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Mental Health Service Use Among Adolescents Following Participation in a Randomized Clinical Trial for Depression

Sharon L. Brenner,

Department of Psychiatry and Behavioral Sciences, Duke University School of Medicine, Box 3454 DUMC, Durham, NC 27710

Barbara J. Burns,

Department of Psychiatry and Behavioral Sciences, Duke University School of Medicine, Box 3454 DUMC, Durham, NC 27710

John F. Curry,

Department of Psychiatry and Behavioral Sciences, Duke Child and Family Study Center, 2608 Erwin Rd, Durham, NC 27705

Susan G. Silva,

Duke University School of Nursing, 311 Trent DR, Durham, NC 27710

Christopher J. Kratochvil, and

University of Nebraska Medical Center – Psychiatry, 987878 Nebraska Medical Center, Omaha, NE

Marisa Elena Domino

University of North Carolina School of Public Health, Campus Box 7411, Chapel Hill, NC

Sharon L. Brenner: sharon.brenner.phd@gmail.com; Barbara J. Burns: barbara.burns@dm.duke.edu; John F. Curry: john.curry@duke.edu; Susan G. Silva: silva007@mc.duke.edu; Christopher J. Kratochvil: ckratoch@unmc.edu; Marisa Elena Domino: domino@unc.edu

Abstract

Objective—Major depressive disorder (MDD) is a common disorder among adolescents. The Treatment for Adolescents with Depression Study (TADS) was a randomized-controlled trial to examine the efficacy of fluoxetine and cognitive-behavioral therapy (CBT), separately and together, compared with placebo, in adolescents ages 12–17 years. The Survey of Outcomes Following Treatment for Adolescent Depression (SOFTAD) was designed as a naturalistic follow-up of participants in TADS. The aims of the current analyses are to describe mental health service use during the SOFTAD period.

Method—196 adolescents were recruited from twelve TADS sites. The Schedule for Affective Disorders and Schizophrenia for School-Age-Children-Present and Lifetime Version was used for clinical diagnoses. Participants completed a psychiatric treatment log and the Child and Adolescent Services Assessment to assess service use.

Results—58% received psychotherapy or non-stimulant psychotropic medication during SOFTAD. Youth with recurrent MDD had higher rates of treatment compared to youth without recurrent MDD (71% vs. 45%). However, nearly one-third of the adolescents in the study did not receive treatment for a recurrent episode of depression. Service use differed by gender for those with recurrent MDD, with females (79%) receiving treatment at higher rates than males (55%), although there was no significant difference in depression severity between genders. Younger participants with recurrent MDD had higher odds of receiving psychotherapy.

Conclusions—Use of psychotherapy and psychotropics following recurrence of depression appears to be influenced by age and gender. Even when youth respond well to treatment, a sizeable percent are likely to experience a subsequent episode that may go untreated.

Keywords

Adolescents; major depressive disorder; mental health services

Major depressive disorder (MDD) is one of the most common disorders among adolescents, with prevalence estimates of approximately 5.9% for females and 4.5% for males (Costello, Erkanli, & Angold, 2006). Both cognitive-behavioral therapy (CBT) and certain selective serotonin reuptake inhibitor (SSRI) antidepressants are established treatments for adolescent MDD. The Treatment for Adolescents with Depression Study (TADS) was a randomized-controlled trial to examine the short-term efficacy of the SSRI fluoxetine and CBT, separately and together, compared to clinical management with a pill placebo; and their longer-term efficacy compared to one another. To summarize TADS findings, at three months combination therapy was the most efficacious short-term treatment, all three treatments had equivalent response rates at nine months, by which point combination proved most cost-effective because of reduced psychiatric hospitalization (Domino, Foster, et al., 2009; TADS Team, 2004; 2007).

Despite efficacious depression treatments, studies show that a sizeable number of adolescents experience a recurrent Major Depressive Episode (MDE) (Weller & Weller, 2010). During TADS and its follow-up study (Survey of Outcomes Following Treatment for Adolescent Depression; SOFTAD), 44.6% of the original TADS sample were followed for a total of five years. As reported elsewhere 96.4% recovered from their index MDE, but 46.6% of recovered adolescents had a recurrent MDE (Curry et al., 2011). Thus, response to depression treatment does not necessarily impart long-term protection from recurrence. Other research indicates a substantial percentage of adolescents treated in clinical trials for MDD receive additional services subsequently: Brent and colleagues (1999) reported that 42.1% received additional treatment within just two years following a psychotherapy trial.

The goal of the current analyses was to examine mental health services received by TADS participants during the SOFTAD follow-up period. Domino, Burns, and colleagues (2009) examined service use among TADS participants 3 months prior to randomization, and found that less than one third (29.3%) had seen a mental health specialist or medical provider for behavioral health reasons. This rate of service use is lower than a national estimate of 40% for annual mental health service use for adolescents experiencing a MDE (SAMHSA, 2005), although it covers a much shorter time period; but it is higher than estimates of mental

health service use among adolescents in the general population, which range from 3 to 7% (Domino, Burns et al., 2009). Because the adolescents in the sample had subsequently participated in a randomized-controlled trial of evidence-based interventions for MDD, it was hypothesized that they would receive similar services during the follow-up at relatively high rates due to familiarity with mental health providers and services, especially in cases of recurrent MDD. Specifically, among those who experienced recovery from MDD, it was hypothesized that receipt of mental health services would be higher for those with a recurrence. In addition, the current analyses also examined factors potentially associated with mental health treatment, including age, gender, social-environmental factors, depression severity, and the presence of non-MDD psychiatric disorders. These factors were examined separately for adolescents with recurrent versus non-recurrent MDD because of the potential for differential effects in these two subsamples. Because previous investigation of the sample documented no differences in rates of mental health service use based on TADS treatment arm (Curry et al., 2011), those analyses are not included in the current paper.

Method

The design, sample characteristics, and outcomes of TADS and SOFTAD have been described previously (Curry et al., 2011; TADS Team, 2004; 2007; 2009). Briefly, TADS participants (N = 439) were randomized to a 12-week intervention of fluoxetine, CBT, their combination, or pill placebo. Those who responded at least partially to any of the three active treatments then proceeded to 6 weeks of continuation and 18 weeks of maintenance treatment, whereas non-responders were referred to community treatment. Placebo participants were then offered 12 weeks of active treatment unless they were full responders without relapse. After week 36, all adolescents were followed openly for one year. SOFTAD was then an additional open follow-up extending 3.5 years after the end of the TADS follow-up year. Therefore, the total TADS-SOFTAD period encompassed 63 months: nine months of TADS treatment, 12 months of TADS follow-up, and 42 months of SOFTAD follow-up.

Participants

All TADS participants were eligible for SOFTAD, regardless of initial TADS treatment assignment or response. SOFTAD participants were 196 adolescents (44.6% of TADS sample) recruited from twelve of thirteen TADS sites. The Duke University Medical Center and site institutional review boards approved this study, and written consent or assent was obtained from participants and parents. The SOFTAD participants have previously been described and compared to non-participating TADS subjects (Curry et al., 2011). They were 56.1% female, with a mean age of 17.8 (SD = 1.8 years) at time of initial SOFTAD visit. They differed from non-participants on age at TADS baseline (slightly younger); ethnicity (fewer minority adolescents); and comorbidity (fewer comorbid diagnoses). More of them had been in their initial MDD episode at TADS baseline. Only seven SOFTAD participants (3.6%) failed to attain remission from their index MDD episode, and these adolescents were excluded from analyses below comparing recurrent and non-recurrent depression subjects.

Procedure

Initial SOFTAD visit optimally occurred 27 months after TADS baseline; however, participants' first assessment actually occurred at the closest point to their recruitment into SOFTAD. Participants could complete up to seven SOFTAD assessments at 6- or 12-month intervals, five of which included diagnostic interviews administered by independent evaluators and two were comprised of mail-in questionnaires. Of the diagnostic interviews, 58% of participants completed the first assessment, while 68–70% completed the remaining four. In months since TADS baseline, points of entry for SOFTAD participants were distributed as follows: month 27 (33.7%); month 33 (21.9%); month 39 (13.8%); month 45 (10.7%); month 51 (9.7%); month 57 (8.2%); month 63 (2.0%). Females were more likely than males to complete the final assessment at month 63 ($OR = 2.10$, 95% CI: 1.11 – 3.97, $p < .05$), but age was not associated with study completion ($OR = 1.12$, 95% CI: 0.94 – 1.32, $p = .20$).

Measures

Schedule for Affective Disorders and Schizophrenia for School-Age-Children-Present and Lifetime Version (K-SADS-P/L)—The K-SADS-P/L (Kaufman et al., 1997) was administered during TADS and SOFTAD to determine major depression and other disorders using DSM-IV criteria (American Psychiatric Association, 2000), and to determine recovery from and recurrence of major depressive episodes. Recurrence was defined as a new episode following at least eight weeks with no MDD symptoms.

Clinical Global Impression-Severity Scale (CGI-S)—The CGI-S (Guy, 1976) is a 1 to 7 rating scale, indicating current severity of depression, where 1 = *normal*, 3 = *mild*, 4 = *moderate*, etc. The independent evaluators completed the CGI-S following administration of the K-SADS-P/L. The highest CGI-S score obtained at any assessment was used as the depression severity index in the present analyses.

Psychiatric Treatment Log (PTL)—With the assistance of the site study coordinator, participants and/or parents completed a record of psychotherapy and psychotropic medication received since the last TADS or SOFTAD visit on the PTL, a form created for this study. This format was chosen to minimize missing data if participants did not complete all assessments. Psychotherapy categorizations were determined by participants with the aid of staff. Data were coded into “yes” (1) or “no” (0) binary indicator variables for (1) psychotherapy; (2) non-stimulant medication; (3) any psychotherapy and/or medication; and (4) both psychotherapy and medication to indicate whether the service was used at any time during SOFTAD. Psychotherapy types included cognitive-behavioral, family, group, interpersonal, and supportive therapies. Non-stimulant medication categories included antidepressants, antipsychotics, anxiolytics, and mood stabilizers.

Child and Adolescent Services Assessment (CASA)—Participants completed a modified version of the CASA (Ascher, Farmer, Burns, & Angold, 1996; Farmer, Angold, Burns, & Costello, 1994) to assess receipt of more intensive services (inpatient psychiatric hospitalization; residential group home or treatment center care) within the past six months. The CASA has good to excellent test-retest reliability and very good correspondence with

provider records (Ascher et al., 1996; Bussing, Mason, Leon, & Sinha, 2003). A binary indicator variable was created for each type of intensive service indicating whether it had been received at any assessment point.

Social-environmental factors

At the initial SOFTAD visit, site study coordinators interviewed the parent of minor participants or the young adult participants and coded whether or not the participant was enrolled in an educational program, living at home, and employed part- or full-time.

Analytic methods—Analyses were run in StataSE 11 (StataCorp., 2009) or SPSS 14.0 (SPSS Inc., 2005). Chi-square goodness-of-fit analyses were used to compare rates of mental health use between adolescents with recurrent versus non-recurrent MDD. Multivariate logit analyses examined mental health service use as the dependent variable. Predictors included age, gender, social-environmental factors, highest CGI-S severity score, the presence of a non-MDD diagnosis at any SOFTAD assessment point, and completion of the final study assessment point. General linear models were run to compare CGIS severity scores for males and females.

Results

Among the 196 adolescents in the sample, the majority (58.7%) received psychotherapy or non-stimulant psychotropic medication during SOFTAD, which included antidepressants, antipsychotics, anxiolytics, and mood stabilizers (Table 2). Psychotherapy and medication were used at similar rates (42.3 and 46.4%, respectively), with 30.1% of adolescents receiving both psychotherapy and medication across the SOFTAD period. Despite previous exposure to CBT by TADS participants, the most commonly received psychotherapy was supportive therapy (21.4%), followed by CBT (11.2%). As previously reported (Curry et al., 2011), antidepressants were the most commonly used medication with 88 adolescents (44.9%) reporting their use. Regarding intensive mental health services, 8.7% received inpatient psychiatric treatment and 3.6% reported placement in a residential treatment center or group home. All of the adolescents receiving intensive services also received psychotherapy and/or non-stimulant medication. Because of the small number receiving intensive services, these services were not included in additional analyses.

Not surprisingly, youth with recurrent MDD had higher rates of psychotherapy and/or medication compared to youth without recurrent MDD ($X^2(1) = 13.07, p < .001$), with 71.6% of those with recurrent depression receiving psychotherapy and/or medication compared to 45.5% of those without (see Table 3). These data indicate that although a high percentage of adolescents received medication and/or psychotherapy, 28.4% of those with a recurrent episode of MDD did not receive either treatment despite previous involvement in the TADS trial.

Service use also differed by gender for those with recurrent MDD, with females receiving treatment at significantly higher rates (78.7% of females versus 55.6% of males; $X^2(1) = 4.92, p < .05$), despite no gender difference in highest depression severity ($t(86) = -1.26, p$

= .10). In contrast, among those without recurrent MDD, males (43.6%) and females (47.8%) received treatment at similar rates ($\chi^2(1) = .177, p = .67$).

Table 4 presents multivariable logistic regression models stratified by recurrent or non-recurrent MDD, with psychotherapy and/or medication, psychotherapy, or non-stimulant medication entered as binary dependent variables, and highest depression severity, gender, and age entered simultaneously as predictors. Because females were more likely than males to complete the final SOFTAD assessment, a dichotomous variable for study completion was also included in the model. The model with any treatment (psychotherapy and/or medication) as the dependent variable resulted in no significant findings for either the recurrent or non-recurrent MDD groups. Similar multivariable models were run for psychotherapy and non-stimulant medication separately. In the recurrent group, psychotherapy was associated with higher depression severity ($OR = 1.33, 95\% CI: 1.00 - 1.77, p < .05$) and younger age ($OR = .70, 95\% CI: .54 - .92, p = .01$), and medication was associated with female gender ($OR = 3.18, 95\% CI: 1.22 - 8.30, p < .05$). In contrast, among participants in the non-recurrent group, only depression severity was associated with receipt of psychotherapy ($OR = 1.71, 95\% CI: 1.06 - 2.79, p < .05$), and younger age was associated with medication use ($OR = 0.73, 95\% CI: 0.56 - 0.96, p < .05$).

We next ran separate multivariable models including educational status, employment status, and living at home as covariates, severity, gender, age, and study completion entered simultaneously as additional predictors, and any psychotherapy and/or medication use as the dependent variable. Only enrollment in school was significantly associated with higher odds of services ($OR = 3.46, 95\% CI: 1.46 - 8.16, p < .01$). Because of potential age effects for the social-environmental covariates, two additional models were run for those ages 14–17 at baseline and those 18-years and older. For the younger participants, none of the social-environmental variables were associated with treatment. For participants 18-years or older at baseline, enrollment in school remained the only factor associated with higher odds of receiving treatment ($OR = 3.98, 95\% CI: 1.16 - 13.7, p < .05$).

Finally, we explored the effect of having a non-MDD psychiatric disorder (other internalizing, disruptive behavior, eating or substance use disorder) on receipt of treatment. Among youth with recurrent MDD, over two-thirds (72.7%) had a non-MDD diagnosis, with other internalizing (58.0%) and substance use disorders (30.7%) being the most prevalent. However, this was not associated with increased odds of receiving psychotherapy and/or medication ($OR = 1.13, 95\% CI: .38 - 3.43, p = .81$). For those without recurrent MDD, approximately half (51.5%) had a non-MDD diagnosis, with other internalizing (37.6%) and disruptive behavior disorders (17.8%) most prevalent. Having a non-MDD disorder was associated with use of psychotherapy and/or non-stimulant medication, even when accounting for depression severity, gender, and age ($OR = 4.11, 95\% CI: 1.56 - 10.83, p < .001$).

Discussion

We followed a sample of depressed adolescents, examining psychotherapy, pharmacotherapy and intensive mental health service use following participation in a large,

national clinical trial. Previous research has indicated that the original TADS sample was broadly representative of depressed American adolescents on gender, age, and majority-minority ethnicity distribution, but with a relative underrepresentation of adolescents from low income families (TADS Team, 2005). On most dimensions the SOFTAD sample was similar to the overall TADS sample. Entry into TADS required stable, functionally impairing MDD: the major reason for exclusion was insufficient or unstable severity of depression at baseline (TADS Team, 2005). Because TADS participants were enrolled in a clinical trial, they may have been more likely to seek treatment than the broader group of community adolescents. Thus, the results of the present study are generalizable to treatment-seeking adolescents with stable moderate to severe MDD, at least to those from middle or higher income families.

The majority (58.7%) of youth in the SOFTAD sample received psychotherapy and/or non-stimulant psychotropic medication during the follow-up period, with 42.2% receiving psychotherapy and 46.4% taking non-stimulant medication. The severity of depressive symptoms was associated with receipt of services for both the recurrent and non-recurrent MDD groups. Thus, whether or not diagnostic criteria were met for MDD, adolescents with greater clinical severity had higher odds of receiving treatment. Even when accounting for age and gender, depression severity was associated with higher odds of psychotherapy for both recurrent and non-recurrent groups, and associated with higher odds of medication and/or psychotherapy for the non-recurrent group.

Despite the overall high rates of treatment, significant differences in the use of services emerged, particularly among the youth who experienced a recurrence of MDD. Specifically, males with recurrent MDD had significantly lower odds of receiving treatment, with just over half (55.6%) reporting use of psychotherapy and/or medication. This finding appeared to be driven by significantly lower odds of males receiving psychotropic medication. Although a relatively high proportion of females (78.7%) received treatment, one fifth did not. Thus, even with prior exposure to evidence-based treatment for MDD, a sizable proportion of adolescents of both genders did not receive treatment for a subsequent episode of MDD. Nonetheless, an effect of participation in the clinical trial is very likely. Among U.S. adolescents with a past year episode of MDD only 37.7% of males and 41.3% of females ages 12–17 received mental health treatment (SAMHSA, 2005). Similarly, among U.S. college students and other young adults ages 18–22 with a past year episode, 43.9% and 40.4%, respectively, received specialty mental health care services (SAMHSA, 2012), whereas 62.5% of male and 70.6% of female SOFTAD participants ages 18–22 with recurrent depression received mental health treatment over the follow-up period. Although rates of service use in the SOFTAD sample were high, they were lower than the 92% rate reported by Goldston and colleagues (2003) for formerly psychiatrically hospitalized adolescents in a longer (up to 8-year) follow-up, perhaps because of the more severe nature of psychiatric impairment in the latter sample. Our findings that service use was higher among those with recurrent MDD and among those with co-morbid disorders for those without recurrent MDD, are similar to those of Brent and colleagues (1999). In their clinical trial follow-up, additional treatment was associated with more severe depression and with the presence of disruptive behavior disorders.

Intensive services were used at relatively high rates by the SOFTAD participants, with 8.7% experiencing psychiatric hospitalization and 3.6% receiving treatment in a residential or group home facility. These rates exceed the national estimates (2% for a hospital admission and 1% for other residential care) for adolescents with emotional and behavioral problems (SAMHSA, 2008). Indeed, our rates may have been an underestimate, as we inquired about such services only within the six months preceding each completed SOFTAD assessment.

Even with the wide age range of our participants (14–22 years at SOFTAD entry), no significant age differences emerged for receipt of “any treatment” (psychotherapy and/or non-stimulant medication); however, the odds of receiving psychotherapy significantly declined among older adolescents with recurrent MDD. This difference could be accounted for by a slight increase in medication rates by age, or resistance among adolescents to participating in therapy. However, among those with non-recurrent MDD, younger age was associated with medication use. These age differences are in contrast to those reported by SAMHSA for national samples indicating that older adolescents receive services at comparable rates to younger adolescents. Because information about insurance coverage was not collected, the role of private insurance in treatment receipt could not be examined. Of the social-environmental factors examined, enrollment in school was the only one significantly associated with receiving psychotherapy and/or medication, and this finding continued to be significant for the older adolescents aged 18 and older at the time of entry into SOFTAD when analyzed separately from the younger participants. This may be due to the increased availability of services in school and college settings.

Several limitations of the current study should be noted. The adolescents in the three active treatment conditions during TADS had received evidence-based psychotherapy and/or pharmacotherapy for MDD during the study, and over half of the placebo group received study treatments after the blind was broken (Kennard, Silva, Mayes et al., 2009). Thus, the study examines service use among a group of adolescents with an optimized experience with mental health treatment who were enrolled in a clinical trial, and TADS participants are not necessarily representative of all depressed adolescents. The adolescents in the SOFTAD sample were predominantly White and from middle class backgrounds so findings may not generalize to more diverse populations. Even within the SOFTAD sample, access to quality mental health services likely varied among participants, and factors such as coverage by private insurance were not measured. Finally, the effect of missing data was minimized through the PTL assessment method and by including an indicator of study completion in the multivariable model. However, the effects of missing study data may not be fully accounted for in study findings, and the PTL was created for this study and not subjected to independent validity testing.

Nevertheless, the findings of the current study are clinically relevant. Even when youth recover after treatment for MDD, a sizeable percent are likely not to obtain treatment for a recurrent episode, particularly among male adolescents. Long-term monitoring of depressive symptoms and need for services is indicated, and may include periodic check-ins with a mental health specialist, primary care physician, or school personnel. Primary care physicians, however, may not adequately recognize or treat adolescent depression. Domino, Burns, and colleagues (2009) found that in the 3 months prior to the TADS study, a sizeable

proportion of the adolescents had been in contact with a physician but did not receive mental health treatment. Providing adolescents and their parents with information about the likelihood of recurrence and possible symptoms to watch for could facilitate the identification of recurrent symptoms, as could additional training for primary care physicians/clinicians. Education about how to locate appropriate services if symptoms reappear would also be beneficial, particularly for older adolescents who are not associated with academic programs. In addition, periodic “booster” sessions with mental health providers may be needed to ensure that recurrent depressive disorder and comorbid conditions are identified and treated.

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Abbreviations

TADS	Treatment for Adolescents with Depression Study
SOFTAD	Survey of Outcomes Following Treatment for Adolescent Depression

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Table 1

Characteristics of SOFTAD Adolescents at Enrollment

Variable	Total (N = 196)	
	n	%
Age at SOFTAD enrollment (M±SD)	17.8±1.8	
Race		
White	154	78.6
African-American	16	8.2
Latino	18	9.2
Female	110	56.1
Enrolled in school	159	81.5
Living at home	168	86.2
Employed	88	44.9
Recurrent MDD	88	46.6
Non-MDD psychiatric disorder during SOFTAD period	121	61.7

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Table 2

Services Received by SOFTAD Participants across All Assessments (N = 196)

Mental health service	<i>n</i>	%
Psychotherapy	83	42.3
Cognitive-behavioral therapy	22	11.2
Family therapy	7	3.6
Group therapy	11	5.6
Interpersonal therapy	15	7.6
Supportive therapy	42	21.4
Non-stimulant medication	91	46.4
Antidepressants	88	44.9
Antipsychotics	16	8.2
Anxiolytics	6	3.1
Mood stabilizers	13	6.6
Medication and psychotherapy	59	30.1
Medication and/or psychotherapy	115	58.7
No medication or psychotherapy	81	41.3
Psychiatric inpatient treatment	17	8.7
Residential/Group home	7	3.6
Treatment among ages 14–17 (<i>n</i> = 91)		
Medication and/or psychotherapy	61	67.0
Psychotherapy	46	50.5
Non-stimulant medication	47	51.6
Treatment among ages 18–22 (<i>n</i> = 105)		
Medication and/or psychotherapy	51	48.6
Psychotherapy	37	35.2
Non-stimulant medication	44	41.9

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Table 3

Service Use Post-TADS Among Participants Who Recovered from Their Index MDE (N = 189)

	Recurrent MDD <i>N</i> = 88		Non-recurrent MDD <i>N</i> = 101	
	<i>n</i>	%	<i>n</i>	%
Psychotherapy	50	56.8	30	29.7
Non-stimulant medication	53	60.2	32	31.7
Any treatment	63	71.6	46	45.5
No treatment	25	28.4	55	54.5
Both psychotherapy and medication	40	45.4	16	15.8
Intensive services (acute and residential treatment)	11	12.5	5	5.0

Note: Index MDE = Major Depressive Episode at TADS baseline

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Table 4
Multivariable Logistic Regression Models for Mental Health Services Among Adolescents with Recurrent and Nonrecurrent MDD

	Odds Ratio	Recurrent MDD		Odds Ratio	Nonrecurrent MDD	
		Lower	Upper		Lower	Upper
Psychotherapy and/or medication						
CGIS	1.30	.96	1.76	1.61	1.00	2.57
Gender	2.60	.95	7.12	1.10	.47	2.53
Age	.90	.69	1.18	.82	.64	1.05
Study completion	1.19	.38	3.65			
Psychotherapy						
CGIS	1.33*	1.00	1.77	1.72*	1.06	2.79
Gender (female)	1.71	.63	4.65	.64	.25	1.61
Age	.70***	.54	.92	.99	.76	1.28
Study completion	1.40	.47	4.13	.77	.30	2.03
Medication						
CGIS	1.09	.83	1.42	1.46	.89	2.40
Gender (female)	3.14*	1.22	8.30	1.83	.73	4.66
Age	1.02	.80	1.30	.73*	.54	.96
Study completion	.80	.27	2.30	1.45	.54	3.90

* $p < .05$;

** $p < .01$