

# Impact of pharmacists in mental health over the past decade

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## ABSTRACT

**Purpose:** As healthcare moves towards an interdisciplinary approach to improve clinical outcomes, it has become increasingly important for health care providers to collaboratively work together. Pharmacists have been working with psychiatrists for several decades to improve patient outcomes. However, their utility in psychiatry has not been recently elucidated. The purpose of this article is to describe and evaluate the impact of pharmacists in psychiatric settings over the past ten years.

**Methods:** A literature search was conducted using PubMed and CINAHL Plus with Full Text. Studies published between 2002 and 2011 were included. Additional studies were identified through references contained within the studies. Case reports and case series were excluded.

**Results:** Seventeen studies met the inclusion criteria: 15 studies in outpatient settings, two in inpatient settings. Outcomes measured included: patient symptoms, economic outcomes, medication adherence, and patient satisfaction. The majority of studies found improvements (e.g., resolution of symptoms, cost savings). However, controlled trials found no significant difference in clinical improvement from pharmacists' interventions.

**Conclusion:** Although the majority of studies suggest pharmacists provide positive outcomes, the trials vary widely in quality and measured outcomes. Additional controlled trials with more standardized methods are recommended to support the role of pharmacists in psychiatric settings.

## KEYWORDS

pharmacist, mental health, outcomes, interventions, psychiatry

## INTRODUCTION

Psychiatric illness is a highly prevalent problem, and there is a constant search for better treatment options.<sup>1</sup> With the high rate of psychiatrist burnout, there is a great need for changes to be made in the treatment of mental illness.<sup>2</sup> A multidisciplinary approach to the treatment of mental illness is one proposed solution, which has been implemented in many settings, and could reduce psychiatrist burnout and improve patient care.

Additionally, the movement to an interdisciplinary approach is heralded as a way to improve patient outcomes and maximize therapeutic regimens.

Pharmacists have been directly involved in the care of psychiatric patients as early as the 1970s, in both inpatient and outpatient settings.<sup>3,4</sup> Over the past decade, the role of pharmacists has continued to evolve beyond the traditional dispensing role, and momentum has increased to include pharmacists on the multidisciplinary team. Therefore, the purpose of this article is to elucidate the impact of pharmacists in psychiatry over the last decade.

## METHODS

A comprehensive literature search for publications analyzing the effects of pharmacists on the treatment of patients with psychiatric disorders was conducted using the PubMed and CINAHL Plus with Full Text databases. Studies published between January 2002 and December 2011 were included in the search criteria. Search terms consisted of "pharmacy" or "pharmacist" in combination with "psychiatry", "psychiatric" or "mental illness". Additional studies were identified by reviewing the reference lists of each study. Inclusion criteria included a study evaluating some form of pharmacist intervention related to psychiatric patients and their care. Case reports and case series were excluded from this review.

## RESULTS

While 19 publications were identified, 17 studies met the inclusion criteria for this review (Table 1). Fifteen studies occurred in outpatient settings<sup>5-19</sup> and two occurred in inpatient settings.<sup>20,21</sup> Of the outpatient studies, eight occurred in primary care clinics<sup>5,7-9,11-13,16</sup>, two in

**Table 1. Impact of clinical pharmacists in psychiatric settings: Summary of studies**

Study (year)	Intervention	Setting	Patient population; Sample size	Study design (duration)	Results	Comments
Adler, et al (2004)	Pharmacists monitored medication therapy, provided therapeutic recommendations to PCPs, provided patient education and advice	9 primary care clinics	MDD, dysthymia N = 533 (Intervention group: 268; control group: 265)	Randomized controlled trial, control patients received usual care from PCP  (6 month intervention period with 18 month follow-up)	Patients in the intervention group had higher rates of antidepressant medication use at 6 months than patients in the control group (57.5% vs. 46.2%, p=0.03).  Depression outcomes at 6 months, based on mBDI scores, did not vary significantly between intervention and control but favored intervention group (p=0.16).	-Study did not exclude patients who were already on antidepressants, unwilling to try antidepressants, or who had co-morbid psychiatric disorders -Pharmacists spent an average of 11 minutes/patient/month -The most significant effect on medication adherence at 6 months occurred in patients who were not taking antidepressants at enrollment (32.3% intervention vs. 10.9% control, p=0.001) -Dose-response effect for time spent with pharmacist
Bultman, et al (2002)	Pharmacists monitored patients taking antidepressant medications. Pharmacists answered patient questions, helped solve medication related problems, and listened to patient concerns	23 community pharmacies in Wisconsin	Patients newly prescribed antidepressant medication  N=100	Prospective field study (2 months)	During the study period, 83% of patients reported missing doses or taking additional doses. 32% of patients found pharmacists to be helpful in solving problems related to their antidepressant medications (42% neither agreed nor disagreed with the statement).	-No parallel group -Pharmacist interventions and monitoring of patients varied
Caballero, et al (2008)	Pharmacist consulted with PCP regarding therapy for psychiatric disorders, provided patient education and drug therapy management until therapy was optimized	Outpatient community health center in south Texas	Various psychiatric illnesses- most common reasons for referral to clinic included depression, dementia/cognitive impairment, anxiety and insomnia  N=96	Naturalistic review (15 months)	Physician or medical director accepted over 90% of pharmacist's clinical recommendations.  After 5.6 weeks of active treatment, patients who were treated for depression or anxiety had a mean decrease in depression and anxiety symptoms as measured by HAM-D or HAM-A scores (Decreases of 52% and 56%, respectively).  After 7.7 weeks, patients who were treated for cognitive impairment/dementia had a mean decrease of MMSE scores by 1.4 points, indicating decline in cognitive function.  All patients who were treated for insomnia reported improvements in sleep. Estimated cost savings generated by the clinic over the 15-month period: \$22,380.	-Many patients had psychiatric comorbidities -Pharmacist was available for limited hours

Study (year)	Intervention	Setting	Patient population; Sample size	Study design (duration)	Results	Comments
Caley, et al (2010)	Clinical pharmacists consulted with nurse practitioners, answered drug information questions, provided educational services to staff, and participated in direct consultations with patients	University health clinic in Connecticut	Patients with various psychiatric illnesses- most commonly depression or anxiety  N=27	Retrospective chart review  (16 months)	Eighty-eight percent of pharmacist recommendations were accepted and implemented.	-Feedback from both nurse practitioners and patients was positive -No measure of clinical or economic outcomes -No control group -Pharmacist services provided one day per week, with an average of 3 hours on-site
Capoccia, et al (2004)	Patients in intervention, or "enhanced care" (EC) group were contacted by a pharmacist at predefined intervals; pharmacist collaborated with PCP to provide patient education, dose adjustment for antidepressants, monitoring of patient adherence to therapy, and management of adverse effects	Outpatient primary care clinic in Washington	Depression  N = 74 (Intervention group: 41; control group: 33)	Randomized controlled trial  (12 months)	No significant difference between intervention and control groups for medication adherence at 12 months (p=0.91).  Mean SCL-20 and SF-12 scores improved significantly for both groups indicating improvement in depression symptoms, but no significant difference between groups.  No difference between groups in number of visits to any type of healthcare provider.  No significant differences between groups for patient satisfaction with psychiatric or overall treatment.	-Majority of pharmacist interventions occurred over telephone -Both groups were encouraged to use all available resources in treatment of depression -Resources utilized by control group may not have been documented
Crockett, et al (2006)	Pharmacists received additional training via videoconference and provided extra advice and support to patients when dispensing medications	32 community pharmacies in rural Australia	Depression  N = 119 (Intervention group: 51; control group: 68)	Non-randomized controlled study  (2 months)	No statistically significant difference in adherence between groups. Improvement in K10 score for both groups indicated improvement in depressive symptoms but no significant difference between groups.  No significant difference between groups in improvement of Drug Attitude Index.	-Some patients were just starting antidepressants while others had been on them long-term. -No randomization -Very short study duration -Some control group pharmacists were later found to have provided similar services as those of the intervention group
Finley, et al (2002)	Pharmacists provided patient education, assessed medication therapy, and provided therapeutic recommendations. Pharmacists had limited prescribing privileges under protocol	Primary care clinic within HMO	Depression  N = 220 (Intervention group: 91; control group: 129)	Prospective controlled cohort  (6 months)	Significant increase in medication adherence among patients in intervention group (drug possession ratio of 0.81 in intervention group vs. 0.66 in control group, p<0.005). Significant increase in number of patients who completed 6-months of antidepressant therapy among intervention group (76% vs. 53% control group, p=0.008). Greater patient satisfaction among intervention group (p<0.05). Greater decrease in PCP visits among intervention group (39.4% decrease for intervention group vs. 12.2% decrease for control, p=0.007).	-No randomization -Intervention involved both phone calls and face-to-face visits with the pharmacist

Study (year)	Intervention	Setting	Patient population; Sample size	Study design (duration)	Results	Comments
Finley, et al (2003)	Pharmacist followed up with patients frequently for assessment of therapeutic effect, adverse effects, and adherence. Pharmacist could titrate antidepressant dose as indicated by HMO guidelines and had limited prescribing privileges under protocol for ancillary medications.	Primary care center within HMO in northern California	Depression N = 125 (Intervention group: 75, control group: 50)	Randomized controlled trial (6 months)	Patients in the intervention group were more likely to complete the continuation phase of treatment (67% vs. 48% control, $p=0.038$ ). Patients in intervention group had a 15% decrease in visits to PCP compared with a 4% decrease in control group, but difference was not significant ( $p=0.14$ ). Medication costs for patients in the intervention group were found to be higher than the control group, but the difference was not significant. There was no statistically significant difference in clinical response based on BIDS and WSDS scores. Patient satisfaction was higher for intervention group ( $p<0.05$ for all survey measures).	-Pharmacist spent an average of 71 minutes with each patient -Cost-effectiveness was not analyzed -Pharmacist met with patients both face-to-face and over telephone -More patients in intervention group changed antidepressants during study (19% vs. 4% control, $p=0.016$ ) -High provider satisfaction with pharmacist interventions
Finley, et al (2011)	Pharmacists met face-to-face with patients for evaluation and management of medication therapy and patient education	Two outpatient clinics in Asheville, NC	Depression N=130	Prospective non-randomized cohort (18 months)	Patients had clinically significant improvement in PHQ-9 score indicating improvement in depressive symptoms ( $p<0.0001$ ). Estimated total savings for employer of \$41,881 per year for the 48 enrollees who were evaluated.	-No control group -Clinical improvements were greatest for those patients with severe depression at baseline compared to those with mild or moderate depression
Gable, et al (2010)	Clinical pharmacist joined an Assertive Community Treatment (ACT) team. Interventions included: patient education, monitoring of lab results and adverse effects, and making therapeutic recommendations to ACT team for both mental and physical health issues	Outpatient Assertive Community Treatment Team in St. Louis, MO	Various psychiatric illnesses N=34	Retrospective chart review (6 months)	One hundred percent of recommendations made by pharmacist regarding medication therapy were accepted and implemented.	-No control group -Recommendations were discussed with the ACT team before being documented -No measure of clinical or economic outcomes
Hare, et al (2008)	Pharmacists used the HANDS screening tool for depression, assessed and discussed results with patients, and referred patients to PCP or emergency department as needed	Four supermarkets in Kansas and Missouri	Depression N = 18	Uncontrolled study (1 day)	Recommendations were made to 6 of the patients (33%) regarding follow-up with PCP for further evaluation and/or continuing current treatment for depression.  One patient transported to emergency department for active suicidal thoughts. Fourteen patients were found unlikely to have major depression, 3 patients had symptoms consistent with major depression, and 1 patient had symptoms strongly consistent with major depression.  After the screenings, 88% of participants felt "satisfied" or "very satisfied."	-Seven of the eighteen patients had previously been diagnosed with depression and/or had taken antidepressant medications at some point -Each screening took 10-15 minutes -Small sample

Study (year)	Intervention	Setting	Patient population; Sample size	Study design (duration)	Results	Comments
Knight, et al (2008)	Patients were screened for depression using the Zung self-rating Depression Scale (SDS)	Five low-income inner city health clinics in the Midwest	Depression N = 45	Retrospective chart review  (4 months)	Of the 12 patients with current diagnoses of depression, 25% were adequately treated, 50% were undertreated, and 25% were not treated at all. Of the 33 patients without a current diagnosis of depression, 48% screened positive.	-There was no statistically significant correlation in A1C value and depression diagnosis -Therapeutic outcomes were not tracked due to time limitations
Rickles, et al (2005)	Pharmacists called patients in intervention group once monthly for 3 months to provide pharmacist-guided education and monitoring (PGEM)	Eight community pharmacies in Wisconsin	Depression N = 60 (Intervention group: 28; control group: 32)	Randomized controlled trial  (3 month intervention period with 5 month follow-up)	The intervention group was significantly more likely to provide feedback to the pharmacist regarding their medication therapy (FPPF score of 23 for intervention group vs. 11 for control group, $p < 0.001$ ).  The rate of missed doses for the intervention group was significantly lower than for the control group, but this finding was not significant in an ITT analysis, which included patients who did not complete the study. The intervention had a significant impact on antidepressant knowledge, beliefs about antidepressants, and awareness of treatment progress.  No significant difference in improvement of depression symptoms between the intervention and control groups based on BDI-II scores; however, both groups showed significant improvement in symptoms ( $p \leq 0.001$ ).	-Intervention group patients were more likely to have history of psychiatric medication use despite randomization
Valenstein, et al (2011)	Patients in Meds-Help intervention group received unit of use packaging for all medications, an educational session, and refill reminders 2 weeks before refills were due. Clinicians were notified if refills were not picked up on time. Educational medication session was conducted by pharmacist	Four outpatient VA clinics	Schizophrenia, schizoaffective disorder, bipolar disorder  N = 118 (Intervention group: 58; control group: 60)	Randomized controlled trial  (12 months)	There was a significant improvement in the MPR for the intervention group from baseline to 12 months indicating that the intervention group had improved adherence to medication therapy (0.54 to 0.86 vs. 0.55 to 0.62 for control group, $p < 0.0001$ ).  There were no significant differences between groups in improvement of symptoms, based on PANSS scores. No significant differences between groups in quality of wellbeing, based on QWB scores.  No significant difference between groups in patient satisfaction based on CSQ-8 scores	-Many interventions were completed by pharmacy technicians under pharmacist supervision

Study (year)	Intervention	Setting	Patient population; Sample size	Study design (duration)	Results	Comments
Wang, et al (2011)	Pharmacist met with patients for patient education, monitoring of therapeutic effect and adverse effects, and administration of rating scales. Treatment plan was collaborative effort between pharmacist and PCP	Outpatient "safety-net" clinic in Skid Row	Various psychiatric illnesses N=36	Uncontrolled study (7 months)	Almost 77% of patients showed clinical improvement. The mean change in PHQ-9 score from baseline to 7 months was $-5.7 \pm 5.7$ ( $p=0.02$ ).	-No control group -No economic outcome data -Pharmacist was reportedly well received by the treatment team
Marino, et al (2010)	Pharmacists clarified orders, formulary conversion, dose recommendations/ adjustments, therapeutic recommendations and lab monitoring	Psychiatric hospital in Florida	Various psychiatric disorders N = 2,220 interventions	Retrospective chart review (18 months)	Estimated cost savings of \$125,500 for the 18-month time frame. Overall acceptance rate of interventions of 98.8%. Acceptance rates for faculty clinical pharmacists, hospital staff pharmacists, and student pharmacists were 97.7%, 99.8%, and 87.5%, respectively.	-Documentation of interventions was voluntary -Majority of interventions were made by hospital staff pharmacists
Suehs, et al (2011)	Pharmacists made recommendations, including initiation of new medication therapy, discontinuing current medications, or obtaining labs	State psychiatric hospital in Texas	Various psychiatric disorders N=105	Retrospective chart review (9 months)	About 67% of pharmacist recommendations were accepted. Statistically significant correlation between improved CGI-S scores and higher rates of implementation of pharmacist recommendations ( $p=0.036$ ) indicating improvement of symptoms.  Correlation between pharmacist recommendation implementation and improved CGI-I scores not statistically significant.	-No economic outcomes -Patients were most commonly referred for consultation due to non-response to treatment or aggression

psychiatric clinics<sup>18,19</sup>, four at community pharmacies<sup>6,10,15,17</sup>, and one within an assertive community treatment (ACT) team.<sup>14</sup> While fifteen studies examined the impact of pharmacist interventions in patients already diagnosed with a psychiatric disorder<sup>5-14, 17-21</sup>, two focused on the ability of pharmacists to screen for depression.<sup>15,16</sup> Overall, approximately 50% of the reports focused on depressive disorders.<sup>5,6,9-13,15-17</sup> Only seven of the studies included a control group: five studies were randomized, controlled trials<sup>5,9,12,17,18</sup>, while two studies were non-randomized controlled trials.<sup>10,11</sup> The majority of the studies found a significant improvement of symptoms in both groups<sup>5,9,10,12,17</sup>; however, no significant difference existed between the intervention and control groups. Pharmacist interventions most commonly included patient education<sup>5-14,17-20</sup> and pharmacist recommendations to other providers.<sup>5,7-9,11-14,19-21</sup> Pharmacist recommendations to other providers commonly involved dose adjustments and changes in medication therapy<sup>5,7-9,11-14,20,21</sup>, and regarded obtaining laboratory work and therapeutic drug levels.<sup>20,21</sup>

Ten studies using various psychiatric inventories assessed clinical outcomes directly resulting from pharmacist interventions.<sup>5,7,9,10,12,13,17-19,21</sup> Of these studies, the uncontrolled trials showed significant improvement in psychiatric symptoms through the course of the study.<sup>7,13,19,21</sup> Improvement in symptoms in these studies was measured by various rating scales, including the HAM-A and HAM-D scales<sup>7</sup>, the PHQ-9<sup>13,19</sup>, and the CGI-S.<sup>19,21</sup> However, the controlled trials found no significant difference in the clinical improvement of patients between the pharmacist intervention and control groups.<sup>5,9,10,12,17,18</sup>

Economic outcomes resulting from the interventions were explored in four studies.<sup>7,12,13,20</sup> The majority found the intervention resulted in economic savings over the study period, when compared to projected costs.<sup>7,13,20</sup> Estimated savings ranged from \$22,380 over 15 months to \$125,500 over an 18 month period.<sup>7,20</sup> In the study which estimated cost savings over \$120,000 the interventions that saved the most money included: clarification of orders, MAR discrepancy and dose adjustments.<sup>20</sup> The only controlled study that assessed economic outcomes found a non-significant increase in institutional drug costs for patients in the intervention group, likely due to increased medication adherence, but this study did not perform a cost-benefit analysis.<sup>12</sup>

Eight studies examined the effect of the interventions on medication adherence.<sup>5,6,9-12,17,18</sup> The majority of interventions consisted of increased pharmacist contact

with patients for the purposes of following up on medication-related concerns.<sup>5,6,8-12,17</sup> One study examined the effect of a patient program, which involved medication refill reminders and unit-of-use packaging of all routine medications.<sup>18</sup> Adherence was assessed by pharmacy computerized refill records<sup>11,12,17,18</sup>, or by self-reported information from the patients.<sup>5,6,9,10</sup> Approximately half of the studies found improved adherence at six months in the intervention groups when compared to control groups.<sup>11,12,17,18</sup> Improvement in medication adherence ranged from 19% to 27% higher within intervention groups compared to control groups.<sup>12,18</sup> Two studies found no significant difference in adherence between intervention and control groups, despite the 95% adherence rate in one of the studies.<sup>9,10</sup> One uncontrolled study found that 83% of patients reported missing doses, taking additional doses, or stopping their medication during the study.<sup>6</sup>

Six studies assessed patient satisfaction.<sup>6,9,11,12,15,18</sup> Patient satisfaction was measured through various follow-up surveys. Two controlled studies found that patients in the intervention groups had higher satisfaction rates in several areas, including the personal nature of care, access to providers, and overall satisfaction with the (health maintenance organization) HMO providing care.<sup>11,12</sup> However, the other two controlled studies, despite a satisfaction rate of at least 80%, found no significant difference in patient satisfaction between control and intervention groups.<sup>9,18</sup> One small uncontrolled study found a patient satisfaction rate of 88% when pharmacists were directly involved in their care via depression screenings.<sup>15</sup>

One retrospective study compared clinical outcomes in patients who had high implementation of pharmacist recommendations with those who had lower implementation rates.<sup>21</sup> This study found a statistically significant correlation between patients with high implementation rates and improvement of symptoms, based on CGI-Severity (CGI-S) scores. The proportion of patients who responded with improved CGI-S scores was greater in the high implementation group when compared with patients who had lower implementation rates (51.9% vs. 31.3%, P=0.036). The same study found that while there was a similar correlation between high implementation and CGI-Improvement (CGI-I) scores, this correlation was not statistically significant.

Two studies assessed the results of a pharmacist-run depression screening program.<sup>15,16</sup> One screening resulted in 33% of the 18 participants being referred to their PCP for follow-up care, after screening with the 10-item

Harvard Department of Psychiatry/National Depression Screening Day Scale (HANDS tool).<sup>15</sup> The other study involved screening 45 diabetic patients with the Zung Self-rating Depression Scale (SDS), and showed over half of the patients with diagnoses of depression were either undertreated or not treated at all, while 48% of patients without a major depression diagnosis screened positive.<sup>16</sup> However, clinical outcomes resulting from these screenings were not assessed.

Three controlled studies assessed the effect of pharmacy interventions on the number of patient visits to other healthcare providers. Two of these studies found there was no significant effect on pharmacy interventions and patient visits to other healthcare providers<sup>9,12</sup>, while another study found a greater decrease in number of visits to primary care physicians in the intervention group.<sup>11</sup>

One study found there was no significant effect of pharmacy interventions and the patients' attitudes towards antidepressant medications.<sup>10</sup> Another study found patients who received pharmacy interventions were more likely to provide feedback about their treatment to the pharmacist, and had improved knowledge and beliefs about antidepressant medications.<sup>17</sup>

## DISCUSSION

A comprehensive literature search found 17 studies published between January 2002 and December 2011 on the impact of pharmacists on psychiatric patients. These studies varied widely, both in practice setting and in the types of interventions in which pharmacists were involved. Half of the identified publications focused on patients with depression, while the other half involved a variety of psychiatric diagnoses (e.g., anxiety, bipolar disorder). The studies varied greatly in size, study design, and measurement of outcomes. The quality of the studies also widely ranged, with only seven of the 17 studies utilizing a control group.

Overall, 60% of the non-controlled studies demonstrated favorable outcomes<sup>7,13,15,19-21</sup>, and 30% did not directly measure the outcomes resulting from pharmacist interventions.<sup>8,14,16</sup> While most studies found high patient satisfaction from pharmacist interventions, one study involving patients filling antidepressant medications at community pharmacies found that only 32% of patients found pharmacists to be helpful in solving medication related problems.<sup>6</sup> Caution is warranted when interpreting these results since 42% of patients in the study did not state an opinion on whether pharmacist

monitoring had been helpful, the pharmacist monitoring styles varied, and many patients did not have further contact with the pharmacist after the medication was dispensed. Therefore, it is difficult to draw definite conclusions from this study.

Each of the uncontrolled studies which evaluated clinical outcomes concluded pharmacist interventions resulted in overall improvement in psychiatric symptoms.<sup>7,13,19,21</sup> Despite not having a control group, one of these studies did compare outcomes in patients who had a higher implementation of pharmacist recommendations compared with patients with lower rates of implemented recommendations, and found pharmacist interventions were associated with favorable outcomes.<sup>21</sup> Another study noted clinical improvements were greater in patients with severe depression, as compared to those with mild to moderate forms of the illness.<sup>13</sup> The severity of the psychiatric illnesses in most of these studies was not stated. Therefore, if patients were mildly-moderately impaired it may have been difficult to determine significance especially with studies having a small sample size.

Despite clinical outcomes favoring the intervention group in one of the controlled studies<sup>5</sup>, it was interesting to see that none of the controlled studies over the past ten years actually demonstrated any statistically significant difference in clinical outcomes between patients receiving pharmacist interventions and control groups. Several additional reasons may explain why these studies demonstrated a lack of statistical differences. In one study, it was discovered after the intervention period that some of the pharmacists in the control group had provided the same types of services as the intervention pharmacists.<sup>10</sup> In another study, pharmacists in the control group were encouraged to use any available resources to assist in the treatment of their patients, but were not required to document any additional services provided to patients.<sup>9</sup> As a result, both studies found no significant difference between the intervention and control groups in treatment adherence or improvement of symptoms. A greater standardization of services provided by the control group pharmacists may have resulted in different results, as the control group pharmacists may have been providing many of the same types of interventions as pharmacists in the intervention group. Additionally, the lack of a statistically significant difference in clinical outcomes could also be a function of small sample sizes. Five of the controlled studies involved sample sizes of less than 200 patients.<sup>9,10,12,17,18</sup> It is



possible that studies with larger sample sizes would be able to detect a significant difference in clinical outcomes.

The majority of studies assessing economic outcomes found pharmacist interventions resulted in cost savings.<sup>7,13,20</sup> These findings are especially promising, as there is an ongoing search for ways to reduce health care costs. While these studies did not involve control groups, they compared actual costs with the projected yearly costs, which should give a more accurate estimate of the savings resulting from pharmacist interventions. It may be reasonable to believe the economic savings from some of these studies may have even been greater than estimated. One study concluded only 50-60% of interventions were documented, which may have had a significant impact on the results of the study.<sup>20</sup> Although the study did find pharmacy interventions resulted in economic savings for the hospital, the cost savings may have been underestimated due to the voluntary system of tracking interventions.

Future studies should employ larger sample sizes, as well as control groups. There is also a need for more standardization among the rating scales that are used to determine clinical outcomes. The great variation in rating scales used by the studies examined in this review demonstrates the possible need for more consistency.

## CONCLUSION

Studies published over the last ten years vary greatly in assessing the value of pharmacists in the treatment of patients with psychiatric illness. Overall, most studies concluded pharmacists provide a valuable role in the treatment of psychiatric patients in both inpatient and outpatient settings on various outcomes (e.g., patient satisfaction, adherence, cost-savings). However, the quality of most of these studies is not ideal, and there is a clear need for additional well-designed, randomized, controlled trials.

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