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ETHNIC DIFFERENCES IN ANTIDEPRESSANT RESPONSE: A PROSPECTIVE MULTI SITE CLINICAL TRIAL

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Abstract

Background—Although depression is a highly prevalent condition that occurs in all ethnic groups, the influence of ethnicity on treatment response still remains unclear.

Methods—A prospective 8-week, open-label clinical trial comparing the efficacy and side-effects of citalopram (CIT) with dose escalation (20–60 mg/day) was performed in African-Americans and Caucasians with non-psychotic major depression. The intent-to-treat sample consisted of 301 participants (169 African Americans and 132 Caucasians).

Results—Although African-Americans were more socially disadvantaged and had a more severe depression, outcomes between the groups were similar. Remission rates were approximately 50% in both groups and about 2/3 of participants met response criteria. Retention was greater than 75% in both groups, with no differences in drop-out rate. There also were no differences in the number of completers, number of visits made, final dose of CIT, or in side effect profiles.

Conclusions—These results confirm the growing body of evidence, including recent studies using measurement-based care, that patients from minority groups have outcomes that are similar to those of Caucasians. The provision of measurement-based care and encouragement of patient participation can reduce ethnic differences in response to treatment for depression.

Keywords

Depression; clinical trial; African-Americans; ethnicity; treatment outcomes

INTRODUCTION

The lifetime prevalence of depression, estimated to be approximately 16.2% in the United States, shows only minor differences among patients from different ethnic/racial groups^[1]. Minority patients, however, typically have poorer access to and utilize mental health care services at a lower rate than Caucasians, are less likely to be prescribed and to fill prescriptions for newer antidepressants, and are less likely to receive non-pharmacological treatment compared to Caucasians^[2–8], often leading to disparities in treatment outcomes^[9]. Evidence comparing depression treatment outcomes by ethnicity has been mixed, with some older studies showing poorer outcomes for minority patients than Caucasians^[3,4,10–14], while other studies using older antidepressant medications, suggesting that African-Americans and Latinos respond more quickly than Caucasians^[15–17]. More recent clinical trials, however, including the Sequenced Treatment Alternatives to Relieve Depression (STAR*D), the largest clinical trial of depression in the United States, have shown that when adjustments are made for baseline variables, there are little or no differences in outcome or speed of response between minority and Caucasian patients^[11,18–20]. Finally, pooled analyses of large pharmacy-sponsored databases showed that response was similar in patients from minority backgrounds compared to Caucasians^[21,22], although their generalizability is open to question^[23]. Despite recent progress and publications by different groups, current data still are limited in terms of whether, to what extent, and in what way ethnicity may influence treatment response. Thus, there is a continued need for prospective investigations regarding possible group differences.

Therefore, as a component of an investigation of pharmacogenetics and treatment response, the purpose of this study was to investigate, in a prospective trial, whether there are ethnic differences in response to the SSRI citalopram (CIT). We began this study prior to the publication of the STAR*D and other studies^[12,13,18,2,22] that reported few ethnic group differences in treatment outcomes. Our hypothesis was based on the extant knowledge and on the known ethnic differences in candidate genes purported to be responsible for the metabolism of CIT^[23–28]. Therefore, we hypothesized that, after controlling for differences in background characteristics, African-Americans with depression would respond faster and better to treatment with CIT compared to their Caucasian counterparts.

We realize that the open-label design is open to challenge for bias, because it does not allow the placebo effect to be determined. However, this study was not designed to test the efficacy of CIT, as this has already been demonstrated in both groups. Accordingly, we were concerned about the ethics of placebo treatment. Instead, it was designed more like a “bioequivalence” study to determine if response differed by ethnicity. Nonetheless, the results should be interpreted with these issues borne in mind.

METHODS

This study was an eight-week open label, dose escalation design using CIT in African-American and Caucasian subjects with non-psychotic major depression (MDE). Demographic, treatment response and side effect data were collected, and blood samples for genotyping and a battery of psychological measures were obtained. The contributions of biological and psychosocial variables to the clinical response will be reported elsewhere.

Participants

Participants were recruited at three mental health clinics enrolling treatment seeking patients as well as those responding to advertisements. Prospective subjects had to meet the following inclusion criteria: be between 18–70 years of age; self-identified as of African-American or Caucasian ethnic background, and report that both parents and four

grandparents self-identified with the same ethnic group; meet DSM-IV criteria for current MDE; have a Hamilton Rating Scale of Depression (21 item HRDS) [29] score of ≥ 17 ; women agreed to use effective contraception; were capable of giving written informed consent.

In addition, they must not have had a current or lifetime diagnosis of a psychotic disorder or psychotic symptoms; current drug or alcohol abuse/dependence or drug or alcohol abuse/dependence within the past 6 months; unstable medical conditions likely to interfere with the treatment of depression; history of allergy to CIT or failure to respond to an adequate trial of CIT (at least 40 mg per day for at least 6 weeks); history of or current seizure disorder; pregnancy or breast-feeding; taking psychotropic medications including antidepressants, antipsychotics, benzodiazepines, or opiates; treatment with fluoxetine or MAOIs in the previous two months; active suicidal ideation, or other safety issues determined by the clinician to not be suitable for inclusion in the study; currently receiving ongoing psychotherapy.

Study Design

After obtaining written informed consent, the screening visit consisted of obtaining sociodemographic, medical and psychiatric history, and physical examination and laboratory tests, a urine toxicology screen, and 20 ml of blood was collected for immortalization of lymphocytes.

Psychiatric diagnoses were obtained by utilizing the Structured Clinical Interview for DSM-IV Disorders (SCID) [30]. Baseline depression severity was measured by the structured interview for the Hamilton Rating Scale for Depression [31], and subjects completed the Beck Depression Inventory (BDI) [32]. General functioning was assessed by the Clinical Global Impression Scale (CGI) [33] and the Treatment Emergent Symptoms Scale (TESS) [33] was administered to establish presence and severity of physical symptoms.

Eligible patients were entered into the treatment phase of the study after a 1-week washout period and given placebo pills physically identical to the active medication. Symptom severity and side effect data were collected at each of eight weekly visits by raters blinded to study hypotheses. Citalopram was begun at a dose of 20 mg/day, and if there was lack of efficacy and tolerable side effects, could be increased to 40 mg at week 4 and to 60 mg/day at week 7. Patients remained free of non-study psychoactive medication throughout the drug trial except for zolpidem (5 mg), which could be prescribed for insomnia (not to exceed two nights/week). To monitor compliance with the protocol, pill counts were made at each visit.

Data Analysis

Data were verified and screened for outliers. To identify possible covariates, a series of 2-group ANOVA and Chi-Square analyses were conducted testing for ethnic group differences in demographic characteristics and psychiatric history. Based on HDRS data, three treatment outcomes were calculated: (1) mean changes from baseline to 8 weeks (i.e. (Week 8 Score–baseline score)), (2) the percent classified as “in remission” (i.e. no longer meeting DSM-IV MDE criteria and having a final HDRS of ≤ 7), and (3) percent “responding” to treatment (i.e. a HDRS score reduction $\geq 50\%$). Mean pre-post changes were tested with repeated measures analyses of covariance (ANCOVA), and the percent remission and improvement were tested with 2-group Chi-Squares. Intent to treat (ITT; those who returned after the screening visit and received at least one dose of medicine), completer and remitter analyses are reported.

RESULTS

Over 1000 potential subjects were screened by telephone or face-to-face interview during the enrollment period (2001–2006). A total of 327 subjects were enrolled: 184 African-Americans and 143 Caucasians. The most likely reasons for non-enrollment were: not meeting criteria for MDE; significant substance abuse; taking medication not allowed by the protocol; and mixed race. The ITT group consisted of 301 individuals: 168 African-Americans and 133 Caucasians.

Demographics

The groups were comparable on many demographic characteristics including age, living status, reported presence of physical illnesses, history of substance use, number of past episodes of MDE, past history of psychiatric illness, and reported family history of psychiatric illness (Table 1). The African-American group had a higher percentage of women than the Caucasian group ($X^2=4.17$; $df=1$; $p=.04$), fewer years of education (13.9 [2.06] vs. 14.7 [2.47], $f=10.58$; $p=.001$) and a higher mean BMI (31.6 [8.7] vs. 28.2 [7]; $f=4.78$; $p=.03$). More Caucasians than African-Americans were working (60.8% vs. 47.1%; $X^2=4.41$, $p=.036$) and were significantly more likely to report alcohol use than African-Americans (47.7% vs. 30.9%; $X^2=6.35$, $p=.012$). African-Americans were depressed for a significantly longer time during this current episode (5.1 months vs. 3.8 months; $F(1,290)=15$; $p=.000$), more expressed suicidal ideation (31.1% vs. 17.6%, Fisher's Exact test $p=.03$), and more met criteria for melancholia (70.8% vs. 45%; Fisher's Exact test $p=.003$).

Of the background characteristics which differed between groups only education was associated with the outcomes. Accordingly, it was treated as covariate in all primary analyses testing for group differences in treatment response.

Ethnic Differences in Response to Washout Period

Group differences in mean change in HDRS during the washout period were calculated to identify those who evidenced at least a 10% reduction in HDRS. A multivariate contingency table controlling for education indicated no ethnic differences in the percent who met this criteria (i.e. 28.8% vs. 35.1%), and no significant differences in the magnitude of change in HDRS during the washout (i.e. 2.60 vs. 2.63).

Intent-to-Treat, Completer and Remitter Analyses (Tables 2 and 3)

Of the 301 subjects who received at least one dose of medication, 235 (78%) completed the trial (75.7% of African-American and 81.1% of Caucasian participants). The most common reasons for non-completion of the trial were: side effects, lack of efficacy, non-compliance with treatment, and administrative reasons. For the ITT group, the African-American group had a statistically more severe depression compared to Caucasians (HDRS scores of 20.0 vs. 18.6; $F(1,283)=5.87$; $p=.016$). Both groups attended the same number of visits (6.9) and the mean dose of CIT was comparable.

In the ITT group, there was an overall HDRS reduction of 52%, with no significant differences between groups. For completers, there was a 58.7% reduction, with no significant differences between groups. In the ITT group, 49.1% of African-Americans vs. 52.3% of Caucasians were classified as remitters (57% in the completer group). Fifty-eight percent of African-Americans and 61.4% of Caucasians in the ITT group and were classified as responders (66.4% of the completer group). There were no ethnic differences in remission or response rates or in speed of response between groups (Table 3 and Figure 1). Comparison between the groups on the BDI revealed no post-treatment differences.

Side effects and adverse effects

Overall, the medication was well tolerated, with side effect profiles for both ethnic groups being similar and what would be expected from a trial of an SSRI. The most common side effects were: headache, gastrointestinal disturbance, sleep disturbance, dry mouth, nausea and sedation. Only three participants dropped out because of side effects (although 57 participants were lost to follow up with no medication related reasons for their discontinuance).

DISCUSSION

The purpose of this study was to investigate possible differences in response to CIT in a prospective 8-week open label trial in African-American and Caucasian participants with MDE. Our results indicated that, despite a number of baseline differences in demographics and severity of depression, treatment outcomes were similar. The hypothesis that African-American patients would respond more quickly was not supported. This hypothesis was based upon putative differences in polymorphisms for the serotonin transporter and CYP2C19 genes. A future report will address outcome in relation to these findings.

African-American participants reported fewer years of education and were more likely to be unemployed. They also had a somewhat more severe depression, as reflected in their modestly higher baseline HDRS score, experiencing more suicidal ideation and melancholia, and they were depressed for a longer time than the Caucasians during this current episode. Despite these baseline differences, however, there were no group differences in treatment outcome.

These findings are consistent with recent reports from pharmaceutical industry-sponsored clinical trials [6,21,22] and by more representative effectiveness trials in psychiatric and primary care settings [18,19,20,34]. Taken together, they indicate that when careful attention is paid to symptoms and side effects, and doses modified accordingly, ethnic disparities in treatment outcomes can be attenuated. These findings are of significant importance, as they add to the growing perception that access to and quality of care (e.g. availability of services, number and frequency of visits, access to medication, careful monitoring of symptoms with subsequent dose escalations, etc.) rather than individual differences in response, are likely contributors to disparities in outcome [3,9,20]. As Miranda et al. [9] recently stated, "...quality improvement interventions have been shown to decrease disparities in depression care for some minority groups initially experiencing lower quality of care." (p. 1106). Whether in a clinical trial or in a depression care program, outcomes in minority groups are similar to those for Caucasians, despite differences in SES.

The strengths of this study are the large number of participants from both groups; the characterization of ethnicity; the use of a measurement based care approach to dosage changes; the use of a structured interview to assess the primary outcome variable at each visit; the respectable retention rate; and the frequent meetings, training, and collaboration among the three sites. Finally, and importantly, this was not a secondary analysis of a data set, but a study prospectively designed to look at this question.

A number of limitations of the study are worth noting, including the open label design and lack of a placebo control group. As noted above, our intent was not to conduct another efficacy study of a commonly used antidepressant, but rather to determine whether differences in treatment response would be observed between African-American and Caucasian groups; hence the choice not to include a placebo. Additionally, eight weeks was chosen as the trial length, with no follow-up period, so no claims can be made for the persistence of response. Only non-psychotic and non-hospitalized patients were enrolled, so

these findings may not be generalizable to more severely ill patients. Our remission and response rates were higher than those seen in the STAR*D trial^[19] where there were fewer exclusion criteria; this further limits generalizability. Wisniewski et al.^[35] recently discussed this issue, drawing attention to the need to increase recruitment of representative treatment seeking participants in clinical trials. Although our study included participants from a wide range of SES, including treatment seeking patients at public clinics, the exclusion criteria did not allow for a true representation of those seeking treatment (e.g. concurrent substance abuse and significant comorbid illness). Also, other ethnic minority groups were not studied, so caution needs to be exercised in generalizing these findings to other ethnic groups.

Studies of ethnic group comparisons face many challenges, including the criteria for assigning participants to the categorical dimensions of “race” or “ethnicity”, especially in the absence of an acceptable “gold standard”. However, in order to maximize the face validity of our group assignment, we required participants to report that both parents and four grandparents were self-identified as being from the same ethnic/racial group. We recognized that even within our groups, there was significant SES and biological heterogeneity. Finally, this study did not evaluate the combined effects of medication and psychotherapy for depression.

Despite these limitations, however, this study does address an unmet need: conducting prospective comparative studies in patients who represent diverse ethnicity/racial groups. As the Surgeon General’s report indicated^[36], this is an area where further study must be undertaken if we are to provide appropriate care to the increasingly diverse population of the United States. This study adds to the growing body of evidence that a key factor in the pattern of ethnic differences in mental health care might relate more to differential access to quality mental health care than to individual response to treatment. In order to test this hypothesis more widely, it will be important to replicate these findings in trials with other underserved and understudied ethnic groups.

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Figure 1.
Mean HDRS score in African-American and Caucasian patients with major depression treated with citalopram for eight weeks.

Table 1

Ethnic Differences on Demographic Characteristics

Demographic Variable	Overall M(SD) n	Af-Am M(SD) n	Caucasian M(SD) n	F	p
Age	42.2 (10.58) 298	42.4 (9.70) 167	42.0 (11.64) 131	.058	.809
Years of Education	14.2 (2.28) 291	13.9 (2.06) 164	14.7 (2.47) 127	10.58	.001
BMI	30.3 (8.2) 202	31.6 (8.7) 126	28.2 (7.0) 76	4.78	.04
Mean number of previous Episodes of MDE	3.2 (2.4) 292	3.4 (2.3) 161	3.0 (2.5) 131	1.76	.19
Number of months in Current episode	4.5 (2.7) 292	5.1 (2.4) 161	3.8 (2.9) 131	15.67	.000
Gender	Overall %(n)	Af-Am %(n)	Caucasian %(n)	X ²	p
Males	37.2 (112)	32.1 (54)	43.6 (58)	4.17	.04
Females	62.3 (189)	67.9 (114)	56.4 (75)		
Employed	52.9(128)	47.1(66)	60.8(62)	4.407	.036
Living w/ Spouse/Partner	16.3(48)	13.9(23)	19.4(25)	1.569	.210
Family Hx of Psych Dx	42.7(93)	41.1(58)	45.5(35)	.380	.538
Hx of Psych Dx	45.9(101)	42.0(60)	53.2(41)	2.568	.109
Hx of Physical Dx	39.5(87)	41.8(59)	35.4(28)	.868	.352
Present Physical Dx	46.5(107)	49.3(73)	41.5(34)	1.311	.252
Alcohol Use	37.4(83)	30.9(42)	47.7(41)	6.346	.012
Recreational Drug Use	9.4(22)	8.8(13)	10.6(9)	.206	.650
Current suicidal ideation	73 (28.6%)	50 (27.2%)	23 (16.1%)		.032*
Melancholia	173 (69.4%)	114 (62%)	59 (41.3%)		.003*

* Fisher's exact test

Af-Am= African American

BMI=body mass index

MDE=major depression episode (missing data accounts for the variation in number (n) of subjects for each variable)

Table 2

Ethnic Differences on Primary Outcomes

Outcome	Overall M(SD) N	Af-Am M(SD) n	Caucasian M(SD) n	F	p
HDRS Pre	19.2 (5.2) 301	19.9 (5.7) 169	18.4 (4.4) 132	6.72	.01
HDRS Post	8.8 (6.9) 301	9.0 (7.2) 169	8.4 (6.6) 132	.70	.40
HDRS Pre-Post Change	-10.5 (7.6) 301	-10.9 (7.9) 169	-10.0 (7.2) 132	.99	.32
BDI Pre	26.1 (9.4) 299	25.7 (10.2) 168	26.6 (8.4) 131	.74	.39
BDI Post	12.3 (10.7) 299	12.5 (11.6) 168	12.2 (9.4) 131	.06	.81
BDI Pre-Post Change	-13.8 (10.7) 299	-13.2 (11.1) 168	-14.5 (10.2) 131	.99	.32

Af-Am= African Americans

HDRS= Hamilton Depression Rating Scale

BDI= Beck Depression Inventory

Table 3

Ethnic Differences on Other Indicators

Indicator	Overall M(SD) N	Af-Am M(SD) n	Caucasian M(SD) n	F/ X ²	p
Mean No. of Visit	6.90 (2.41) 301	6.87 (2.38) 169	6.93 (2.46) 132	.049	.825
Average Final Dosage (mg)	28.51 (12.91) 290	29.33 (13.35) 165	27.52 (12.87) 125	2.333	.311
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	Overall % (n)	Af-Am % (n)	Caucasian % (n)	Fisher's Exact Test	p
% Completers	78.1 (235)	75.7 (128)	85.1 (107)		.326
% Treatment Responders	59.5 (179)	58 (98)	61.4 (81)		.636
% Remitted	50.5 (152)	49.1 (83)	52.3 (69)		.642

Af-Am= African-American