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# Pharmacist-Led Care: Improving Treatment Outcomes in Neuropsychiatric Disorders

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## Abstract

The role of pharmacists in the management of neuropsychiatric disorders is an evolving area within healthcare, driven by the need for effective treatment options for mental illnesses affecting over 50 million Americans. This review examines the critical interventions provided by pharmacists to optimize treatment in neuropsychiatric disorders, emphasizing the multi-faceted nature of their contributions within healthcare teams. Pharmacists' interventions include medication management, adherence, patient counseling, and other methods that support the prevention of adverse events, and they are key players in enhancing mental health care through collaborative practice models. **Objectives:** The primary objective of this review is to evaluate the impact of pharmacist-led interventions on patient outcomes in the management of neuropsychiatric disorders, exploring their roles in various settings and collaborative environments. **Background:** Neuropsychiatric disorders, which span both psychiatric and neurologic conditions, require comprehensive and integrated care approaches. Pharmacists are increasingly involved in medication management, patient education, and adherence strategies essential for managing these disorders effectively. **Methods:** A literature review was conducted to analyze studies examining pharmacist-led interventions in neuropsychiatric care, including adherence programs, medication reconciliation, adverse event monitoring, and pharmacogenomic applications. Articles were selected based on their focus on pharmacist interventions in community, hospital, and interdisciplinary settings. **Results:** Evidence suggests that pharmacist-led interventions improve adherence, optimize medication management, and contribute to reducing readmissions in patients with neuropsychiatric disorders. Key findings highlight the success of interventions such as patient counseling, pharmacogenomic-guided therapy, and collaborative care models, demonstrating improved outcomes across various settings. **Conclusions:** Pharmacists play a critical role in managing neuropsychiatric disorders through comprehensive

medication management, patient education, and collaboration with other healthcare providers. Their involvement is essential for safe, effective, and personalized mental health care, underscoring the need to further integrate pharmacists in mental health services.

## Keywords

Pharmacist Intervention, Neuropsychiatric Disorders, Medication Management

## 1. Introduction

Over 50 million American adults suffer from a mental illness, and in 2021, nearly half of those received mental health services through inpatient or outpatient treatment [1]. The National Institute of Mental Health (NIMH) defines mental illness as any condition affecting mental, behavioral, or emotional health. It may include depression, anxiety disorders, personality disorders, eating disorders, obsessive-compulsive disorder, post-traumatic stress disorder, bipolar disorder, schizophrenia, and many more [1] [2]. While mental health is primarily considered a psychiatric disorder, meaningful connections exist with neurological health and other disorders of the brain, and the discipline of neuropsychiatry acknowledges the relationship between neurology and psychiatry, providing a cohesive approach to the treatment of numerous disorders [3]. Neuropsychiatric disorders are highly prevalent yet often inadequately diagnosed and treated, leading to significant health impacts [2] [4]. Current treatment approaches vary based on disease and patient factors but frequently include a combination of pharmacotherapy and non-drug therapy.

Current evidence suggests that pharmacist-led interventions improve patient outcomes, especially for chronic conditions such as mental health disorders [5]. Pharmacists perform essential interventions in the management of neuropsychiatric disorders, but there currently lacks a broad overview of their role and the multifaceted interventions they provide [6]. The purpose of this review is to investigate the pharmacist's role in managing neuropsychiatric disorders.

The role of the pharmacist has changed over time to meet the needs of the patient in a variety of settings, such as inpatient hospitals, ambulatory clinics, and outpatient community pharmacies. Pharmacists are critical in treating both neurologic and psychiatric conditions, where medications are key to treatment outcomes yet difficult to manage due to the adverse effects, drug interactions, and difficulty with adherence [4]. Pharmacists provide medication monitoring, individualized pharmacotherapy interventions, and pharmacogenomic testing. Additional pharmacist-led interventions such as medication reviews, patient education, and adherence support are effective in reducing adverse drug events and optimizing medication used in mental health patients [6]. Within the interdisciplinary care team, the pharmacist's role in identifying and resolving medication-

related problems (MRP), helps ensure adherence and specialized pharmacotherapy recommendations in collaboration with other providers [6]. The integration of pharmacists in the healthcare team not only supports medication safety but also contributes to reducing readmissions in hospital settings and has been shown to improve overall patient outcomes [6].

## 2. Review of the Literature

### 2.1. Patient Education and Counseling

Patient counseling is an essential pharmacist role in patient care and a significant part of medication management. Pharmacists are responsible for educating their patients on their medications, how to use them, how to identify potential side effects or safety risks, and how to mitigate them [7]. Patients should also understand the importance of adhering to therapy to meet treatment goals [7]. In many cases, patients are accompanied by caretakers and family members, who should be included in the patient's care plan and counseling as well [8].

Pharmacist interventions, particularly in-person counseling and educational materials, effectively enhanced patient antidepressant adherence. One systematic review found that adult patients with depressive disorders in the US and non-US countries were 2.5 times more likely to adhere to their antidepressant therapy as prescribed when receiving pharmacist interventions compared to standard care in outpatient settings [9]. However, there was no significant improvement in depressive symptoms, suggesting that pharmacist interventions may enhance adherence, but the impact on clinical outcomes from adherence alone remains unclear [9]. Another systematic review and meta-analysis evaluating antidepressant adherence found pharmacist interventions have a positive effect on medication adherence, with the most common interventions including patient education, promoting adherence through providing visual or written information and making recommendations or adjustments to medications. Still, more data is necessary to confirm the findings [10]. A systematic review evaluating patients with schizophrenia found that 13 out of 16 studies reported that interventions significantly improve adherence, with technology-based reminders such as SMS, family involvement, and other pharmacist-led interventions such as educational and motivational interviews, showing the most promising results [11].

Counseling on adherence is vital in patients with comorbidities when multiple disease states may require various medications. One review investigating transplant recipients with comorbid psychiatric disorders noted intervention strategies, including medication adherence aids, motivational interviewing, and patient education, may improve adherence, but the selection of intervention should consider patient demographics, literacy, and preference [12]. Another retrospective review found that pharmacist-led telepharmacy interventions and alerts significantly improved psychotropic medication adherence in patients with type 2 diabetes [13].

A randomized controlled trial (RCT) showed that community pharmacists play

a crucial role in recognizing and assisting women with PCOS [14]. Highlighting the high prevalence of anxiety and depression among women with PCOS in both war-zone and non-war-zone settings, demonstrating the effectiveness of pharmacist-led interventions in improving mental health outcomes for this population [14]. They can provide critical support in managing the condition's physical and mental aspects [14]. By offering interventions such as education on lifestyle changes (ranging from 4 - 10 minutes), particularly emphasizing proper diet and physical activity, which resulted in reducing anxiety and depression symptoms [14]. This is or could be indicative that accessible and short pharmacist interventions can lead to meaningful mental health improvement [14].

### 2.2. Medication Management

Managing and optimizing a patient's medication regimen is a fundamental duty of the pharmacist. Pharmacist consults for medication management are particularly important for patients with complex or chronic conditions, taking into account all their treatments to identify and solve medication issues through interventions like medication reconciliation, dose adjustments, and deprescribing [15]. Leading pharmacists' expertise in medication management improves treatment outcomes and patients' quality of life [6].

Medication reconciliation is an essential, patient-centered element of medication management. It is considered a "gold standard" for ensuring accuracy in medication reconciliation [16]. It is a comprehensive documentation and evaluation of a patient's prescribed and non-prescribed drug regimens, and when performed correctly, minimizes the risk of medication errors and promotes the safe use of medication in and across health systems [17]. The pharmacist-led process takes place at transitions of care like admission or discharge and should identify potential discrepancies between the home and hospital prescriptions [10]. The American Pharmacists Association notes that nearly 1.5 million adverse events occur yearly due to preventable medication-related problems [17]. Recent studies suggest medication reviews performed by a pharmacist significantly improve outcomes, reducing discharge medication errors at a surgical unit from 90% to 47% and 57% to 33% at an academic medical center's medical unit. Still, barriers to implementing MedRec include a lack of data standardization in the list of medication records and the need to establish standard best practices [17]. Psychiatric pharmacists are increasingly involved in medication reconciliation and therapeutic patient education (or psychoeducation) to improve medication management and adherence [18].

While pharmacists may not hold the same level of prescriptive authority as other providers, pharmacists can exercise recommendations or adjustments to medication therapies in many clinical settings through consults. In one study, the effectiveness of pharmacist-managed electronic consults (e-consults) for managing uncomplicated mental health conditions in veterans showed that 93.5% of patients were maintained in primary care with high implementation of pharmacist

recommendations (87.7%) [19]. The e-consult service improves primary care management, enhances access to mental health services, and offers time and cost savings by reducing unnecessary specialty referrals [19]. One analysis documents 280 consultations submitted by providers to psychiatric pharmacists, with the most common questions relating to drug interactions, dosing, formulations, adverse effects, and pharmacokinetics [20]. Another overview emphasizes the importance of optimizing medications such as antipsychotics to prevent adverse outcomes and tapering or deprescribing medications such as benzodiazepines as necessary [21]. The pharmacist's role in optimizing medications extends beyond the clinical setting, as mental health patients in hospital-in-the-home programs have also observed improved outcomes and reduced re-admissions [22]. Some states, like North Carolina, have Clinical Pharmacist Practitioners who have prescribing authorities in conjunction with other providers in settings such as ambulatory care clinics to better assist patients with medication management [23].

### 2.3. Pharmacist-Led Screening and Monitoring

Pharmacists are often among the most accessible healthcare professionals in their community and serve as patient advocates in various settings. Nearly 90% of Americans reside within 5 miles of a pharmacy [24]. Thus, outpatient pharmacists can monitor patient health closely and can leverage their position to provide valuable preventative care, especially to patients in rural, low-income, or otherwise underserved communities [24]. There are numerous pharmacist-implemented community programs to improve patient outcomes for conditions such as depression and pain [25]. One paper describes a safety-net clinic serving psychiatric patients suffering from homelessness in Los Angeles, where primary care providers were not comfortable providing medication follow-up beyond uncomplicated depression and anxiety disorders [26]. Therefore, a collaboration between primary care physicians and psychiatrist pharmacists leads to interventions such as initiating drug therapy, adjusting the dosage, discontinuing drug therapy, and giving medication education [26]. The pharmacist-led interventions in safety-net clinics improved access to mental health services for patients with established psychiatric diagnoses and led to favorable patient satisfaction ratings [26].

Community pharmacists can implement convenient and timely screening services. One evaluation of community pharmacist-led screening used prescription bags to select and offer the Patient Health Questionnaire (PHQ-2) and Generalized Anxiety Disorder (GAD-2) screen, with follow-up PHQ-9 and GAD7 for at-risk individuals [27]. Individuals identified as high risk met with the pharmacist for consultation and recommendations were discussed, noting inadequate doses or the need for additional treatment [27]. Despite patient reluctance for follow-up with their provider, a review of the profiles after 2 months showed half of the patients at-risk received one or more changes to their mental health medication [27]. In addition to psychiatric screening, pharmacists can assess for numerous health risks, especially when comorbidities occur frequently with psychiatric conditions.

One model tested a community pharmacist-led depression screening in a rural, multi-ethnic population where adult patients with uncontrolled diabetes were assessed for depression through the PHQ-9 [28]. Positive screens were faxed to providers with recommendations for further evaluation, but authors note an alternate method of communication may be more effective [28].

Adverse drug event (ADE) monitoring is crucial for mental health patients. Patients should be educated on all potential side effects before starting therapy and receive follow-up to assess any medication-related safety or tolerability issues such as weight gain or sexual dysfunction as is common with antidepressants [29]. Furthermore in some antidepressants, there is a minor but serious risk of increased suicidal behavior, especially in young patients, and it is essential to ensure the patient is aware [29]. Clinical guideline documents such as the CANMAT 2023 Update on the Management of major depressive disorder acknowledge the importance of pharmacotherapy as part of a treatment regimen and emphasize the need for informed, shared decision-making [29]. Patients with schizophrenia are twice as likely to develop cardiometabolic disorders, and this risk is attributed partly to second-generation antipsychotic medication, which can contribute to weight gain, dyslipidemia, and impaired glucose tolerance [30]. Pharmacists, in these cases, could potentially conduct point-of-care testing for lipids and blood glucose as well, supporting early detection and management of metabolic issues as demonstrated in patients with schizophrenia [30].

Not all adverse events are necessarily drug-related. Patients with neurologic diseases may also frequently display neuropsychiatric symptoms, including "psychosis, depression, agitation, anxiety, irritability, and apathy", and must be closely monitored when treating with psychotropic agents [31].

Pain management can be difficult and complex, but pharmacists are critical providers in developing and monitoring pain management plans. They should always remain vigilant of the risks of substance use disorder and be able to identify and treat such disorders as well [32]. In patients with depression and pain, a community pharmacist-led intervention involving classes and a personalized care plan led to a decrease in pain levels and a reduction in the use of morphine-equivalent medications as a measurement for pain [25]. As a result, both depression and pain are common, and they lack symptoms-differences for interventions [25]. However, interventions such as medication adherence, reducing stigma, and improving self-efficacy improved overall in managing the disease [25]. A systematic review of pharmacist management of chronic pain found that their interventions effectively reduced pain intensity. However, further research is needed to evaluate broader outcomes like quality of life and cost-effectiveness [33]. Similarly, another review found that pharmacist-led interventions effectively reduce opioid dosage to improve safety in non-malignant chronic pain management. Still, limitations include communication barriers and access to patient records [34].

### 2.4. Pain Management and Deprescribing

Pharmacist's interventions in the management of pain have improved the opioid

epidemic by screening for misuse and co-occurring mental health disorders such as depression or anxiety. Optimizing medication management, conducting pharmacogenomic testing to personalized treatment, ensuring the safety and efficacy of therapies and providing patient counseling and education tailored to vulnerable populations, assisting patients in understanding their treatment plans, reducing opioid dependency, and adhering to alternative pain management strategies such as non-opioid pharmacologic treatments. Interventions were often supplemented by educational materials such as pamphlets or videos to enhance patient understanding and adherence [9]. Pharmacist collaborative approaches are valuable. They serve as supportive and knowledgeable healthcare providers that can provide comprehensive, safe, and effective medication management strategies.

Medication stewardship is another important role of the pharmacist. Deprescribing medication should involve patient engagement and shared decision-making, and pharmacists must communicate closely with the clinical team during the tapering process to monitor for withdrawal symptoms and potential signs of unmasked depression or anxiety disorders [35]. Benzodiazepines and benzodiazepine receptor agonists (BZRAs) such as zopiclone and zolpidem are commonly used long-term for insomnia, but should be tapered due to risks of dependence and falls, especially in older adults [35]. The potential for harm with long-term use of BZRAs may outweigh the short-term benefits of treating insomnias in certain populations, especially elderly patients [35]. Antipsychotics are another drug class often used in elderly patients to control behavioral and psychological symptoms of dementia, but they should not be used for extended periods of time due to safety risks [36]. Antipsychotics are useful in treating certain symptoms of dementia such as hallucinations and aggression, and their sedative properties are useful in treating insomnia, but when used chronically they can mask the progression of dementia symptoms and contribute to numerous additional neuropsychiatric adverse events [36]. Antipsychotic overuse is a growing concern, and the subsequent side effects can lead to prescribing cascades which contribute to drug interactions and nonadherence [36]. Pharmacists in long-term care facilities should regularly assess medication for safe and appropriate deprescribing, and help to educate providers on the risks of medication overuse [36].

### 2.5. Pharmacogenomic Testing

Another area where pharmacists have a strong clinical impact is through pharmacogenomic screening. In a statement released in 2022, the American Society of Health-System Pharmacists (ASHP) suggests that pharmacogenomic testing leads to "improved clinical outcomes, decreased side effects, lower cost of treatment, increased medication adherence, more appropriate selection of therapeutic agents, decreased length of treatment, and enhanced patient safety" [37]. Although genomic testing is not yet part of routine psychiatric practices, pharmacists possess unique skills to recognize when pharmacogenomic testing is beneficial [37]. Clinical pharmacists process and evaluate the results from PGx testing in the

context of the patient's medication history, medical and laboratory data, and any co-medication to adjust and optimize therapy as needed [38].

A pharmacist can guide medication selections and doses by considering genetic variations that affect drug metabolism, particularly in enzymes like CYP2D6 and CYP2C19, which influence the efficacy and tolerability of many psychotropic medications. The data provided by pharmacogenomic testing allows every patient to receive personalized medication regimens, which minimizes adverse effects and improves therapeutic outcomes [34]—making it crucial for optimizing the treatment of psychiatric disorders, where responses to medications may vary widely among individuals. Even though there are barriers, pharmacogenomic testing is an essential tool moving towards precision medicine within the psychiatric practice and is well recognized [39].

Antidepressant therapy is another relevant application of pharmacogenomic testing. Pharmacist-guided genomic testing has the potential to significantly improve treatment outcomes and reduce adverse drug reactions by guiding antidepressant selection and dosing using clinically guided and personalized recommendations [38]. Nearly half of patients with major depressive disorder do not respond to first-line treatment, but incorporating pre-emptive testing allows providers to select antidepressants most likely to improve response [38]. While cost is generally perceived the greatest barrier to neuropsychiatric healthcare, there is a growing demand for treatment of mental health conditions such as depression [40]. There are many commercially available pharmacogenomic tests on the market today, producing promising results on many antidepressant therapies with a simple blood sample or cheek swab [38]. Pharmacogenomic testing intervention has also led to reduced hospitalization times in patients with depression [41].

The International Society of Psychiatric Genetics (ISPG) notes that while limitations exist, genetic testing can be used to inform selection and dosing of many commonly used neuropsychiatric medications [42]. The ISPG's review and consensus document summarizes evidence and presents guidelines for antidepressants, antipsychotics, mood stabilizers and anticonvulsants [42]. The ISPG included pharmacogenomic information on anxiolytics and hypnotics, ADHD medication and addiction medications as well, but emphasizes the need for more robust evidence, standardization and education before genomic testing can allow for personalized medicine in psychiatry [42].

### 2.6. Collaborative Practice and Pharmacist's Role in Team-Based Settings

Pharmacists provide a variety of interventions in collaborative practice settings such as inpatient, ambulatory, and community settings. The frequency and extent of a pharmacist's role can vary considerably based on the practice setting, with inpatient clinical pharmacists able to participate in close monitoring with daily rounds and direct observation of patients while outpatient pharmacists may have more limited contact and ability to monitor, screen, and manage patients [4].

A retrospective observational study showed that medication reconciliations were completed for all admitted patients in teams involving pharmacy students with 82% accuracy, compared to 61% accuracy in teams without pharmacy students' involvement [43]. Including fourth-year pharmacy students in interdisciplinary mental health teams led to an increase in clinical interventions, patient counseling sessions, and medication reconciliations compared to teams without a pharmacy student [43]. Incorporating mental health first aid training into pharmacy education can enhance empathy and confidence in handling mental health crises. Still, additional strategies may be needed to impact knowledge and attitudes toward mental illness more effectively [44]. Providing pharmacy students and pharmacists the reinforcement and necessary expertise to make an impact. Pharmacists actively collaborate with individuals experiencing mental health challenges to address issues such as polypharmacy, facilitate the deprescription process, support medication withdrawal, and optimize medication outcomes [44].

Pharmacists have the clinical knowledge and expertise to aid mental health teams by providing medication management adherence and optimizing psychopharmacotherapy in collaboration with psychiatrists [18]. A study explored the role of pharmacists in community mental health teams (CMHTs), focusing on optimizing medication use by providing evidence-based information, participating in clinical meetings, conducting medication reviews, and educating clients and caregivers [45]. As a result, pharmacists were perceived as valuable sources of unbiased and evidenced-based drug information for mental health teams, patients, and caregivers [45]. Collaboration between pharmacists and psychiatrists, such as through specialized centers, improves the application of clinical guidelines and patient care [18].

Involving clinical pharmacists in interdisciplinary rounds significantly reduced drug-related problems and improved medication management in psychiatric settings [46]. A study evaluated the impact of interventions during interdisciplinary ward rounds at a psychiatric hospital in Slovenia [46]. There was a high acceptance rate of 93.7%, leading to a 93.8% reduction in expressed and potential drug-related problems [46]. The most common interventions included dose adjustments, medication initiation, and discontinuation related to antipsychotics and antidepressants [46]. Data showed that approximately three months after discharge, 70.5% of the accepted recommendations were maintained [46]. Integrating pharmacists into team-based care models helps personalized treatment, enhances outcomes, and manages complex regimens [18].

## 3. Discussion

The expansion and integration of pharmacists into team-based settings, screening, medication management, and monitoring is very beneficial for the mental health community. However, particular challenges may be faced, such as inadequate support from pharmacy owners, limited staff resources, insufficient training in mental health, unclear roles for monitoring, inadequate communication systems,

potential resistance from healthcare providers and patients, and remuneration [30]. For example, pharmacists were valued for improving medication management, but limited engagement (one day per week) hindered deeper collaboration with the teams [45]. Therefore, pharmacists were addressing gaps in pharmaceutical care, but more frequent involvement and alternative models are needed to enhance their effectiveness [45]. On the other hand, new pharmacogenetics findings may change the trial's recommendations, affecting consistency [38]. Further research is needed to validate the benefits of pharmacist-guided PGx testing and explore the long-term impact on treatment adherence and healthcare costs [38].

A patient's adherence to their treatment regimen is critical to ensuring the safety and efficacy of treatment, especially with chronic or long-term conditions. Medication nonadherence is common in psychiatric patients, and the consequences can include medication withdrawal effects or psychiatric decompensation [12]. Ultimately, pharmacist education and counseling can lead to significantly improved medication adherence in patients with psychiatric disorders, but further research is needed to investigate the clinical impact.

## 4. Conclusion

Neuropsychiatric disorders are complex conditions requiring careful monitoring to ensure effective treatment. Pharmacist-led interventions, including medication management, patient education, counseling, screening, and monitoring, can support health outcomes, especially when patients' access to the healthcare system is limited. Further research is necessary to assess the strength of evidence and develop more effective interventions, but pharmacists remain active in treating and managing neuropsychiatric conditions.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

## References

[1] NIMH (2024) Mental Illness—National Institute of Mental Health. https://www.nimh.nih.gov/health/statistics/mental-illness

[2] World Health Organization (2024) Neuropsychiatric Conditions. https://platform.who.int/mortality

[3] Taslim, S., Shadmani, S., Saleem, A.R., Kumar, A., Brahma, F., Blank, N., *et al.* (2024) Neuropsychiatric Disorders: Bridging the Gap between Neurology and Psychiatry. *Cureus*, **16**, e51655. https://doi.org/10.7759/cureus.51655

[4] Goldstone, L.W., DiPaula, B.A., Caballero, J., Park, S.H., Price, C. and Slater, M.Z. (2015) Improving Medication-Related Outcomes for Patients with Psychiatric and

Neurologic Disorders: Value of Psychiatric Pharmacists as Part of the Health Care Team. *Mental Health Clinician*, **5**, 1-28. https://doi.org/10.9740/mhc.2015.01.001

[5] Ng, R., El-Den, S., Stewart, V., Collins, J.C., Roennfeldt, H., McMillan, S.S., *et al.* (2021) Pharmacist-led Interventions for People Living with Severe and Persistent Mental Illness: A Systematic Review. *Australian & New Zealand Journal of Psychiatry*, **56**, 1080-1103. https://doi.org/10.1177/00048674211048410

[6] Spaulding, A.M. (2012) A Pharmacotherapeutic Approach to the Management of Chronic Posttraumatic Stress Disorder. *Journal of Pharmacy Practice*, **25**, 541-551. https://doi.org/10.1177/0897190012442714

[7] ACCP—About Clinical Pharmacists. https://www.accp.com/about/clinicalpharmacists.aspx#:~:text=Clinical%20pharmacists%3A,effectiveness%20of%20the%20patient's%20medications

[8] Samaksha, P.B., Kishor, M. and Ramesh, M. (2022) A Novel Study on Clinical Pharmacist and Psychiatrist Collaborative Pharmacotherapy Management Services among Elderly Population with Psychiatric Illness. *Indian Journal of Psychiatry*, **64**, 20-24. https://doi.org/10.4103/indianjpsychiatry.indianjpsychiatry_379_21

[9] Readdean, K.C., Heuer, A.J. and Scott Parrott, J. (2018) Effect of Pharmacist Intervention on Improving Antidepressant Medication Adherence and Depression Symptomology: A Systematic Review and Meta-Analysis. *Research in Social and Administrative Pharmacy*, **14**, 321-331. https://doi.org/10.1016/j.sapharm.2017.05.008

[10] Rubio-Valera, M., Serrano-Blanco, A., Magdalena-Belío, J., Fernández, A., García-Campayo, J., March Pujol, M., *et al.* (2011) Effectiveness of Pharmacist Care in the Improvement of Adherence to Antidepressants: A Systematic Review and Meta-Analysis. *Annals of Pharmacotherapy*, **45**, 39-48. https://doi.org/10.1345/aph.1p429

[11] Cahaya, N., Kristina, S.A., Widayanti, A.W. and Green, J. (2022) Interventions to Improve Medication Adherence in People with Schizophrenia: A Systematic Review. *Patient Preference and Adherence*, **16**, 2431-2449. https://doi.org/10.2147/ppa.s378951

[12] Khorassani, F., Tellier, S. and Tsapepas, D. (2018) Pharmacist's Role in Improving Medication Adherence in Transplant Recipients with Comorbid Psychiatric Disorders. *Journal of Pharmacy Practice*, **32**, 568-578. https://doi.org/10.1177/0897190018764074

[13] Bingham, J., Silva-Almodóvar, A., Lee, H., Benson, C., Michael, R., Azurin, C., *et al.* (2020) The Role of the Pharmacist in Mental Health: An Investigation of the Impact of Pharmacist-Led Interventions on Psychotropic Medication Adherence in Patients with Diabetes. *Journal of the American Pharmacists Association*, **60**, e58-e63. https://doi.org/10.1016/j.japh.2020.01.009

[14] Alkoudsi, K.T. and Basheti, I.A. (2020) Prevalence of Anxiety and Depression among Women with Polycystic Ovary Syndrome Living in War versus Non-War Zone Countries: A Randomized Controlled Trial Assessing a Pharmacist Intervention. *Research in Social and Administrative Pharmacy*, **16**, 689-698. https://doi.org/10.1016/j.sapharm.2019.08.027

[15] APHA (2024) Medication Management. https://www.pharmacist.com/Practice/Patient-Care-Services/Medication-Management/

[16] Fatima, S., Arshad, A., Zafar, A., Farrukh, S., Rahim, A., Nazar, S., *et al.* (2024) Journey of Medication Reconciliation Compliance in a Lower Middle-Income Country: A Retrospective Chart Review. *BMJ Open Quality*, **13**, e002527. https://doi.org/10.1136/bmjoq-2023-002527

[17] American Pharmacists Association and American Society of Health-System Pharmacist (2012) Improving Care Transitions: Optimizing Medication Reconciliation. *Journal of the American Pharmacists Association*, **52**, e43-e52. https://doi.org/10.1331/japha.2012.12527

[18] Javelot, H., Gitahy Falcao Faria, C., Vandenberghe, F., Dizet, S., Langrée, B., Le Maout, M., *et al.* (2021) Clinical Pharmacy in Psychiatry: Towards Promoting Clinical Expertise in Psychopharmacology. *Pharmacy*, **9**, Article 146. https://doi.org/10.3390/pharmacy9030146

[19] Herbert, C., Winkler, H. and Moore, T.A. (2017) Outcomes of Mental Health Pharmacist-Managed Electronic Consults at a Veterans Affairs Health Care System. *Mental Health Clinician*, **7**, 131-136. https://doi.org/10.9740/mhc.2017.05.131

[20] Gotlib, D., Bostwick, J.R., Calip, S., *et al.* (2017) Collaborative Care in Ambulatory Psychiatry: Content Analysis of Consultations to a Psychiatric Pharmacist. *Psychopharmacol Bull*, **47**, 41-46.

[21] Hahn, M., Stuhec, M. and da Costa, F.A. (2023) Overview of This Issue: Clinical Pharmacy Impacting Mental Health Delivery and Outcomes. *International Journal of Clinical Pharmacy*, **45**, 1025-1026. https://doi.org/10.1007/s11096-023-01654-1

[22] Farag, M., Chalmers, L., Hoti, K. and Hughes, J. (2022) The Role of the Clinical Pharmacist in Mental Health Hospital-In-The-Home: A Scoping Review. *Research in Social and Administrative Pharmacy*, **18**, 3724-3735. https://doi.org/10.1016/j.sapharm.2022.04.004

[23] Clinical Pharmacist Practitioner (2024) https://www.ncbop.org/clinical-pharmacist-practitioner.html

[24] Kelling, S.E., Rondon-Begazo, A., DiPietro Mager, N.A., Murphy, B.L. and Bright, D.R. (2016) Provision of Clinical Preventive Services by Community Pharmacists. *Preventing Chronic Disease*, **13**, Article 160232. https://doi.org/10.5888/pcd13.160232

[25] Karp, J.F., Kincman, J., Lightfoot, M., Foust, J.E., Maher, R. and Gebara, M.A. (2022) A Systematic Review of Community Pharmacy Initiatives to Improve Treatment of Depression and Pain: Focus on Types of Programs and Patient-Reported Outcomes. *Research in Social and Administrative Pharmacy*, **18**, 2569-2578. https://doi.org/10.1016/j.sapharm.2021.05.015

[26] Chung, B., Dopheide, J.A. and Gregerson, P. (2011) Psychiatric Pharmacist and Primary Care Collaboration at a Skid-Row Safety-Net Clinic. *Journal of the National Medical Association*, **103**, 567-575. https://doi.org/10.1016/s0027-9684(15)30382-5

[27] Reid, S., Nichols, R., Veach, S., Alhersh, E. and Witry, M. (2024) Evaluation of an Enhanced Depression and Anxiety Screening with Targeted Pharmacist Intervention. *Journal of the American Pharmacists Association*, **64**, Article 102067. https://doi.org/10.1016/j.japh.2024.102067

[28] Wilson, C. and Twigg, G. (2018) Pharmacist-Led Depression Screening and Intervention in an Underserved, Rural, and Multi-Ethnic Diabetic Population. *Journal of the American Pharmacists Association*, **58**, 205-209. https://doi.org/10.1016/j.japh.2017.11.001

[29] Lam, R.W., Kennedy, S.H., Adams, C., Bahji, A., Beaulieu, S., Bhat, V., e*t al.* (2024) Canadian Network for Mood and Anxiety Treatments (CANMAT) 2023 Update on Clinical Guidelines for Management of Major Depressive Disorder in Adults: Réseau canadien pour les traitements de l'humeur et de l'anxiété (CANMAT) 2023: Mise à jour des lignes directrices cliniques pour la prise en charge du trouble dépressif majeur chez les adultes. *The Canadian Journal of Psychiatry*, **69**, 641-687.

https://doi.org/10.1177/07067437241245384

[30] Karge, R., Curtain, C. and Salahudeen, M. (2023) Community Pharmacists' Role in Reducing the Incidence of Cardiometabolic Adverse Drug Events in Schizophrenia: Insights from Mental Health Professionals. *Medicina*, **59**, Article 2052. https://doi.org/10.3390/medicina59122052

[31] Cummings, J.L. and Jeste, D.V. (2007) Pharmacotherapy of Neuropsychiatric Syndromes in Neurologic Disorders: Definitional and Regulatory Aspects. *Psychopharmacol Bull*, **40**, 89-98.

[32] Pain Management and MOUD Resource Center—ASHP. https://www.ashp.org/Pharmacy-Practice/Resource-Centers/pain-management-and-moud-resource-center

[33] Thapa, P., Lee, S.W.H., KC, B., Dujaili, J.A., Mohamed Ibrahim, M.I. and Gyawali, S. (2021) Pharmacist-Led Intervention on Chronic Pain Management: A Systematic Review and Meta-Analysis. *British Journal of Clinical Pharmacology*, **87**, 3028-3042. https://doi.org/10.1111/bcp.14745

[34] Iqbal, A., David Knaggs, R., Anderson, C. and Toh, L.S. (2022) Role of Pharmacists in Optimising Opioid Therapy for Chronic Non-Malignant Pain; A Systematic Review. *Research in Social and Administrative Pharmacy*, **18**, 2352-2366. https://doi.org/10.1016/j.sapharm.2020.11.014

[35] Pottie, K., Thompson, W., Davies, S., *et al.* (2018) Deprescribing Benzodiazepine Receptor Agonists: Evidence-Based Clinical Practice Guideline. *Canadian Family Physician*, **64**, 339-351.

[36] Bjerre, L.M., Farrell, B., Hogel, M., *et al.* (2018) Deprescribing Antipsychotics for Behavioural and Psychological Symptoms of Dementia and Insomnia: Evidence-Based Clinical Practice Guideline. *Canadian Family Physician*, **64**, 17-27.

[37] Haidar, C., Petry, N., Oxencis, C., Douglas, J.S. and Hoffman, J.M. (2021) ASHP Statement on the Pharmacist's Role in Clinical Pharmacogenomics. *American Journal of Health-System Pharmacy*, **79**, 704-707. https://doi.org/10.1093/ajhp/zxab339

[38] Stäuble, C.K., Lampert, M.L., Allemann, S., Hatzinger, M., Hersberger, K.E., Meyer zu Schwabedissen, H.E., *et al.* (2021) Pharmacist-Guided Pre-Emptive Pharmacogenetic Testing in Antidepressant Therapy (PrePGx): Study Protocol for an Open-Label, Randomized Controlled Trial. *Trials*, **22**, Article No. 919. https://doi.org/10.1186/s13063-021-05724-5

[39] Alchakee, A., Ahmed, M., Eldohaji, L., Alhaj, H. and Saber-Ayad, M. (2022) Pharmacogenomics in Psychiatry Practice: The Value and the Challenges. *International Journal of Molecular Sciences*, **23**, Article 13485. https://doi.org/10.3390/ijms232113485

[40] Mojtabai, R. (2009) Unmet Need for Treatment of Major Depression in the United States. *Psychiatric Services*, **60**, 297-305. https://doi.org/10.1176/ps.2009.60.3.297

[41] Bättig, V.A.D., Roll, S.C. and Hahn, M. (2020) Pharmacogenetic Testing in Depressed Patients and Interdisciplinary Exchange between a Pharmacist and Psychiatrists Results in Reduced Hospitalization Times. *Pharmacopsychiatry*, **53**, 185-192. https://doi.org/10.1055/a-1096-1171

[42] Bousman, C.A., Bengesser, S.A., Aitchison, K.J., Amare, A.T., Aschauer, H., Baune, B.T., *et al.* (2020) Review and Consensus on Pharmacogenomic Testing in Psychiatry. *Pharmacopsychiatry*, **54**, 5-17. https://doi.org/10.1055/a-1288-1061

[43] Mathys, M., Neyland-Turner, E., Hamouie, K. and Kim, E. (2015) Effect of Pharmacy

Students as Primary Pharmacy Members on Inpatient Interdisciplinary Mental Health Teams. *American Journal of Health-System Pharmacy*, **72**, 663-667. https://doi.org/10.2146/ajhp140411

[44] Frick, A., Osae, L., Ngo, S., Anksorus, H., Williams, C.R., Rodgers, P.T., *et al.* (2021) Establishing the Role of the Pharmacist in Mental Health: Implementing Mental Health First Aid into the Doctor of Pharmacy Core Curriculum. *Currents in Pharmacy Teaching and Learning*, **13**, 608-615. https://doi.org/10.1016/j.cptl.2021.01.027

[45] Bell, J.S., Rosen, A., Aslani, P., Whitehead, P. and Chen, T.F. (2007) Developing the Role of Pharmacists as Members of Community Mental Health Teams: Perspectives of Pharmacists and Mental Health Professionals. *Research in Social and Administrative Pharmacy*, **3**, 392-409. https://doi.org/10.1016/j.sapharm.2006.10.005

[46] Stuhec, M. and Tement, V. (2021) Positive Evidence for Clinical Pharmacist Interventions during Interdisciplinary Rounding at a Psychiatric Hospital. *Scientific Reports*, **11**, Article 13641. https://doi.org/10.1038/s41598-021-92909-2