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Psychosocial factors associated with medication adherence in ethnically and socioeconomically diverse patients with epilepsy

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Abstract

The current study examined psychosocial correlates of medication adherence in a socioeconomically and racially diverse sample of patients with epilepsy. Fifty-five patients with epilepsy completed standardized self-report questionnaires measuring depression, stress, social support, and medication and illness beliefs. Antiepileptic drug (AED) adherence was measured using the 8-item Morisky Scale; 36% reported poor adherence. We tested which psychosocial factors were independently and most strongly associated with AED adherence. Stress and depression were negatively correlated with adherence, while perceived social support was positively correlated with adherence (*P*s < .05). When including all three of these variables and relevant covariates in a multiple regression model, only perceived social support remained a significant predictor of adherence (*P* = .015). This study is one of the first to suggest the importance of targeting social support in screening and intervention approaches in order to improve AED adherence among low-income, racially/ethnically diverse patients with epilepsy.

Keywords

Epilepsy; Medication adherence; Psychosocial factors; Race/ethnicity; Minority patients

1. Introduction

Antiepileptic drugs (AEDs) are the primary treatment for patients with epilepsy, and near-perfect adherence to medications is required for optimal seizure control [1]. However, nonadherence to AEDs is common and is associated with increased mortality, hospitalizations, fractures, head injuries, and impaired quality of life [2]. Identifying modifiable factors that contribute to AED nonadherence will inform the development of interventions to improve adherence and health outcomes for patients with epilepsy.

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Depression [3], low social support [4], stress [5], and negative illness and medication beliefs [6,7] are associated with AED nonadherence. Our understanding of these associations is very limited as most previous studies have examined psychosocial predictors in isolation. Additionally, few studies have examined these predictors in socioeconomically disadvantaged minority patients who have the lowest rates of adherence [8]. Psychosocial and clinical characteristics of patients with epilepsy vary by socioeconomic status and race/ethnicity [9], suggesting possible unique predictors of AED adherence for low-income, minority patients. Identifying which psychosocial factors are independently and most strongly associated with AED adherence is critical for identifying modifiable intervention targets to improve adherence and, in turn, health outcomes among low-income, minority patients with epilepsy.

The aims of this study was to examine potential psychosocial correlates of AED adherence in a low-income, racially/ethnically diverse patient sample with epilepsy and to characterize which factors are most strongly associated with adherence.

2. Methods

2.1 Study design and patient selection

We enrolled fifty-five socioeconomically and ethnically diverse English- and Spanish-speaking patients over the age of 18 from NYU-affiliated neurology and epilepsy clinics at Bellevue Hospital. Bellevue Hospital is a public hospital that serves a diverse and medically underserved population. Forty-five percent of Bellevue patients are of Hispanic ethnicity. Patients were recruited between August 2012 and June 2014 and had either focal or generalized epilepsy and were required to have had at least one seizure in the past six months. Diagnosis of epilepsy was confirmed via review of medical records and presence of epileptiform activity on an electroencephalogram. Patients who had known or suspected psychogenic non-epileptic events were excluded. The Rapid Estimate of Adult Literacy in Medicine–Short Form (REALM-SF) was used to ensure the patients were able to read the questionnaires. Patients who scored > 4 on the REALM-SF were included in the study. The study was approved by the local institutional review board. After obtaining written informed consent, patients answered questions about their epilepsy management and treatment and completed a series of validated self-reported assessments. Participants completed all questionnaires with the assistance of a bilingual research assistant as needed.

2.2 Measures

Medication adherence was measured using the 8-item Morisky Medication Adherence Scale (MMAS) [10]. A summed score was calculated, with higher scores reflecting greater adherence (maximum adherence = 8). As done in prior studies [11], adherence was treated as a continuous variable instead of a dichotomous variable in order to examine relationships with *quality* of adherence and because of the small sample size. Beliefs about AEDs were measured with the 10-item Beliefs About Medicines Questionnaire (BMQ) [12]. The BMQ includes two sub-scales (‘necessity’ and ‘concerns’), which were examined separately. Depression was measured with the 6-item Neurological Disorders Depression Inventory for Epilepsy (NDDI-E) [13]. A cutoff score of > 15 was used to identify patients with symptoms

consistent with a diagnosis of major depressive disorder (MDD). Illness perceptions was measured with the 8-item Brief Illness Perception Questionnaire (Brief-IPQ) [14]. Perceived social support was measured with the 12-item Interpersonal Self Evaluation List (ISEL-12) [15]. Stress was measured using the abbreviated 4-item Perceived Stress Scale (PSS) [16].

2.3 Data analyses

Using Pearson's bivariate correlation, we first examined which psychosocial variables were associated with adherence. Variables that were correlated with adherence ($P < .05$) were selected as simultaneous predictors in a multivariate linear regression. Age, sex, income, seizure frequency, number of AED medications, time since epilepsy diagnosis, and antidepressant medication usage were included as control variables. Statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS Version 21.0)

3. Results

Table 1 summarizes sample descriptive statistics. Mean adherence scores were 5.93 (± 1.55); using the established cutoff of scores <6, we found that this corresponds to a 36% rate of poor adherence. Table 2 shows results from Pearson's bivariate correlations and linear regression analysis. Depression, higher perceived stress, and lower perceived social support were significantly correlated with poorer AED adherence. Neither the illness perception scale nor the beliefs about medications subscales were correlated with adherence. When entering all significant psychosocial variables (depression, stress, and social support) and relevant control variables (age, sex, income, seizure frequency, number of AEDs, time since diagnosis, and antidepressant medication usage) were included in the multiple linear regression, only social support remained a significant predictor of adherence. This result was replicated when treating adherence as a dichotomous outcome in a logistic regression model.

4. Discussion

This study examined psychosocial factors correlated with AED adherence and identified which factors are most strongly associated with adherence in a predominately low-income, diverse patient sample. Adherence was negatively correlated with depression and stress and positively correlated with perceived social support. Adherence was not correlated with illness perceptions or beliefs about medication (BMQ). When depression, stress, and social support were included in the same model, controlling for key demographic and clinical characteristics, only social support remained correlated with adherence.

Rates of adherence from this study were comparable to those of the only other study that has examined self-reported AED adherence in a predominately minority sample (e.g., African American patients) [6]. The finding that only certain psychosocial factors were correlated with adherence may be surprising given evidence showing each of these to be related to adherence in other disease conditions [17]. However, two other studies have found nonsignificant relationships between illness perceptions [18] and AED beliefs [6] and adherence, although these studies used two different measures of adherence, with the former utilizing an objective drug treatment assessment of adherence. The latter study utilized two measures of adherence and found nonsignificant results only with the Morisky measure of

adherence. The convergence of our findings with other preliminary AED adherence studies points to a discrepancy between correlates of adherence in epilepsy versus other disease conditions. Indeed, some evidence supports that psychosocial predictors of medication adherence vary by disease condition [19]. Future research with a larger sample of epilepsy patients is needed to address whether disease condition moderates the relationship between psychosocial variables and adherence and the relative role that race/ethnicity may additionally play in these relationships.

The result that social support is a more robust predictor of adherence than depression or stress is a novel finding in patients with epilepsy and parallels one large-scale study indicating that patients with epilepsy who lack social support have the poorest quality of life, even when controlling for seizure severity and medication adherence [20]. Given the unique role of social support in predicting positive health outcomes among Hispanic verses non-Hispanic patients [21], these results are concordant with the high proportion of Hispanics in our sample. Although higher social support predicted better adherence over and above stress and depression, these variables are correlated [22] and may have complex associations with adherence as mediators or moderators. We did not find support for the mediating or moderating role of any of these variables on adherence in exploratory analyses, but this may have been due to limited statistical power.

Our results provide evidence that social support has substantial effects on adherence to medications in predominately low-income, racially/ethnically diverse patients with epilepsy. Since social support is a modifiable risk factor, these results point to important considerations relevant to screening and intervention approaches that target social support. To date, very limited standardized interventions/programs have been developed to promote social support for patients with epilepsy, and most tertiary medical centers do not offer these interventions for their patients.

For this study, we were primarily interested in perceived emotional and instrumental support, which predicts a range of important outcomes but does not directly index availability (i.e., actual support), quality of social support, or medication regimen-specific support. These factors may be important to consider for screening and treatment development and implementation. Precise determination of which types of social support are associated with the greatest improvements in medication adherence will be essential for developing focused and effective interventions.

4.1 Limitations

Several limitations of the current study merit further investigation. First, our small sample size may have resulted in limited power to detect significant results. Thus, although replication studies with larger sample sizes are needed, our study offers novel insights into predictors of medication adherence in low-income and racially/ethnically diverse patients with epilepsy. This is a clinically important issue that that has not been comprehensively addressed in prior studies. As such, this pilot study may also inform future investigations in this patient population. Second, as a cross-sectional study, causal conclusions cannot be made about whether social support directly leads to better adherence. However, convergence of our findings with evidence from experimental and longitudinal studies substantiates our

interpretation that social support predicts adherence rather than the other way around. Third, we relied on self-report measures. Although we applied widely utilized standardized inventories, self-report measures of adherence are subject to retrospective and recall bias. Future research utilizing direct (testing medication levels in biological fluid) and/or multiple indirect methods of adherence (medication monitoring, prescription claims data) that minimize recall bias would enhance our understanding of psychosocial influences on adherence. Relatedly, the Morisky measure of adherence is not well suited to comprehensively assess the reasons for poor medication adherence. Although this is a conceptually distinct construct than adherence itself and is thus beyond the scope of this paper, future studies with diverse samples would do well to measure degree of adherence as well as the associated reasons underlying this outcome. Fourth, we were unable to examine the possible relationship between insurance coverage and adherence. Although we controlled for income in our analyses, given the low socioeconomic status of our sample and the prospective challenges of medication costs, future studies should report on the relationship between insurance status (e.g., Medicaid or no insurance) and adherence. Finally, although our sample was predominately low-income and Hispanic, we cannot conclude that results generalize to Hispanics because we were unable to examine this group separately due to small cell sizes. Future studies should examine individual racial/ethnicity groups in order to detect cultural differences that may influence adherence and related outcomes. Similarly, generalizability of results may extend only to individuals with the clinical profile of patients included in this study (e.g., patients who have experienced at least one seizure in the past six months). Future studies with heterogeneous patient samples are needed.

5. Conclusion

The high rate of nonadherence to medications in patients with epilepsy and the severity of outcomes associated with less-than-perfect adherence to AEDs warrant concern and scientific investigation to identify modifiable factors to improve adherence. This study is one of the first to suggest the importance of targeting social support in screening and intervention approaches in order to improve AED adherence among low-income, racially/ethnically diverse patients with epilepsy.

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Conflict of interest statement: Dr. French serves as the president of The Epilepsy Study Consortium, a nonprofit organization. New York University, where Dr. French is employed, receives a fixed amount from the Epilepsy Study Consortium toward Dr French's salary. The money is for work performed by Dr. French on behalf of The Epilepsy Study Consortium, for consulting and clinical trial–related activities. Dr French receives no personal income for these activities. Within the last year, The Epilepsy Study Consortium received payments for research services from Acorda, Alexza Pharmaceuticals, Becker Pharmaceutical, Bio Pharm Solutions, Biotie Therapies, Brabant Pharma, Eisai Medical Research, Georgia Regents University, GlaxoSmithKline, GW Pharma Ltd, Marinus, Novartis, Pfizer, Pfizer-Neusentis, SK Life Science, Sunovion, Supernus Pharmaceuticals, Takeda Pharmaceuticals International, UCB Inc/Schwarz Pharma, Ultragenyx Pharmaceuticals and Upsher-Smith. Dr. French is also an investigator at NYU on studies for Eisai Medical Research, LCGH, Impax, Mapp

Pharmaceuticals, Novartis, UCB Inc./Schwarz Pharma, Upsher-Smith, and an investigator with the Human Epilepsy Project (HEP), which receives research support from UCB, Pfizer, Lundbeck and Eisai.

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Table 1

Demographic and Clinical Characteristics of Study Population.

Characteristics	Overall (*N* = 55)
Age (in years), mean ± SD	38.26 ± 10.78
Gender	
Female	27 (49.1)
Race/Ethnicity	
Non-Hispanic, White	9 (16.4)
Hispanic	20 (36.4)
Black/African-American	7 (12.7)
Asian	5 (9.0)
Other/unknown	14 (25.5)
Marital status	
Single (never married, widowed, or divorced)	33 (60.0)
Married/living with partner	22 (40.0)
Years of education	
Less than high school	12 (23.6)
High school or GED	15 (27.3)
Some college/tech school certificate	10 (18.2)
College or graduate	17 (30.9)
Family income per year	
≤ $40,000	37 (67.3)
Medication adherence, mean ± SD	5.93 ± 1.55
Nonadherence[a]	20 (36.4)
Depression (NDDI-E cut off)[b]	21 (38.2)
Seizure frequency	
Less than once per month	10 (18.2)
More than once per month	26 (47.3)
More than once per week	14 (25.5)
Number of seizure medications, mean ± SD	1.92 ± .781
Current antidepressant medication use	11 (20.0)
Beliefs about medications (concerns), mean ± SD	3.09 ± 1.16
Beliefs about medication (necessity), mean ± SD	4.01 ± 1.00
Illness beliefs, mean ± SD	48.25 ± 12.76
Social support, mean ± SD	35.85 ± 8.61
Stress, mean ± SD	7.18 ± 2.96

Note. Data are presented as number (percentage) unless otherwise indicated.

[a] MMAS scores <6 = low adherence.

[b] NDDI-E scores > 15 = symptom criteria consistent with diagnosis of MDD.

Table 2

Association between medication adherence and psychosocial variables.

Variable	*r*	β (95% CI) [a]
Depression	−.379**	.203 (−.956–2.309)
Perceived stress	−.299*	−.038 (.027–.224)
Perceived social support	.346*	.618 (−.254–.211)*
Illness beliefs	−.244	-
BMQ-Necessity	.062	-
BMQ-Concerns	−.058	-

r = Pearson correlation coefficient; β = regression coefficient; CI = confidence interval; BMQ = Beliefs About Medicines Questionnaire.

[a] Multivariable model includes variables that are significantly correlated with medication adherence and is adjusted for age, sex, income, seizure frequency, number of antiepileptic medications, time since diagnosis, and antidepressant medication usage.

* *P*<05;

** *P*<01.