria were (1) currently meeting DSM-IV criteria for bipolar I disorder, (2) age 15 to 50 years at the time of follow-up, (3) discharge from first hospitalization with a prescription for a mood stabilizer or antipsychotic agent, (4) completion of at least 4 months of follow-up in the FEM study, and (5) able to communicate in English. Participants were excluded by (1) a diagnosis of mental retardation or documented IQ < 70 and (2) self-reported ethnicity other than African American or white. Only African American and white participants were compared, as individuals from other ethnic groups were too infrequent in our catchment area to permit analysis. After a complete description of the study was provided to the participants, written informed consent was obtained. This study was approved by the University of Cincinnati Institutional Review Board.

Clinical Assessments and Procedures

For the purposes of the present study, participants were evaluated at a single FEM follow-up visit at least 4 months after first hospitalization for acute mania using the Structured Clinical Interview for DSM-IV Axis I Disorders, Patient Edition (SCID-I/P),[25] a demographic questionnaire, symptom rating scales, a clinician-administered medication and adherence questionnaire, and a visual analog scale (VAS) designed to assess attitudes regarding factors previously associated with nonadherence. The investigators who performed the index and follow-up clinical assessments were all white.

Upon follow-up, a current diagnosis of DSM-IV bipolar I disorder was confirmed (the diagnosis had been previously established during a baseline hospitalization) by board-certified or board-eligible psychiatrists or Ph.D. psychologists using the SCID-I/P. Substance use disorders were also reassessed using the substance use disorders module of the SCID-I/P to examine both current and past histories of alcohol and drug use disorders. The investigators are experienced with these instruments and demonstrate good interrater reliability ($\kappa > 0.90$).[22–24]

Demographic information and psychiatric symptom ratings were then obtained by these same investigators from direct patient interviews and review of medical records. Psychiatric symptom rating scales employed included the Young Mania Rating Scale (YMRS),[26] the 17-item Hamilton Rating Scale for Depression (HAM-D),[27] and the Scale for the Assessment of Positive Symptoms (SAPS).[28] The investigators demonstrate good interrater reliability for these symptom measures (intraclass correlation coefficient > 0.90 for YMRS and HAM-D total scores and SAPS global scores[22–24]). A total psychosis score was calculated by summing SAPS global hallucinations, delusions, and thought disorder items.

Information regarding treatment was obtained by direct patient interview, review of medical records, and, when necessary (for unreliable informants), contacting clinicians and asking patients to bring medication bottles to the index follow-up visit. Medication levels were not routinely obtained, as consistent with the naturalistic design of the larger FEM study. The amount and type of medication prescribed were recorded week by week for the index 4-month follow-up interval. For this analysis, we specifically examined the use of conventional antipsychotics (e.g., phenothiazines and haloperidol), atypical antipsychotics (olanzapine, risperidone, quetiapine, and clozapine), and both established and putative mood sta-

bilizers (lithium, valproate, carbamazepine, lamotrigine, and new antiepileptic drugs, e.g., topiramate). From these records, we calculated the percent of follow-up that each patient was prescribed a given type and class of medication and the mean dose and duration and maximum dose and duration for lithium, anticonvulsants, typical antipsychotics, and atypical antipsychotics over the past 4 months. Additionally, it was determined whether or not participants completed an adequate trial of each medication based upon accepted clinical practice guidelines.[29,30]

Adherence information was formally assessed using a structured, clinician-administered questionnaire.[11,13,21] Each participant's level of adherence to prescribed medications was assessed using the treatment data based on definitions from our previous work[11,12]: (1) full adherence, in which pharmacologic treatment was taken ≥ 75% of the time as prescribed; (2) total nonadherence, in which pharmacologic treatment was taken ≤ 25% of the time as prescribed; and (3) partial adherence, in which pharmacologic treatment was taken between these 2 extremes. This rating was obtained by reviewing week-by-week interval medication use with each patient and with family members and clinicians, when indicated (i.e., if a patient's reliability was suspect). From this week-by-week review, the percent of follow-up in which patients exhibited each category of adherence was determined for each prescribed psychotropic medication. We have established good reliability for this rating ($\kappa > 0.99$). A mean adherence measure was calculated by summing the follow-up weeks in full adherence for all prescribed medication classes, weighted by the total number of weeks on each medication (e.g., a participant taking 2 medications would be based on 32 weeks).

If some degree of nonadherence was present, the participant was asked to give his or her self-perceived reasons for nonadherence without further prompting. For the purpose of analysis, reasons for nonadherence were categorized as patient-related, illness-related, or medication-related based on the previous literature.[10,11] These reasons included, but were not limited to, physical and cognitive side effects (specifically listed if endorsed), lack of efficacy, lack of control over life/mood, denial of illness (poor insight), cost, lapse of prescription, loss of prescription/medication, lack of knowledge regarding illness/medications, others encouraging nonadherence, patient assumption of recovery and no further need of pharmacologic treatment, "self-medication" with alcohol and drugs, fear of becoming addicted to medications, medications seen as a symbol of mental illness, patient missing positively regarded symptoms, poor memory, and poor continuity of care.

Finally, a VAS was developed and administered to assess participant self-perceptions toward factors previously associated with medication nonadherence.[10,11] The VAS was filled out by the participants, who were asked to make a mark along a 100-mm line to indicate their level of agreement or disagreement with 14 statements associated with medication nonadherence (see Appendix 1, which includes only the 11 items retained after the validity/reliability analysis, as reported below).

Statistical Analysis

All statistical analyses were conducted using SPSS for Windows version 11.0.1 (SPSS, Chicago, Ill.). Mean differences in demographic variables, medication status, symptom rating scale scores, and medication adherence levels between African American and white participants were assessed using simple statistics (independent samples t tests, Mann-Whitney U tests, or χ^2 tests).

The individual, self-reported reasons for nonadherence were tabulated and converted to percentages. Only the reasons for nonadherence that were self-endorsed by ≥ 20% of the individuals within each ethnic group are reported in the text as clinically relevant. Between-group comparisons of these individual reasons for nonadherence were conducted using χ^2 tests. Additionally, all self-endorsed reasons for nonadherence were collapsed into either a patient-related or an illness/medication-related category based on the results of a principal components analysis (PCA; described below), and further between-group comparisons were made using χ^2 tests.

Principal components analysis with varimax rotation was performed on 14 items comprising the VAS, which was developed utilizing items previously related to medication nonadherence (see Appendix 1). A scree plot was used to determine the number of interpretable components, and the strength of the individual item loadings on each component was examined. The items within identified components were then assessed separately using reliability analyses to examine item-total correlations and Cronbach's α with each item deleted (to assess the relative importance of each item). Finally, Cronbach's α coefficient was calculated as a measure of the internal consistency of the separate components identified in PCA based on the mean interitem correlation, and Pearson bivariate correlation coefficients were calculated between each component identified in PCA and overall compliance level.

A 2 (African American, white) × 2 (PCA component 1, PCA component 2) mixed analysis of variance (ANOVA) with repeated measures on the second variable was conducted on the VAS data to examine patient self-perceptions regarding factors previously associated with nonadherence. Follow-up t tests between and within groups, utilizing the Bonferroni correction, were also conducted in the presence of a statistically significant omnibus effect and to examine the individual VAS items that accounted for any identified group difference. Finally, post hoc tests were conducted as necessary for completeness.

Table 1. Demographic and Clinical Characteristics of the Bipolar Patient Sample by Ethnicity

Characteristic	African American (N = 20)	White (N = 30)	Test Statistic[a]	p Value
Demographic				
Age, mean (SD), y	30 (8)	28 (8)	1.19	.24
Education, mean (SD), y	13 (2)	13 (3)	0.15	.88
Sex, female, N (%)	11 (55)	13 (43)	0.65	.42
Married/common law, N (%)	2 (10)	4 (13)	0.13	.72
Employment status, mean (SD)[b]	5 (3)	5 (2)	0.19	.85
Income level, mean (SD)[c]	2 (1)	2 (1)	0.90	.37
Parental employment, mean (SD)[b]	4 (2)	4 (2)	0.01	.99
Parental education, mean (SD), y	14 (3)	14 (3)	0.66	.52
Medication status				
Chlorpromazine equivalent, mean (SD), mg[d]	249 (266)	129 (207)	1.78	.08
Antipsychotic monotherapy, N (%)	12 (60)	13 (43)	1.33	.25
Mood stabilizer monotherapy, N (%)	9 (45)	10 (33)	0.69	.41
Mood stabilizer/antipsychotic combination, N (%)	8 (40)	6 (20)	2.38	.12
Rating-scale score, mean (SD)				
YMRS total	9 (9)	8 (9)	0.23	.82
HAM-D total	4 (4)	5 (5)	0.62	.54
SAPS total	3 (3)	2 (3)	1.35	.18
Adherence level, N (%)[e]				
Full adherence	9 (45)	11 (37)	0.38	.83
Partial adherence	2 (10)	4 (13)		
Total nonadherence	9 (45)	15 (50)		
Subjects endorsing at least 1 nonadherence factor, N (%)				
Patient-related factors	4 (20)	2 (7)	2.02	.16
Illness-related factors	9 (45)	10 (33)	0.69	.41
Drug-related factors	12 (60)	19 (63)	0.06	.81

[a]Continuous data evaluated with the t statistic; ordinal data evaluated with the z statistic; nominal data evaluated with the χ^2 statistic.
[b]Premorbid employment rated on a Likert-style scale: 0 = student, 1 = high executive/professional, 2 = lesser professional, 3 = administrative personnel, 4 = clerical/sales, 5 = skilled manual labor, 6 = semiskilled manual labor, 7 = unskilled manual labor, 8 = unemployed. Students were given the lowest score since we found this group to have the best outcome in previous studies.[32,33]
[c]Premorbid income level rated on a Likert-style scale: 1 = $0 to $10,000; 2 = $10,001 to $20,000; 3 = $20,001 to $35,000; 4 = $35,001 to $50,000; 5 = $50,001 to $75,000; 6 = $75,001 to $100,000; 7 = > $100,000.
[d]Each patient's mean daily dose of antipsychotic medication during the previous 4-month interval was converted to an approximate mg equivalent of 100 mg of chlorpromazine based on Pies[34] and current recommended dosing for newer compounds.
[e]Full adherence = adherent with medication ≥ 75% of the time as prescribed; partial adherence = adherent with medication < 75% but > 25% of the time as prescribed; total nonadherence = adherent with medication ≤ 25% of the time as prescribed.
Abbreviations: HAM-D = Hamilton Rating Scale for Depression, SAPS = Scale for the Assessment of Positive Symptoms, YMRS = Young Mania Rating Scale.

RESULTS

Demographic and clinical characteristics of the study groups by ethnicity are presented in Table 1. There were no statistically significant differences between groups on any demographic factor including age, years of formal education, sex, marital status, employment status, and income level. Moreover, the groups did not differ statistically on medication status, symptom rating scale scores, or overall levels of adherence with psychotropic medications. Although the African American sample was somewhat more likely than the white sample to receive a higher mean daily dose of antipsychotic medication and combination therapy, this group also received relatively more elevated positive symptom ratings (moderate vs. mild).

Greater than 20% of the white sample indicated a lack of insight about their illness (23%, N = 7), general physical side effects from medications (40%, N = 12), especially sedation (30%, N = 9), and general cognitive side effects (27%, N = 8). Greater than 20% of the African American sample indicated a lack of insight (40%, N = 8) and general physical side effects (50%, N = 10), especially sedation (20%, N = 4). There were no statistically significant group differences in the number of participants who self-endorsed any of the above individual reasons for nonadherence. Moreover, as seen in Table 1 (bottom), there were no statistically significant group differences in the number of participants who self-endorsed at least 1 patient-, illness-, or medication-related factor associated with nonadherence.

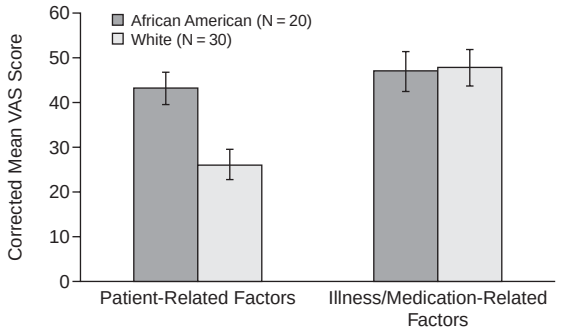
A scree plot indicated a 2-component solution for the VAS developed for this study, which incorporated components with eigenvalues greater than 2. The first component accounted for 16% of the variance. With the addition of a second component, the solution explained 32% of the cumulative variance.

For each component, the item loadings, item-total correlations, and α coefficients with each item deleted are presented in Table 2. The first component was interpreted as containing primarily patient-related factors, while the second component contained a combination of illness- and medication-related factors. Loadings under .40 were not interpreted.[31] Both the first and second components had overall α levels equal to .59. Correlation analysis in-

Table 2. Principal Factor Loadings for Medication Adherence After Varimax Rotation in African American and White Patients With Bipolar Disorder

Factor	Factor Loading	Item-Total Correlation	α if Item Deleted
Component 1			
(patient-related factors)			
Knowledge about illness	.66	.46	.46
Memory	.63	.36	.53
Medication as symbol of illness	.58	.41	.50
Encouragement	.47	.36	.54
Fear of addiction to medication	.43	.19	.62
Component 2			
(illness/medication-related factors)			
Efficacy of medication	.68	.53	.46
Insight	.60	.27	.57
Substance use	.59	.30	.56
Course of illness	.52	.28	.56
Side effects	.50	.30	.56
Regard for symptoms	.46	.30	.56

Figure 1. Mean Overall (collapsed over individual items) Patient- and Illness/Medication-Related Visual Analog Scale (VAS) Scores[a,b] by Ethnicity



[a]Higher scores reflect a greater likelihood of nonadherence with medications.
[b]Error bars represent the standard error of the mean.

dicated a nonsignificant positive relationship between current compliance levels and VAS scores on the first component ($r = .12$, $N = 50$, $p = .20$) and a significant positive relationship with the second component ($r = .26$, $N = 50$, $p < .05$).

The VAS scale means revealed that the ethnic groups responded differentially to the patient-related and illness/medication-related factors associated with nonadherence. Group means indicated that African American participants rated patient-related factors associated with nonadherence higher than white participants on average (mean [SD] = 42.8 [19.5] vs. 26.1 [17.9]) and illness/medication-related factors similarly to white participants (mean [SD] = 46.4 [19.5] vs. 47.9 [20.4]). This impression was confirmed by a repeated-measures ANOVA that resulted in a significant group-by-component interaction ($F = 5.44$, $df = 1,48$; $p < .05$).

Between-group comparisons on the observed means utilizing the Bonferroni correction indicated that differences between groups on patient-related factors ($t = 3.11$, $df = 48$, $p < .01$) were primarily responsible for the omnibus interaction. Specifically, fear of addiction (to medication) ($t = 2.22$, $df = 48$, $p < .05$) and medication as a symbol of illness ($t = 2.07$, $df = 48$, $p < .05$) were the only items that accounted for significant individual patient-related VAS score group differences. Within-group comparisons on observed means using the Bonferroni correction indicated that the white group recorded significantly lower scores on the patient-related factors relative to illness/medication-related factors ($t = 4.46$, $df = 29$, $p < .001$), while the African American group's means were not significantly different.

To examine the influence of current compliance levels on these VAS score results, we conducted a post hoc analysis of covariance using compliance level (full, partial, non-) as the covariate. As can be seen in Figure 1, a significant group-by-factor type interaction ($F = 5.18$, $df = 1,47$; $p < .05$) was essentially identical to that in the prior ANOVA. In this analysis, compliance level at the time of the assessment did not have any significant influence on the model.

To examine whether the VAS was valid in detecting nonadherence, we conducted a post hoc discriminant function analysis between the nonadherent group and the partial- and full-adherence groups combined. Classification results indicated that of the total sample, 84% were correctly classified compared to 50% that would be classified correctly by chance alone. Of the nonadherent patients, 87% were correctly classified followed by 80% of the fully adherent patients.

DISCUSSION

The current study was conducted to examine ethnic differences in the rates of adherence, reasons for nonadherence, and self-perceptions regarding remediable factors previously associated with nonadherence. Our prediction of ethnic differences in medication adherence levels as previously described[12,13] was not supported by the present data, nor was our prediction that nonadherence was differentially mediated by medication- and illness-related factors in African American and white participant groups, respectively. Instead, participants in both groups denied having bipolar disorder (an illness-related factor) and described physical and/or cognitive side effects (medication-related factors) as the major reasons for being either fully or partially nonadherent with medications.

The patient (PCA component 1)– and illness/medication (PCA component 2)–related components comprising the VAS accounted for the same percentage of variance (16%) and had similar reliability coefficients. Although the reliability of the 2 components was modest in the present sample (α levels = .59), the importance of each individual

item was evidenced by strong item-total correlations and reduced α levels when individual items were deleted from the analysis (with the possible exception of fear of addiction; see Table 2).

The construct validity of the VAS was confirmed by its ability to detect nonadherent patients in discriminant function analysis. Moreover, both the illness/medication-related component and the patient-related component of the VAS were positively related to current, overall adherence levels as expected. However, although the illness/medication component was significantly related to adherence level, the patient component was not. Thus, the patient-related component may also involve certain psychological constructs that are not directly related to adherence. In fact, by participant self-report, only illness/medication-related factors directly contributed to nonadherence behaviors. This suggests a possible lack of awareness that patient-related factors, which most likely derive from personal and cultural beliefs, also influenced patients' adherence behavior. In other words, although both the African American and white groups' self-perceptions of factors previously associated with nonadherence reflected the illness/medication-related reasons for nonadherence they endorsed, the African American group was significantly more likely to agree with certain patient-related perceptions of nonadherence as well, especially the ideas that medications are perceived by others as a symbol of mental illness and that they personally feared becoming addicted to their prescribed psychiatric medications. These ethnic differences may reflect cultural beliefs that indirectly influence medication adherence. Note, however, that current levels of adherence had no influence on the VAS result, indicating that current adherence does not necessarily influence one's self-perceptions about factors associated with adherence.

As with any clinical study, there are limitations that must be considered when interpreting these findings. First, patients were recruited at a single site, so that these findings may not be generalizable to other regions of the country or other treatment settings. Second, we did not systematically obtain medication levels to verify patient reports of treatment adherence. Nonetheless, the naturalistic approach taken here has been used in previous reports and is reliable.[11,22] Third, despite the lack of statistical differences in illness severity measures at the time of assessment (i.e., symptom ratings, medication status), the influence of these factors on the present results cannot be ruled out completely. A final issue to consider in interpreting the present results is that the ethnic groups were demographically similar, possibly suggesting some degree of recruitment bias (e.g., African American samples are often disadvantaged relative to white samples in terms of income and education). However, demographic similarities were not the result of group matching by design and are thought primarily to represent similarities in the Cincinnati tristate catchment area served by the University of Cincinnati Medical Center. Additionally, the lack of demographic confounds allows a more straightforward interpretation of the primary effects.

Although factors associated with nonadherence have been described as patient-, illness-, and medication-related,[10,11] the current findings suggest that a distinction between patient-related factors and illness/medication-related factors may be more valid based on the PCA. These findings also suggest that African American and white patients both demonstrate poor adherence (over 50% of the participants in each group were either fully or partially nonadherent with medications) that they attribute to illness/medication-related factors (i.e., denial of illness, side effects of medication). However, patient-related factors (i.e., fear of addiction to medications and medication as a symbol of illness) seemed to account for ethnic differences on self-ratings of self-perceptions regarding nonadherence factors. This might suggest that patients are sometimes unaware that their own culturally biased attitudes regarding mental illness and psychiatric medications influence their behavioral tendencies to adhere with treatment as much as, or more than, the actual symptoms of the illness and side effects of medication themselves. These same biases may alter the perceived significance of side effects and symptoms, differentially affecting the ability to tolerate either. Therefore, a goal for clinicians who treat multicultural populations should be to become aware of cultural variability in self-perceptions regarding factors that might influence medication adherence. This might be done through the use and discussion of rating scales such as described herein, cognitive-behavioral therapy and behavior modification techniques, or simply by the provision and teaching of detailed information regarding bipolar disorder and the medications prescribed for it. These techniques may help to minimize the self-perceived stigma associated with taking psychiatric medications for bipolar disorder and alleviate fears of becoming addicted to them.

Drug names: carbamazepine (Carbatrol, Tegretol, and others), chlorpromazine (Thorazine, Sonazine, and others), clozapine (Clozaril, FazaClo, and others), haloperidol (Haldol and others), lamotrigine (Lamictal), lithium (Lithobid, Eskalith, and others), olanzapine (Zyprexa), quetiapine (Seroquel), risperidone (Risperdal), topiramate (Topamax).

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Appendix 1. Visual Analog Scale for Factors Associated With Medication Adherence in Bipolar Disorder

Name: _____ Date: _____

Directions: Please make a mark along the line to show how strongly you agree or disagree with each statement. You may place your mark at any location on the line.

Encouragement
My family and friends discourage me from taking my medicine.

Disagree ⊢——————————⊣ Agree

Knowledge
I know little about my disorder.

Disagree ⊢——————————⊣ Agree

Memory
I have trouble remembering to take my medicine.

Disagree ⊢——————————⊣ Agree

Regard for Symptoms
I enjoy some of the symptoms of bipolar disorder.

Disagree ⊢——————————⊣ Agree

State of Illness
I believe I have recovered from bipolar disorder.

Disagree ⊢——————————⊣ Agree

Course of Illness
I believe the course of my illness has been good (few symptoms and mood episodes).

Disagree ⊢——————————⊣ Agree

Substance Use
I believe street drugs and/or alcohol can help control my symptoms.

Disagree ⊢——————————⊣ Agree

Side Effects
I have uncomfortable side effects from my medicine.

Disagree ⊢——————————⊣ Agree

Fear
I am afraid of becoming addicted to my medicine.

Disagree ⊢——————————⊣ Agree

Efficacy
I believe my medicine does not work well.

Disagree ⊢——————————⊣ Agree

Symbol of Illness
I believe other people would judge me negatively if they knew I was taking medicine.

Disagree ⊢——————————⊣ Agree