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Evaluation of a Clinical Pharmacist-Led Multidisciplinary Antidepressant Telemonitoring Service in the Primary Care Setting

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Abstract

Guidelines recommend patient follow-up within 2 weeks of antidepressant initiation or uptitration to minimize treatment discontinuation and suicidal ideation risks; however, time constraints and lack of systematic processes remain barriers in primary care. A pharmacist-led multidisciplinary telemonitoring service aimed to address these barriers. This was a retrospective, observational study of adults with depression initiated or uptitrated on an antidepressant between May and October 2016. Outcomes included the proportion of eligible patients successfully contacted, adherence, adverse effects, suicidal ideations, and pharmacist interventions. Clinical pharmacists successfully reached 258 of 380 (68%) patients and provided follow-up in 298 calls. Patients endorsed antidepressant nonadherence during 56 (19%) calls, adverse effects in 81 (27%) calls, and suicidal ideations in 13 (4%) calls. Pharmacists provided 109 total interventions for 102 patients. The clinical pharmacist-led multidisciplinary antidepressant telemonitoring service is an alternative resource to monitor patients after antidepressant initiation or titration in primary care settings.

Keywords: clinical pharmacy, antidepressant, primary care, pharmacists, depression, telehealth

Background

Major depressive disorder (MDD) has an estimated lifetime prevalence of 16% and is associated with increased comorbidities, high suicide rates, and significant economic burden.[1–5] In primary care, MDD is one of the 5 most prevalent medical conditions, with nearly 10% of all visits related to MDD.[6,7] Additionally, more patients receive mental health care and treatment from primary care providers (PCPs) than mental health providers.[8,9] Most patients with MDD are treated with antidepressant medications; however, up to 43% of patients self-discontinue antidepressants within the first 30 days.[10] Reasons for self-discontinuation include lack of immediate treatment effects, adverse effects, worsening depressive symptoms, and suicidal ideations.[11,12] Unfortunately, most patients fail to inform their PCP of treatment self-discontinuation in a timely manner, if at all, and as a result, suffer from untreated MDD.[13]

To minimize treatment disruptions, guidelines recommend following up with patients within 1 to 2 weeks of antidepressant initiation or uptitration.[14] During this follow-up, clinicians can assess adherence, adverse effects, and suicidal ideations and determine if interventions, such as patient education or therapy modifications, are needed to optimize MDD treatment and improve patient outcomes. However, in primary care, PCPs and their staff are overburdened with clinical and administrative responsibilities and lack systematic processes for patient follow-up.[15–18]

Given their unique medication expertise and ability to assess patients' responses to treatment, clinical pharmacists are well equipped to collaborate with PCPs to efficiently offer this service for antidepressant follow-up. Thus, at the University of Colorado Hospital, PCPs and clinical pharmacists created a pharmacist-led multidisciplinary antidepressant telemonitoring service. Prior studies assessing multidisciplinary telemedicine services for depression have demonstrated improved patient adherence, enhanced patient satisfaction, and increased number of depression follow-up visits over 6 months; however, the process of antidepressant

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telemonitoring services and short-term outcomes of successful calls remain unknown.[19–23]

Methods

An observational retrospective cohort study was conducted from May 3, 2016, to October 19, 2016 to evaluate the feasibility of implementing a clinical pharmacist-led multidisciplinary antidepressant telemonitoring service, evaluate potential opportunities for clinical pharmacy intervention, and identify which patients with MDD would be most likely to benefit from this service in primary care. This study was approved by Colorado Multiple Institutional Review Board.

Description of the clinical pharmacist-led multidisciplinary antidepressant telemonitoring service

PCPs at 2 internal medicine clinics collaborated with the lead clinical pharmacist to implement the pharmacist-led multidisciplinary antidepressant telemonitoring service in 2015. The lead clinical pharmacist was integrated into the internal medicine clinic for 6 years prior to initiation of the service, providing medication management for other chronic disease states. Other clinical pharmacists involved with this service also were integrated into the internal medicine clinic and had established relationships with the PCPs. Additionally, pharmacy students, under the supervision of clinical pharmacists, assisted in providing this service.

At the beginning of each week, clinical pharmacists received a report generated from the electronic health record (EHR) that identified patients ages ≥18 years who were prescribed a new antidepressant or who had a documented dose increase. The clinical pharmacists attempted to reach these patients with 2 phone calls within 2 weeks of antidepressant initiation or uptitration. For patients successfully reached, the pharmacist asked a series of questions focusing on: (1) adherence to PCP recommendations for depression management, including antidepressant use and access to specialty care, (2) adverse effects, and (3) suicidal ideations (Table 1). The clinical pharmacist provided interventions as needed, such as reinforcing the initial plan or recommending medication changes. If patients expressed suicidal ideations, the clinical pharmacist used the P4 Suicidality Screener to determine suicide risk and the resources most appropriate for the patient (eg, notifying the PCP, reaching out to family members, counseling about the suicide hotline). The clinical pharmacist then documented the telephone encounter in the patient's EHR and forwarded this summary to the patient's PCP for review and, if needed, to request approval for any recommended antidepressant changes. For patients not reached within 2 phone calls made on separate days, the pharmacist documented the attempts to reach the patient in the EHR and forwarded this note to the patient's PCP. Patients with multiple antidepressant initiations or uptitrations received a corresponding number of contact attempts.

Data collection and outcomes measured

Patients included in this study were ages ≥18 years, had a documented diagnosis for unipolar depression or dysthymia in the EHR, and were instructed by a provider in one of 2 internal medicine clinics to initiate or uptitrate an antidepressant. Patients prescribed antidepressants by providers outside the internal medicine clinics, such as a psychiatrist or oncologist, were excluded because the outside provider was deemed to be responsible for treatment management. Additionally, patients prescribed antidepressants for other indications such as pain, bipolar disorder, or anxiety, were excluded.

To characterize the patient population of the telemonitoring service, demographic data, such as age, sex, insurance, and patient health questionnaire (PHQ) score were collected. Additionally, as a validated measure of patient complexity, the number of current and prior prescription medications from the patient's medication list (within 1 year of the PCP encounter in which antidepressant initiation or uptitration occurred) was collected.[24–26] To better understand patients' treatment plans, information was collected about prior number of prescribed antidepressants, current antidepressant name and dose, and PCP's recommendation to initiate or uptitrate antidepressant therapy. All data were collected from the EHR.

To evaluate feasibility, the study team examined the proportion of eligible patients contacted and successfully reached by clinical pharmacists. To evaluate the potential opportunities for clinical pharmacy intervention, the team analyzed patients' responses to the series of questions asked during the antidepressant follow-up calls and interventions made by clinical pharmacists. Telephone encounter notes of patients successfully reached by a clinical pharmacist were reviewed to extract pharmacist interventions and patients' responses pertaining to adherence, adverse effects, and suicidal ideations. Primary nonadherence was defined as failure to initiate or uptitrate an antidepressant as ordered from the time of the provider visit to the follow-up call. Secondary nonadherence was defined as initially following a provider's recommendation but then deviating from the provider's instructions from the time of the provider visit to the follow-up call. Specialty care nonadherence was defined as not accessing specialty care despite being referred by the PCP from the time of provider visit to the follow-up call. Patient-reported adherence and adverse events were collected and categorized (Table 1). Suicidal ideation was considered to be present if patients answered ''yes'' when asked if they had thoughts of hurting themselves and considered to be new onset if there was no previous documentation of suicidal ideation in the patient's EHR. Clinical pharmacy interventions were categorized into one of 4 categories: reinforcing the initial plan, recommending a new administration time, recommending an alternative medication or dosing regimen, and other.

To identify which patients were most likely to benefit from the antidepressant telehealth monitoring service, the study team performed a subanalysis to identify patient characteristics predictive of nonadherence or increased likelihood of experiencing adverse effects. Patient characteristics assessed included sex, number of prescription medications, and antidepressant class (selective serotonin reuptake inhibitors, serotonin-norepinephrine reuptake inhibitor [SNRI], other [consisting of bupropion, buspirone, mirtazapine, and tricyclic antidepressants]). These specific patient characteristics were selected given the study team's prior clinical experiences and belief that these characteristics were likely

Table 1. Antidepressant Telemonitoring Evaluation Form

Did the patient EVER start the med, or increase the dose as instructed? (Answer YES even if they are no longer.)	□ Yes □ No
Why did the patient NOT make the change?	□ Cost/insurance problem □ Did not have time/ability to go to pharmacy □ Do not think they need it □ Scared of ADRs □ Other _____
What is the primary reason the patient did NOT make the change?	□ N/A – pt identified 1 reason □ Cost/insurance problem □ Did not have time/ability to go to pharmacy □ Do not think they need it □ Scared of ADRs □ Other _____
If the patient made the change initially, did they later stop the med or go back down on the dose?	□ Yes □ No
Why did the patient decide NOT to continue the change?	□ Cost/insurance problem □ Did not have time/ability to go to pharmacy □ Do not think they need it □ Scared of ADRs □ Other _____
If the patient was supposed to access specialty psych care, did they?	□ Yes □ No □ N/A – patient was not supposed to access specialty care
Why did they NOT access specialty care?	□ Cost □ Can't find a specialist covered by insurance that works for them □ Not interested or do not think they need it □ Not ready □ Other _____
Did/are they experiencing an adverse effect?	□ Yes □ No
What adverse effect(s) did or are they experiencing with this change?	□ Sexual □ Weight gain □ GI □ Sleep disturbance □ Dry mouth □ Other _____
Does the patient express suicidal ideation?	□ Yes □ No
Does the patient have a plan?	□ Yes □ No
Which medication interventions did you make?	□ Reinforced initial plan □ Recommended/enacted new med □ Recommended/enacted new dosing regimen □ Recommended/enacted new administration timing □ Other _____
Did the patient agree to try to access specialty care or consider it?	□ Yes □ No

ADR, adverse drug reaction; GI, gastrointestinal; N/A, not applicable; pt, patient.

to be indicators of nonadherence (eg, increased number of prescription medications) or increased likelihood of adverse effects (eg, female gender, SNRI). The team was unable to assess depression severity as an indicator given the limited number of patients with documented PHQ-9 scores.

Statistical analysis

Descriptive statistical analysis was performed to analyze baseline patient characteristics and outcomes of adherence, adverse effects, suicidal ideations, and pharmacist interventions. To determine which patients were most likely to benefit from the antidepressant telemonitoring service, patients were dichotomized into 2 groups based on the presence or absence of primary or secondary nonadherence and/or adverse effects. Logistic regression was used to evaluate the multivariable associations between nonadherence/adverse effects and primary variables of gender, number of prescription medications, and antidepressant class. SAS 9.4 (SAS Institute Inc., Cary, NC, USA) was used for analyses.

Table 2. Patient Demographics of Patients Successfully Contacted

Male, n (%)	81 (31)
Age (years), mean ± SD	53.87 ± 17.21
Insurance, n (%)	
■ Commercial	125 (48.5)
■ Medicare	97 (37.5)
■ Medicaid	18 (7)
■ Other	18 (7)
Patient Health Questionnaire-2 (PHQ-2) score, mean ± SD (per 287 calls)	2.71 ± 2.17
Patient Health Questionnaire-9 (PHQ-9) score, mean ± SD (per 166 calls)	14.47 ± 5.95
Number of antidepressants before initiation or uptitration, median (IQR)*	1 (0,1)
Number of prescription medications 1 year prior to PCP encounter, mean ± SD*	7.54 ± 5.61
Recommendation to initiate antidepressant, n (%)*	197 (66)
Recommendation to increase antidepressant, n (%)*	101 (34)
Antidepressant initiated or increased, n (%)*	Mean total daily dose ± SD
■ Bupropion XL, 25 (8.4)	234 ± 107
■ Bupropion SR, 8 (2.7)	231 ± 75
■ Bupropion, 7 (2.3)	135 ± 79
■ Sertraline, 66 (22.1)	66 ± 38
■ Fluoxetine, 37 (12.4)	28 ± 17
■ Citalopram, 34 (11.4)	20 ± 11
■ Escitalopram, 21 (7.1)	12 ± 7
■ Paroxetine, 12 (4.1)	20 ± 9
■ Venlafaxine XR, 28 (9.4)	123 ± 80
■ Duloxetine, 26 (8.7)	47 ± 27
■ Venlafaxine, 16 (5.4)	87 ± 62
■ Mirtazapine, 13 (4.4)	22 ± 14
■ Nortriptyline, 3 (1)	33 ± 14
■ Desipramine, 1 (0.3)	25
■ Buspirone, 1 (0.3)	15

*Reflective of all telephone encounters (n = 298).
IQR, interquartile range; PCP, primary care provider; SD, standard deviation.

Results

Of the 415 unique patients identified, 35 (8%) were excluded because of being prescribed an antidepressant by an outside provider or for indications besides unipolar depression or dysthymia. Of the 380 eligible unique patients, 122 (32%) were not successfully reached despite 2 phone call attempts. Thus, 298 successful phone calls to 258 unique patients were included in this study; demographics of this population are reported in Table 2. Of the 258 unique patients, 32 experienced multiple antidepressant therapy changes and were successfully contacted several times to follow up on each antidepressant therapy change. Patients successfully reached were predominately female, with mean age of 54 years and moderate-severe depression, who were initiated on a new antidepressant.

Of the 298 phone calls, patients reported primary or secondary nonadherence during 56 (19%) calls, primarily related to adverse effects experiences or concerns. The most common adverse effects reported by patients included mood instability, sleep disturbances, and nausea/vomiting. Patients expressed suicidal ideations in 4% of calls; only 1 of those patients expressed new onset suicidal ideation after antidepressant change. Approximately half of those referred to specialty care accessed it. Patients who did not access specialty care cited transportation, work, and lack of scheduled appointment as barriers. Adverse effects and patient-reported reasons for primary, secondary, and specialty care nonadherence are reported in Table 3.

Clinical pharmacists provided 109 interventions for 102 of the 258 (40%) unique patients. Most patients (96, 94%) received 1 intervention, with 5 patients receiving 2, and 1 patient receiving 3 interventions. Interventions included reinforcing the initial plan (60, 55%), recommending a new administration time (9, 8%), and recommending an alternative medication or dosing regimen (5, 5%). Thirty-five (32%) interventions were not explicitly specified in the progress notes and thus categorized as ''other.''

Based on the logistic regression model, a higher number of prescription medications was associated with nonadherence and adverse effects, while sex and antidepressant class were not significant factors in the model (Table 4).

Discussion

This study describes the successful implementation of an antidepressant telemonitoring service in 2 academic internal medicine clinics. Of the follow-up calls provided within 2 weeks of antidepressant initiation or uptitration, clinical pharmacists identified medication nonadherence in 19%, noted suicidal ideation in 4%, and provided interventions in 42% of calls. These short-term findings reinforced the critical need for monitoring of antidepressant therapy changes and demonstrated the successful use of a pharmacist-led multidisciplinary telemonitoring service as an alternative resource in primary care.

Table 3. Patient-Reported Outcomes of Antidepressant Telemonitoring Service

Did not initiate or increase antidepressant, n (%)	26 (8.7)
Patient reasons for not initiating or increasing antidepressant, n (%)*	
■ Other (eg, outside provider managing, self-management)	12 (46)
■ Did not think antidepressant was necessary	9 (35)
■ Concerned about/experienced adverse effects	3 (12)
■ Inability to get to pharmacy	3 (12)
Attempted to initiate or increase antidepressant, but reverted to prior action, n (%)	30 (10.1)
Patient reasons for not initiating or increasing antidepressant, n (%)*	
■ Concerned about/experienced adverse effects	20 (67)
■ Other (eg, outside provider managing, misunderstanding, drug interactions)	10 (33)
■ Did not think antidepressant was necessary	2 (7)
Experienced adverse effects, n (%)	81 (27)
Type of antidepressant adverse effect experienced, n (%)*	
■ Other (eg, decreased appetite, sweats, increased anxiety, headaches)	38 (47)
■ Sleep disturbances	25 (31)
■ Gastrointestinal	20 (25)
■ Dry mouth	9 (11)
■ Sexual dysfunction	3 (4)
Reported suicidal ideations, n (%)	13 (4)
New onset suicidal ideation after antidepressant initiation or uptitration, n (%)	1 (7)
Patient was recommended by provider to access specialty care	68 (23)
Did not access specialty care despite recommendation, n (%)	31 (46)
Patient reasons for not accessing specialty care, n (%)*	
■ Other (transportation, work schedule, did not have phone number to call)	21 (68)
■ Cannot find specialist covered by insurance	4 (13)
■ Not ready	3 (10)
■ Cost	2 (6)
■ Not interested or did not think it was necessary	2 (6)

*Multiple reasons or adverse effects may have been reported by patients.

A small proportion of patients reached by clinical pharmacists reported nonadherence to medication and/or lack of specialty care access. The majority of these patients reported not notifying their PCPs of their actions or reaching out for further assistance. Lack of communication between patients and PCPs remains a significant concern. One study showed that only approximately 16% of patients receive appropriate antidepressant follow-up within 6 weeks of antidepressant initiation; thus, the majority of patients with treatment nonadherence continued to experience untreated or inadequately treated MDD for a longer duration of time.[13] In the present study, 68% of patients were reached within 2 weeks of antidepressant initiation or uptitration and necessary interventions were provided. With this antidepressant telemonitoring service, clinical pharmacists brought patients' medication concerns to the PCP's attention in a more timely manner.

Although the study team was unable to robustly assess the impact of clinical pharmacists' interventions in the present study, one study compared medication adherence between patients who received pharmacist-led telephone follow-ups versus those managed by PCPs only. That study found a significant improvement in medication possession ratio (0.81 vs. 0.66; $P=0.0001$) with pharmacist-led telephone follow-ups, which supports the benefits of a clinical pharmacist-led antidepressant telemonitoring service.[23]

In the present study, many patients reported experiences or concerns with adverse effects. Most adverse effects associated with antidepressants are transient or can be alleviated with nonpharmacologic or pharmacologic measures.[27] Alternatively, depending on the severity of the adverse effect, antidepressants may be switched to an alternative antidepressant. Clinical pharmacists, given their pharmacotherapy expertise, are well equipped to provide recommendations related to administration time or alternative therapies. The study assessing medication adherence also found medication switch rates to be higher in patients managed by pharmacists compared with patients managed by PCPs alone (24% vs. 5%; $P=00001$), which further supports the benefits of a clinical pharmacist-led multidisciplinary antidepressant telemonitoring service.[23]

One unique aspect of this service was the opportunity for clinical pharmacists to provide suicide screening in the primary care setting. Clinical pharmacists assessed for suicidal ideation during every call and if present, utilized the P4 Suicidality Screener to determine suicide risk and appropriate resources.[28] According the American Foundation for Suicide Prevention, there are 1.1 million suicide attempts

Table 4. Association Between Patient Characteristics and Nonadherence or Likelihood of Experiencing an Adverse Effect

Patient Characteristic	*Odds Ratio*	*95% Confidence Limit*	P *value*
Female sex	0.798	0.459 – 1.388	0.425
Number of prescription medications	0.946	0.901 – 0.994	0.027
Antidepressant Class			
SNRI vs. SSRI	1.487	0.798 – 2.769	0.426
Other antidepressants[1] vs. SSRI	1.341	0.668 – 2.692	0.782

[1]Other antidepressants: tricyclics, mirtazapine, bupropion, buspirone.
SNRI, serotonin-norepinephrine reuptake inhibitor; SSRI, selective serotonin reuptake inhibitor.

annually in America and nearly 43,000 succeed every year.[29] The cost of suicide is predicted to be $44 billion. Thus, clinical pharmacists can help to mitigate suicide risks and reduce the burden of suicide on society.

This study was limited by its retrospective nature and lack of available data for process-related outcomes, such as the cost of the intervention and time spent per telephone encounter and identification of patients eligible for this service. Additionally, the rates of adherence, adverse effects, and suicidal ideations may be underreported, given the reliance on patient reporting and clinical pharmacist documentation for these data points. Furthermore, this study included only 1 academic medical center; thus, findings may not be generalizable. Additional studies, such as a prospective randomized controlled trial evaluating clinical outcomes, cost of the intervention, and patient and PCP satisfaction, would be beneficial to further determine the impact of the clinical pharmacist-led multidisciplinary antidepressant telemonitoring service. However, this study reinforced the need for a systematic antidepressant follow-up process and supported prior findings that clinical pharmacists are well equipped to provide this service in primary care settings.

Conclusion

The clinical pharmacist-led multidisciplinary antidepressant telemonitoring service is a possible resource in primary care and can monitor patients who need early interventions after antidepressant initiation or uptitration to optimize adherence, mitigate adverse effects, and minimize suicide risks.

Author Disclosure Statement

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References

1. Kessler RC, Berglund P, Demler O, Jin R, Merikagas KR, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. Arch Gen Psychiatry 2005;62:593–602.
2. Biesheuvel-Leliefeld KE, Kok GD, Bockting CL, et al. Effectiveness of psychological interventions in preventing recurrence of depressive disorder: meta-analysis and meta-regression. J Affect Disord 2015;174:400–410.
3. Aina Y, Susman JL. Understanding comorbidity with depression and anxiety disorders. J Am Osteopath Assoc 2006;106(5 suppl 2):S9–S14.
4. Whiteford HA, Degenhardt L, Rehm J, et al. Global burden of disease attributable to mental and substance use disorders: findings from Global Burden of Disease Study 2010. Lancet 2013;382:1575–1586.
5. National Institute of Mental Health. Major depression among adults. https://www.nimh.nih.gov/health/statistics/prevalence/major-depression-among-adults.shtml Accessed January 20, 2017.
6. Unutzer J, Park M. Strategies to improve the management of depression in primary care. Prim Care 2012;39:415–431.
7. Stafford RS, Ausiello JC, Misra B, Saglam D. National patterns of depression treatment in primary care. Prim Care Companion J Clin Psychiatry 2000;2:211–216.
8. Wang PS, Lane M, Olfson M, Pincus HA, Wells KB, Kessler RC. Twelve-month use of mental health services in the United States: results from the National Comorbidity Survey Replication. Arch Gen Psychiatry 2005;62:629–640.
9. Wang PS, Demler O, Olfson M, Pincus HA, Wells KB, Kessler RC. Changing profiles of service sectors used for mental health care in the United States. Am J Psychiatry 2006;163:1187–1198.
10. Olfson M, Marcus SC, Tedeschi M, Wan GJ. Continuity of antidepressant treatment for adults with depression in the United States. Am J Psychiatry 2006;163:101–108.
11. Samples H, Mojtabai R. Antidepressant self-discontinuation: results from the collaborative psychiatric epidemiology surveys. Psych Serv 2015;66:455–462.
12. Vlahitis A, Devine ST, Eichholz J, Kautzner A. Discontinuation rates and health care costs in adult patients starting generic versus brand SSRI or SNRI antidepressants in commercial health plans. J Manag Care Pharm 2011;17:123–132.
13. Smolders M, Laurant M, Verhaak P, et al. Adherence to evidence-based guidelines for depression and anxiety disorders is associated with recording of the diagnosis. Gen Hosp Pyschiatry 2009;31:460–469.
14. National Institute for Health and Care Excellence [NICE]. Depression in adults: recognition and management. https://www.nice.org.uk/guidance/cg90 Accessed September 30, 2016.
15. Baron RJ. What's keeping us so busy in primary care? A snapshot from one practice. N Engl J Med 2010;362:1632–1636.
16. Manning JS, Jackson WC. Providing guideline-concordant assessment and monitoring for major depression in primary care. J Clin Psychiatry 2015;76:e3.
17. Manning JS, Jackson WC. Treating depression in primary care: initial and follow-up treatment strategies. www.cmeinstitute.com/Psychlopedia/Pages/depression/22ido/sec2/section.aspx Accessed January 31, 2017.
18. Szegedi A, Jansen WT, van Willigenburg AP, van der Meulen E, Stassen HH, Thase ME. Early improvement in the first 2 weeks as a predictor of treatment outcome in patients with major depressive disorder: a meta-analysis including 6562 patients. J Clin Psychiatry 2009;70:344–353.
19. Fortney JC, Pyne JM, Mouden SB, et al. Practice-based versus telemedicine-based collaborative care for depression in rural federally qualified health centers: a pragmatic randomized comparative effectiveness trial. Am J Psychiatry 2013;170:414–425.
20. Locke A, Kamo N. Utilizing clinical pharmacists to improve delivery of evidenced-based care for depression and anxiety in primary care. BMJ Qual Improv Rep 2016;5:1–5.
21. Aljumah K, Hassali MA. Impact of pharmacist intervention on adherence and measurable patient outcomes among depressed patients: a randomized controlled study. BMC Psychiatry 2015;15:219.
22. Gallimore C, Kushner K. A pharmacist-guided protocol for improved monitoring of patients on antidepressants. WMJ 2013;112:124–128.

23. Finley PR, Rens HR, Pont JT, et al. Impact of a collaborative pharmacy practice model on the treatment of depression in primary care. Am J Health Syst Pharm 2002;59: 1518–1526.
24. Farley JF, Harley CR, Devine JW. A comparison of comorbidity measurements to predict healthcare expenditures. Am J Manag Care 2006;12:110–119.
25. Perkins AJ, Kroenke K, Unutzer J, et al. Common comorbidity scales were similar in their ability to predict health care costs and mortality. J Clin Epidemiol 2004;57: 1040–1048.
26. Brilleman SL, Salisbury C. Comparing measures of multimorbidity to predict outcomes in primary care: a cross sectional study. Fam Pract 2013;30:172–178.
27. Crawford AA, Lewis S, Nutt D, et al. Adverse effects from antidepressant treatment: randomised controlled trial of 601 depressed individuals. Pyschopharmacology (Berl) 2014; 231:2921–2931.
28. Dube P, Kroenke K, Blair MJ, Theobald D, Williams LS. The P4 screener: evaluation of a brief measure for assessing potential suicide risk in 2 randomized effectiveness trials of primary care and oncology patients. Prim Care Companion J Clin Pyschiatry 2010;12:e1–e8.
29. American Foundation for Suicide Prevention. Suicide: 2016 Facts & Figures. https://afsp.org/wp-content/uploads/2016/06/2016-National-Facts-Figures.pdf Accessed January 25, 2017.

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