Do Clinician and Patient Adherence Predict Outcome in a Depression Disease Management Program?

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Abstract

Disease management (DM) programs have been designed to overcome barriers to provider and patient adherence to treatment guidelines with the goal of improving treatment outcomes. In this article, the authors report on the acute treatment phase of a depression DM program and examine the impact of patient and provider adherence on outcomes. 154 patients from 11 practices were referred by their primary care clinicians to a DM program. The program’s main intervention was a trained nurse who visited the practices and met with patients. Patient demographics, psychiatric history, current mental health treatment, and medical comorbidity were recorded, and depressive symptoms were assessed using the Center for Epidemiologic Studies-Depression scale (CES-D). Data on adherence were gathered retrospectively from interview notes made by the DM nurse. Patients enrolled had a mean ± SD baseline CES-D score of 30.8 ± 11.0 and mean ± SD age of 49.1 ± 15.5; 78.6% were female, and 96.1% were diagnosed with unipolar depression. 109 (70.8%) completed the 6-week evaluation, and 76 (49.4%) completed the 12-week evaluation. 27.5% showed significant reduction of symptoms (at least a 50% reduction in CES-D scores) at 6 weeks, and 42.1% showed improvement by 12 weeks. Active clinician adherence at 6 and 12 weeks was 63.4% and 32.4%, respectively. Guideline adherence by physicians at 6 weeks significantly predicted 12-week outcome (F = 4.49; P = 0.04). Patient adherence to clinician recommendations within 6 weeks also strongly predicted outcome (F = 6.47; P < 0.05). In conclusion, monitoring adherence as an early “outcome” in a DM program and modifying intervention and recruitment strategies as needed may be necessary to optimize rates of clinical response.

Depressive disorders are common in primary care, with a prevalence rate of approximately 22% in this setting [1]. Most patients with depression are seen by primary care clinicians rather than by specialty mental health providers [2]. However, rates of detection of depression in primary care are low, with as many as half of depressed patients in primary care not detected as depressed by their clinicians [3]. Furthermore, even when depression is detected, patients often are not adequately treated [4,5] and treatment guidelines are seldom followed [4]. Thus, primary care patients identified by clinicians as depressed seldom experience better outcomes than placebo controls in clinical trials [6,7].

A well-implemented disease management (DM) program could address some of the barriers to effective care for patients with depression. Research shows that components of DM programs such as clinician and patient education, clinician feedback, and more frequent patient monitoring can improve depression care outcomes [5,8–11]. These studies suggest that DM may improve outcomes for depression through its impact on clinician adherence to treatment guidelines. In this paper, we report the results of the acute treatment phase of a depression DM program and examine the impact of provider adherence and patient adherence to clinician treatment recommendations on outcomes.

Methods

Setting and Participants

The clinical care program for depression DM was conducted between February 1998 and December 1999 at 11 primary care practices in the University of Pennsylvania Health System (Dr. Disbot), Philadelphia, PA.
The program’s main intervention was a nurse with added training and experience in mental health who regularly visited the participating practices and met face-to-face with patients referred to the program for care (Table 1). The practices were selected in part on the basis of the distribution of other DM programs in the affiliated primary care groups as well as on providers’ preferences. The practices were located in urban and suburban settings and included 50 internal medicine and family practice physicians as well as nurse practitioners. Primary care providers were encouraged to refer patients with depressive symptoms to the program. However, if these patients were identified as having significant suicidal risks, ongoing substance abuse problems, current psychotic symptoms, or evidence of bipolar affective disorder, a recommendation was made to the primary care provider for referral to a mental health specialist. These patients were followed in the program only to facilitate the completion of this referral.

**Treatment Guidelines and Goals**

The depression DM program incorporated Agency for Healthcare Research and Quality (AHRQ) guidelines for treatment of major depression [12]. For the acute phase of depression treatment, the guidelines recommend that practitioners prescribe an antidepressant and/or therapy, followed by weekly or biweekly contact for at least the first 6 to 8 weeks of treatment. The frequency of follow-up is reduced only when depressive symptoms have significantly improved. The acute phase treatment guidelines suggest treatment goals of 50% improvement by 6 weeks and remission of depressive symptoms by 12 weeks. When these goals are not met, suggested modifications to treatment include medication change or augmentation, addition of psychotherapy, or referral to a mental health provider. The AHRQ guidelines and DM program also address the continuation and maintenance phases of depression treatment, where the focus is prevention of relapse or recurrence of depression.

**Program Methods**

An initial academic detailing conference was held with each of the participating practices to discuss implementation of the clinical practice guidelines for the treatment of depression and introduction to the DM program. Toolkits providing guidance on depression recognition, diagnosis, and treatment were distributed, and the information was also made available online at the health system Web site. The DM nurse was regularly scheduled to be present at specific times in each of the participating primary care offices for initial face-to-face contact with the patients referred for care. The initial appointment with the DM nurse occurred after a scheduled appointment with the physician or on the basis of an appointment made with the DM nurse after preliminary telephone contact. During the initial meeting, the DM nurse conducted an intake assessment that was structured in content but not scripted and provided education on symptoms and treatment options. As part of the intake assessment, the DM nurse administered the Center for Epidemiologic Studies-Depression scale (CES-D, 20-item; [13]), reviewed the patient’s clinical chart for concurrent psychiatric and nonpsychiatric medications, past medical and psychiatric history, and obtained demographic information. Depressive diagnosis and psychiatric and medical comorbidities were obtained by patient interview and chart documentation. Education topics included depression as a treatable medical illness, treatment options for depression, coping skills for stress, risk factors for depression, suicide prevention strategies, and follow-up with the primary care clinician. The DM nurse then discussed the results of the assessment with the referring clinician and provided a summary of the assessment for the patient’s clinical chart.

The goals of the follow-up meetings included further education, support of adherence to the treatment plan (including medication, psychotherapy, follow-up with primary care clinician, or referral) and feedback to the clinician regarding patient progress. Follow-up assessments were conducted as necessary but in all cases at 6 and 12 weeks after intake. The follow-up evaluations were usually conducted face-to-face but also were conducted over the telephone. Assessments included administration of the CES-D and assessment of symptom response and medication side effects. The DM nurse also asked the patient about treatment recommendations and assessed adherence. As with the initial assessment, follow-ups were structured but not scripted.

The DM nurse had weekly meetings with a health system psychiatrist to facilitate treatment planning and follow-up. The providers had access to the UPHS depression treatment
algorithm as well as contact with the DM psychiatrist as needed. Patient specific feedback to the primary care providers consisted of reports on the patient’s clinical status and reference to where the patient fit within the treatment algorithm. Enrollment and follow-up in the program was terminated when the program was changed to a telephone assessment and monitoring design with the goal of extending the benefits of the program to additional practices in a cost-effective manner.

**Measures**

**Outcomes.** A retrospective review of the DM nurse’s assessment notes was conducted by one of the authors (CD). CES-D scores at baseline and 6 and 12 weeks were used to assess patient improvement. Data on concurrent medications, past medical history, demographic information, depression diagnosis, and medical comorbidities were also gathered. This review was conducted without access to other medical records.

**Physician adherence.** Data on provider and patient adherence to AHRQ recommended timing for clinician assessment and treatment decision making (ie, 6 and 12 weeks) were gathered and coded. Coding distinguished between active and passive clinician adherence, since there may be an association between clinician adherence and patient outcomes even when clinicians are relatively inactive regarding depression treatment. In such cases, the clinician may be rated as adherent only because the patient’s depression symptoms improved. Therefore, ratings of active clinician adherence at 6 weeks required that clinicians recommend initiation of a treatment (either antidepressant medication or psychotherapy referral) if this had not already been done prior to referral to the program. For those who had been undergoing treatment for 4 weeks or more prior to the initial evaluation, ratings of active 6-week adherence required a change of treatment if there was not at least 50% improvement in depressive symptoms.

If the patient continued to exhibit significant residual depressive symptoms at 12 weeks, ratings of active clinician adherence required that the clinician recommend treatment modification, either by increasing the antidepressant dose, changing this medication, or referring to a mental health provider. If 50% improvement by 6 weeks or remission by 12 weeks was seen, no active intervention was required of the clinician. In such cases, clinician adherence was considered present but categorized as passive adherence.

**Patient adherence.** Patient adherence was assessed by 6 weeks and then cumulatively by 12 weeks. Patients were considered adherent if they followed their clinician’s treatment recommendations with respect to initiating treatment, taking medications, and increasing doses as recommended. For those with side effects, patient adherence required reporting them to the clinician and following recommendations about dose reduction or discontinuation. If patients were already seeing or initiated seeing a therapist, attending therapy visits regularly was also considered for coding patient adherence. In cases where a clinician was nonadherent (eg, did not make a necessary medication or dose change) but the patient remained adherent to the clinician’s instructions, the patient was considered adherent.

**Analysis**

Means and standard deviations (or proportions for categorical data) were calculated for the baseline characteristics of the sample and for depression treatment outcome and adherence. We compared patients who dropped out of the program with patients who completed the study on all baseline measures using t tests and chi-square tests for continuous and categorical data, respectively. For the statistical analysis of remission of depressive symptoms, a CES-D score of less than 11 was chosen as the definition of remission of symptoms. To examine the impact of adherence on outcome, we conducted repeated measures general linear models, with adherence and time predicting depression outcome. An interaction between time of assessment and adherence in predicting the outcome in question was evidence of a difference in rates of improvement, or in other words an effect of adherence on treatment response. To account for the impact of patients who needed no intervention being included as guideline adherent, separate general linear models were calculated including these patients in the adherent dyads and excluding them from the analyses.

**Results**

One hundred fifty-four patients were enrolled in the depression DM program during the data collection period. All patients referred to the program completed the initial assessment. The patients were predominantly female, middle-aged, and experiencing moderate to severe depressive symptoms, and most had a medical comorbidity (Table 2). Patients who scored below a cut-point of 15 on the CES-D scale baseline (9.1%), indicating minimal depressive symptoms, had been referred for the management of continuation or maintenance phases of recurrent depression and were not considered in the evaluation of acute treatment responses. Most of the patients (96.1%) were diagnosed with unipolar depression. The most common types of psychiatric comorbidities were anxiety disorders (8.6%) and substance abuse disorders (6.6%). Patients who were seeing a mental health specialist at the time of entry into the program (14.5%) continued to follow up with these specialists as they had prior to their involvement with the DM program.

A total of 109 (70.8%) patients completed the week 6 evaluation, and 76 (49.4%) completed the week 12 evaluation. By
the 12-week follow-up, 48 patients were considered “dropped out” because they did not keep follow-up appointments or return phone calls. Another 30 patients could not complete their 12-week follow-up before the face-to-face disease management program ended. There were few differences between those who completed 12 weeks of follow-up and those who did not. There were no differences in gender (chi-square = 0.49; \( P = 0.48 \)), likelihood of having a medical comorbidity (chi-square = 0.21; \( P = 0.65 \)), current mental health treatment (chi-square = 1.32; \( P = 0.25 \)), previous treatment for depression (chi-square = 21.4; \( P = 0.14 \)), or age (t [152] = 0.84; “\( P = 0.40 \)). Those who did not complete 12 weeks in the program had lower baseline CES-D scores (mean ± SD = 27.9 ± 10.1) than those who completed 12 weeks in the program (mean ± SD = 33.8 ± 11.0; t [152] = 3.49; \( P < 0.005 \)).

Those who “dropped out” of the program (n = 48) did not differ from those who completed the program (n = 76) by gender (chi-square = 0.27; \( P = 0.61 \)), likelihood of having a medical comorbidity (chi-square = 0.07; \( P = 0.79 \)), current mental health treatment (chi-square = 0.34; \( P = 0.56 \)), or previous treatment for depression (chi-square = 1.38; \( P = 0.24 \)). Those who had dropped out of the program were younger (mean ± SD = 44.1 ± 13.5) than those who had not (mean ± SD = 51.4 ± 15.9; t [152] = 2.73; \( P < 0.01 \)), and had lower baseline CES-D scores (mean ± SD = 26.7 ± 10.6 versus 32.7 ± 10.7; \( t = 3.24; P < 0.005 \)). The effect of early active clinician adherence resulting in late (between weeks 6 and 12) patient drop out was also explored, with no significant influence found.

Rates of Improvement and Adherence
By 6 weeks’ follow-up, 27.5% (30/109) of patients in the program showed significant reduction of symptoms (at least a 50% reduction in CES-D scores); this proportion increased to 42.1% by 12 weeks. Having been prescribed an antidepressant prior to entry into the program did not predict outcome. By 6 weeks, 31.2% of patients had CES-D scores under 16; by 12 weeks, this proportion had increased to 35.5%. The mean ± SD CES-D score for patients in the program dropped from 30.8 ± 11.0 at baseline to 22.6 ± 11.8 by 6 weeks and to 19.7 ± 10.5 by 12 weeks (\( F [2, 142] = 58.7; P < 0.001 \)).

Rates of physician adherence among those who completed the program were 78.5% at 6 weeks and 64.2% at 12 weeks, with 55.8% adherent at both times. Excluding those who did not need treatment adjustments, rates of active adherence were 63.4% and 32.4%, respectively, with only 20% adherent at both times. Rates of patient adherence were 76.4% at 6 weeks and 72.7% at 12 weeks. When patient drop out from the program was included as patient nonadherence, intent-to-treat analysis showed patient adherence of 61.1% by 6 weeks and 44.9% by 12 weeks. Rates of dyads in which the clinician was adherent to treatment guidelines and patient was adherent to clinician instructions were 61.7% by 6 weeks and 55.3% by 12 weeks.

Predictors of Patient Adherence
Patient age, gender, presence of medical comorbidity, current mental health treatment, and previous treatment for depression were not predictors of patient adherence. A higher baseline CES-D score was significantly and positively associated with patient adherence by 12 weeks (t = –2.12; \( P = 0.04 \)). On the basis of intention-to-treat analysis, considering those who had dropped out as patient nonadherent, older patients were more likely to be adherent early in the program (by 6 weeks) (t = –2.18; \( P = 0.03 \)), but by 12 weeks this finding was no longer statistically significant (t = –1.57; \( P = 0.12 \)). Higher baseline CES-D scores continued to show a significant correlation with patient adherence at 6 weeks (t = –3.64; \( P < 0.001 \)) and at 12 weeks (t = –3.94; \( P < 0.001 \)). As before, patient gender, presence of medical comorbidity, current mental health treatment, and previous treatment for depression were not statistically significant predictors of patient adherence.

Table 3 summarizes repeated measures analyses conducted using a variety of adherence conditions. Clinician guideline adherence by 6 weeks significantly predicted outcome by 12 weeks when those who needed no treatment adjustment were included (F = 4.49; \( P = 0.04 \)), with suggestive effects when those who needed no treatment adjustment were excluded (F = 3.46; \( P = 0.07 \)). Clinician adherence by 12 weeks was not considered as a predictor of patient outcome at the 12-week follow-up because insufficient time had passed to see results of a treatment adjustment during the 6- to 12-week window. Patient adherence to clinician recommendations by 6 weeks strongly predicted outcome (F = 6.47; \( P < 0.05 \)). Additionally, requiring that both clinicians and patients be adherent somewhat strengthened the prediction of outcome by adherence.

There was a strong relationship between clinician adherence by 6 weeks and adherence by 12 weeks, with 87.9% of clinicians adherent by 6 weeks still adherent by 12 weeks,
and 50% of clinicians not adherent by 6 weeks still not adherent by 12 weeks (chi-square = 11.16; $P < 0.001$). A similar, albeit somewhat weaker pattern emerged for patients; 79.3% of patients adherent by 6 weeks were adherent by 12 weeks, while 50% of patients not adherent by 6 weeks were not adherent by 12 weeks (chi-square = 5.46; $P < 0.05$).

**Discussion**

The patients referred to the UPHS DM program were moderately to severely depressed. The average CES-D score at referral was significantly elevated, and baseline scores were not influenced by whether patients had already begun treatment for depression. By 12 weeks, over 40% of patients showed significant reduction in symptoms. The proportion of clinicians adherent to treatment guidelines was 55.8%, and nearly 80% of patients were adherent to clinician recommendations. There was strong evidence that both clinician and patient adherence predicted improvement, suggesting that treatment guideline adherence is a mediator of the effect of such interventions on outcome. Not only was there a strong effect for both patient and clinician adherence on outcome, but this effect became evident in acute treatment; by the 12-week follow-up, significant differences between adherent and nonadherent clinicians and patients had emerged.

Evaluating the effectiveness of a DM program requires the availability of data on patient-level treatment outcomes, but ongoing evaluation of provider and patient adherence can prove useful in optimizing the delivery of the program. The strength of the associations presented here supports several measures of adherence, specifically active provider adherence, as a measure of the quality of care. Active provider adherence may be more informative than measures of patient adherence alone and more specific than measures of total adherence (active plus passive). Using adherence as an assessment of patient and provider needs and evaluating dropout from the program in order to make program adjustments for future patient and provider enrollments can prove useful for long-term evaluation and improvement of such treatment interventions. Using the results presented above, DM education could be designed to target younger patients, educating them about symptoms of depression and reinforcing that depression is a treatable illness. Additionally, those with milder depressive symptoms may need more encouragement to follow-up with depression treatment. Finally, early active clinician guideline adherence did not lead to more patient drop out. This should encourage primary care providers that most patients do not consider active adherence as “too aggressive.”

The rates of improvement seen here are similar to those found in the intervention arm of other studies of depression in primary care [11] and were evident over a shorter time frame. It is encouraging that nearly half of patients showed substantial improvement in symptoms within 3 months of referral to the program. On average, depressive symptoms decrease between 10% and 15% without treatment over the short term (< 20 weeks) in patients with major depression [14]. The rate of adherence to treatment guidelines is also

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**Table 3. Repeated Measures Analysis of the Impact of Adherence on Outcomes**

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<thead>
<tr>
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<th>Adherent Baseline</th>
<th>Adherent 12 Weeks</th>
<th>Nonadherent Baseline</th>
<th>Nonadherent 12 Weeks</th>
<th>F Test of Adherence by Time Interaction</th>
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</thead>
<tbody>
<tr>
<td>Clinician adherence at 6 weeks, including improved without intervention</td>
<td>34.16 ± 10.12</td>
<td>17.74 ± 9.30</td>
<td>57</td>
<td>35.75 ± 11.89</td>
<td>27.31 ± 11.95</td>
</tr>
<tr>
<td>Clinician adherence at 6 weeks, not including improved without intervention</td>
<td>34.89 ± 9.12</td>
<td>18.20 ± 9.80</td>
<td>25</td>
<td>35.75 ± 11.89</td>
<td>27.31 ± 11.95</td>
</tr>
<tr>
<td>Clinician and patient adherence at 6 weeks</td>
<td>35.51 ± 9.86</td>
<td>16.43 ± 8.61</td>
<td>48</td>
<td>33.44 ± 10.55</td>
<td>26.76 ± 10.82</td>
</tr>
</tbody>
</table>

CES-D = Center for Epidemiologic Studies-Depression scale.

*Numbers include patients who had adherence data available at 6 weeks’ follow-up and had CES-D scores available at 12 weeks’ follow-up.

‡$P < 0.10$.

†$P < 0.05$.

§$P < 0.001$. 

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encouraging. Not only were there high rates of adherence by both clinicians and patients, but over the course of treatment, nonadherent clinicians and patients were more likely to become adherent, suggesting an ongoing impact of the DM program on adherence. This enthusiasm must be tempered somewhat, however; if only active adherence in those needing treatment modifications by 6 or 12 weeks is examined, rates of clinician adherence drop substantially. Furthermore, the percentage of patients for whom clinicians both prescribed appropriately and followed up appropriately (assessed and adjusted medication as needed) was low, just over one half, and these conditions were met for only one fifth of those patients who required treatment adjustment by weeks 6 and 12. Although depression DM may improve clinician and patient adherence, there remains substantial room for improvement, particularly in the monitoring and appropriate follow-up of patients that require more active treatment modifications.

Limitations
Although these preliminary results are encouraging, there are a number of reasons for caution in their interpretation. First, as this is a report of a health system’s depression DM program without a control group of usual care patients, it is difficult to estimate the impact of the program on adherence versus adherence in usual care. Therefore, we can only compare these results with those of other primary care studies. Second, the practices where the program was initiated were selected based on availability of other UPHS services and not randomly chosen. Third, there were too few clinicians in this study to know if the results were related to specific clinician differences (ie, being more or less effective at treating depression).

Fourth, the patients enrolled in this program had all been identified and referred by their primary care clinician. The motivations to refer a patient to the program were not always easy to determine. However, a few of the patients initially referred were not significantly symptomatic, based on the CES-D score, while still others were already being followed by mental health professionals. A depression diagnostic assessment tool was not used; the only measure of mood was depressive symptomatology as measured by the CES-D, but clinical chart documentation of depression diagnosis at baseline was obtained. It would have been informative to learn if these depressed patients met criteria at any time in the DM program for major or other depressive disorders. While DM notes were coded for patient and clinician adherence, the authors did not have access to the clinical charts to confirm the patient report of clinician treatment recommendations or decision making.

Fifth, there was a significant loss of patients to completion at 12 weeks due to a combination of early program termination and patient-initiated drop out. It would have been informative to learn their reason for initiating the drop out and to learn of the depression treatment outcomes in both groups who did not complete the program; however, this was beyond the scope of available DM data.

Finally, the same DM nurse collected all initial and follow-up assessment data used in the analysis of adherence and outcome, a method which may have entered some systematic bias. It is not clear whether this bias was toward the null, that adherence was not associated with outcome, or in the direction of a difference. However, using the same DM nurse was also likely to decrease systematic errors such as interrater reliability on follow-up assessments, and patients reporting on follow-up depressive symptoms and adherence may be more likely to be honest with an interviewer they already know.

Although caution should be exercised in applying these results to the general primary care population, there is reason to believe that such a program can be effective in patients identified as depressed by their clinicians. Patients identified through screening rather than by clinicians, however, typically have milder, more transient symptoms [15], making treatment effects harder to demonstrate. Also, because the costs of depression are lower in patients with milder symptomatology, such patients may be less willing to commit to a long-term treatment strategy. Rost et al [16] found that the strongest predictor of clinician detection of depression was patient willingness to take an antidepressant. Clearly, there is a set of patients with mild symptoms of depression who go undetected and are unlikely to benefit from such a program. Finally, clinician adherence to guidelines represents only one step in improving the outcomes of depressed patients in primary care. A recent review by Bauer [17] reports that only 6 of 13 studies that investigated clinician adherence to practice guidelines and patient outcome found greater rates of clinician adherence to be associated with better patient outcomes.

Conclusions
These results suggest cautious optimism regarding the potential for depression DM to improve the clinical outcome of depressed patients in primary care and indicate a potential mechanism by which improvements may occur (ie, increased clinician and patient adherence). Monitoring patient outcomes through a depression DM program shows promise as a mechanism for improving adherence and outcomes. By monitoring active guideline adherence on the part of providers, it is possible to evaluate the effectiveness of intervention programs and to define measures that can be used to optimize them. It is clear that some of these patients will see improvement in their depressive symptoms without active clinician intervention, either due to a period of self-limited distress or spontaneous remission. It is therefore important to clarify the presence of passive clinician adherence that may not be related to the effectiveness of DM. This paper presents
evidence that provider and patient adherence needs to be considered in the evaluation of depression in primary care outcomes. Future research should explore prospective means of collecting data on these different forms of adherence.

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