DOI: https://doi.org/10.54393/pjhs.v6i4.2923

PAKISTAN JOURNAL OF HEALTH SCIENCES
(LAHORE)
https://thejas.com.pk/index.php/pjhs
ISSN (E): 2790-9352, (P): 2790-9344
Volume 6, Issue 04 (April 2025)

Original Article

OPEN ACCESS

Impact of Pharmacist-Led Interventions On Medication Adherence in Patients with Chronic Psychiatric Disorders

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ARTICLE INFO

Keywords:
Medication Adherence, Psychiatric Patients, Pharmacist Interventions, Mixed-Methods

How to Cite:
Haq, U. U., Ellahi, S., Khan, Z., & Mansoor, A. (2025). Impact of Pharmacist-Led Interventions On Medication Adherence in Patients with Chronic Psychiatric Disorders: Pharmacist On Medication Adherence in Patients with Chronic Psychiatric Disorders. Pakistan Journal of Health Sciences, 6(4), 11-17. https://doi.org/10.54393/pjhs.v6i4.2923

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Received date: 1st April, 2025
Revised date: 3rd April, 2025
Acceptance date: 28th April, 2025
Published date: 30th April, 2025

ABSTRACT

Mental health disorders represent a growing global health challenge, affecting an estimated 970 million people worldwide as of 2019. These disorders not only impair individuals' ability to function but also impose significant economic and social burdens. In a country like Pakistan, mental health treatment resources are minimal, and chronic psychiatric disorders like bipolar personality disorder, schizophrenia, and chronic depression have become an enormous burden. **Objectives:** To assess the impact of pharmacist-led interventions on medication adherence among psychiatric patients in Rawalpindi, Pakistan. **Methods:** This quasi-experimental mixed-method study employed a pre-post intervention design. Conducted in two psychiatric clinics in Rawalpindi, it involved a total sample of 60 participants for the quantitative phase and 10 for the qualitative phase. Quantitative data were analyzed using McNamara's test and the Wilcoxon signed-rank test, while qualitative data underwent thematic analysis. **Results:** Significant improvements in medication adherence were observed post-intervention, as evidenced by Paired Chi-Square (McNamara's test) and Wilcoxon Signed Rank Test.Thematic analysis of the qualitative data identified four main themes with three sub-themes, providing insights into the patients' attitudes, knowledge, and practices regarding medication adherence. **Conclusions:** It was concluded that pharmacist-led interventions were found to be effective in enhancing medication adherence among psychiatric patients.The study underscores the importance of ongoing support and education for this patient group and recommends the continuation of such interventions to sustain improvements in adherence.

INTRODUCTION

As of 2019, nearly 970 million people have been affected by chronic mental disorders such as bipolar personality disorder, schizophrenia, and other depressive illnesses [1]. The most prominent effect of these disorders can be observed not only on the individual's quality of life but also economically and socially. In a country like Pakistan, which is considered a low and middle-income country, mental health is an underfunded and extremely ignored dimension of public health with minimal integration into primary healthcare services, intensifying the worries and complications faced by patients and their caregivers [2]. The most critical component in the management of a mental health disorder is the adherence of the patient to the prescribed medication regimen. Medication adherence ensures stabilization of symptoms and reduces hospitalization rates, but medication non-adherence persists as a prevailing fact, as global estimates according to studies conducted reveal a massive 50% non-adherence of patients with chronic mental illnesses [3]. In a country like Pakistan, the severity of this issue has seen an exceptional increase due to fragmentation in healthcare systems, stigma in society regarding psychiatric disorders, and limited affordability of medicines [4]. This study explores the potential of pharmacist-led interventions in improving medication adherence among psychiatric patients in Islamabad. By addressing systemic and cultural barriers, the findings aim to inform sustainable models of care that enhance mental health outcomes. The most

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critical and fundamental factor in the therapeutic management of chronic psychiatric illnesses is the strict following of prescribed medication regimes.Research studies conducted across the globe have repeatedly proven that proper medication adherence produces prominent improvement in clinical results with consistent stabilization in symptoms and a sharp decrease in hospital admission rates [3].Despite all these advantages, we see that non-adherence is the most prevalent medication problem globally.In an LMIC like Pakistan, levels of medication adherence are too low, according to research only less than 20% of the people with chronic psychiatric conditions adhering to the prescribed regimen [4].Non-adherence to medication in psychiatric patients is the fundamental issue that reduces treatment effectiveness and aggravates the global burden on health systems. Pakistan faces multidimensional barriers such as extreme societal stigma, limited access to mental healthcare services, and disintegrated healthcare that further worsen the problem [2]. Pakistan faces multidimensional barriers to medication adherence. The majority of chronic psychiatric patients and their caregivers both suffer from the societal stigma that prevents them from seeking treatment, while the fragmentation in the Pakistani healthcare system, alongside poor access to affordable medicines, further aggravates the situation [5]. Pharmacists are such accessible healthcare professionals who have sublime expertise in medication regimen management, promising a productive solution to these existing challenges. There is no doubt that around the globe, pharmacist-led interventions have produced excellent results and major improvements in medication adherence rates and outcomes of treatment [6, 7]. However, the role of pharmacists in mental health treatment is often overlooked in Pakistan and remains severely underexplored, as the majority of pharmacists are confined to dispensing medicines only.

This study aims to analyze the impact of pharmacist-led interventions on medication adherence and treatment outcomes in psychiatric clinics in Rawalpindi, Pakistan.

METHODS

A mixed-methods quasi-experimental pre-post intervention study design was used to complete this study. The study was conducted in Rawalpindi. It was a multicenter study. To ensure the generalizability of results, 2 different mental health clinics were selected for the administration of pharmacist-led interventions and in-depth post-intervention interviews. Both these clinics had a patient influx with diverse socioeconomic and demographic backgrounds. Quantitative data collection was conducted in 2 phases, as interviews with patients were conducted once before and then after the pharmacist-led interventions. Qualitative data collection was conducted after the completion of the interventions by a pharmacist. Open-ended questions were asked of willing patients in live interviews, and their in-depth responses regarding their medication adherence routine, beliefs and experiences were transcribed verbatim. A structured questionnaire incorporating socio-demographic data, MARS, and PHQ-9 both cross-culturally validated tools ensured reliable quantitative assessment, while in-depth interviews with open-ended questions strengthened qualitative insights. Data integrity was maintained through complete entry and analysis in SPSS version 23.0, eliminating missing values. Pre-intervention data established a baseline, with post-intervention assessments capturing pharmacist-led program effects. This self-comparison design enhances internal validity by controlling for between-group variability. Only those patients took part in this study who were diagnosed with a chronic mental illness and had to visit the doctor for a checkup at least 2 times a month. This study only includes outpatients. Convenience sampling was used to recruit participants. A sample size of this research was set at 60 as equal participation of patients from both clinics was ensured, including 30 patients from both mental health clinics. The sample size determination considered an effect size of Cohen's d=0.5, a 0.05 significance level, and 80% power, resulting in 32 patients per group (total=64), with 60 deemed sufficient. For qualitative analysis, data saturation guided participant selection, typically achieved with 10–15 individuals; thus, 10 intervention-group patients were purposively chosen. This dual approach ensures robust statistical power for quantitative analysis while providing meaningful qualitative insights. A total of 120 responses were collected, 60 responses before and 60 after the administration of pharmacist-led interventions for quantitative data analysis and 10 patients who had received pharmacist interventions participated in the in-depth interviews for qualitative data collection and thematic analysis. Clinical pharmacists consistently ensured their presence in both clinics and administered interventions during the 4-week study period (Figure 1).

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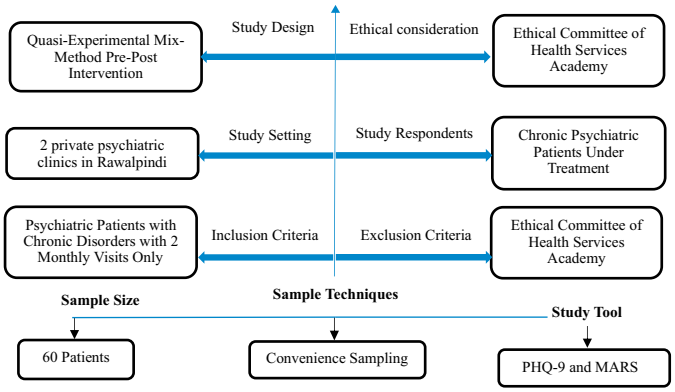

Figure 1: Methods Included Sample Size, Sample Techniques and Study Tool

Pharmacists interacted with each patient and their caregiver two times during the study, and each session lasted 10 minutes. They focused on patient education on the significance of medication adherence and proper use of sedative-hypnotics and antidepressant drugs while completing a structured checklist to ensure the effectiveness of the intervention. Medically, the one-month intervention period was justified and appropriate, as most antidepressants and psychiatric medications significantly improve symptoms within two weeks of consistent usage. Research indicates that 90% of patients experience a noticeable improvement in their symptoms if they adhere to their treatment regimen, making one month an apt duration and ensuring no dropout. Ethical approval was obtained from the Institutional Review Board of the Health Services Academy, Islamabad. The IRB approval letter (F.No. 000873/HSA/MSPH-2023). Data collection started on 26 December 2024 and was completed in March 2025, for a total duration of 33 days. The framework of this study is based on the Health Belief Model (HBM), which provides a structured approach to understanding medication adherence behavior, allowing us to assess how patients' perceptions influence adherence patterns. The Health Belief Model was incorporated in data collection and questioning to ensure systematic evaluation of perceived barriers, benefits, and self-efficacy. Thematic analysis was conducted using N Vivo software following Braun and Clarke's (2006) framework. A structured codebook guided the process, ensuring systematic and transparent coding. Inter-coder reliability was assessed using Cohen's Kappa, and discrepancies were resolved through discussion. Triangulation and an audit trail were maintained to enhance validity and reproducibility. Reflexivity discussions minimized bias, ensuring a rigorous and credible analysis.

RESULTS

The McNamara's Test results indicate significant improvements in medication adherence. There was a notable reduction in medication forgetfulness (p=0.002), carelessness in taking medicine (p=0.008), and stopping treatment upon feeling better (p=0.041). Additionally, forgetfulness due to travel (p<0.001) and side effects (p=0.002) showed a marked decline. These findings suggest that the intervention effectively improved patients' consistency in taking medication. However, no significant changes were observed in stopping treatment when feeling worse (p=0.09) or taking medicine only when sick (p=0.07). This indicates that while medication adherence improved in many areas, some behavioral patterns remained unchanged. Future interventions may need to address these specific issues to achieve more comprehensive adherence improvements (Table 1).

Table 1: Summarized Results of Paired Chi-Square McNemar's Test

Variables	Pre -> Post: Yes to No	Pre -> Post: No to Yes	Pre: Total Yes	Pre: Total No	p-Value	Significant Change	Notes
Medication Forgetfulness	13	1	41	19	0.002	Yes	Significant Reduction in Forgetfulness
Carelessness in Taking Medicine	15	3	38	22	0.008	Yes	Notable Decrease in Carelessness
Treatment Cessation Upon Feeling Better	12	2	26	34	0.041	Yes	Improved Adherence When Feeling Better
Treatment Cessation Upon Feeling Worse	8	9	43	17	0.09	No	No Significant Changes
Taking Medicine Only When Sick	9	5	41	19	0.07	No	No Significant Changes
Medication Forgetfulness During Travel	25	0	51	9	<0.001	Yes	Significant Improvement During Travel
Medication Forgetfulness Due to Side Effects	20	0	45	15	0.002	Yes	Reduced Forgetfulness Due to Side Effects

The sample size was calculated to ensure sufficient power (80%) to detect statistically significant changes in medication adherence and psychological outcomes, including treatment cessation when feeling worse and taking medicine only when sick. Based on an effect size of Cohen's d=0.5 and a 0.05 significance level, the required sample size was 32 per group (total=64), but 60 patients were included, maintaining robust statistical power. For qualitative analysis, data saturation guided the selection of 10 intervention-group participants, ensuring meaningful insights. While treatment cessation when

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feeling worse (p=0.09) and taking medicine only when sick (p=0.07) did not show statistical significance, the study's power was sufficient to detect changes in these behaviors. The absence of significance likely reflects deeply ingrained beliefs rather than methodological limitations, highlighting the need for targeted interventions to address these specific adherence challenges. To establish both statistical and clinical significance, effect sizes and absolute adherence improvements were analyzed. Cohen's d (0.5–0.8) confirmed moderate to large effects in Wilcoxon results, reflecting meaningful psychological improvements, while McNamara's test odds ratios (>2) demonstrated substantial adherence gains. Beyond p-values, adherence improved by 46.56%, with forgetfulness decreasing by 65.85% and carelessness by 39.47%, reflecting real-world clinical impact. These findings underscore the effectiveness of pharmacist-led interventions in improving medication adherence and mental health, reinforcing their value in addressing adherence-related challenges in psychiatric care. The Wilcoxon signed test results highlight significant improvements in psychological well-being. Participants showed increased interest in activities (p<0.001), improved sleep patterns (p<0.001), enhanced concentration levels (p<0.001), and greater self-confidence (p<0.001). Additionally, there was a reduction in suicidal thoughts (p=0.032), indicating positive mental health outcomes. These findings suggest that the intervention contributed to overall emotional and cognitive improvements. However, no significant changes were observed in depression symptoms (p=0.252) or feelings of fatigue (p=0.563), suggesting that while some aspects of mental health improved, others remained unaffected. This indicates the need for targeted approaches to address persistent depressive symptoms and energy levels for a more holistic impact. Statistical analyses revealed a 46.56% overall improvement in medication adherence following a pharmacist-led intervention. Notable reductions were observed in medication forgetfulness (65.85%) and carelessness (39.47%), along with increased adherence when feeling better (46.15%). Adherence also improved in cases of illness (32.14%), traveling (49.02%), and side effects (44.44%), underscoring the intervention's effectiveness in fostering consistent medication-taking behaviors. However, treatment cessation when feeling worse (32%) and taking medication only when sick (26.32%) showed no statistically significant change. The McNamara's test demonstrated significant reductions in forgetfulness (p=0.002) and carelessness (p=0.008), while the Wilcoxon signed-ranks test indicated enhanced mental health outcomes, including reduced depressive symptoms (p<0.001) and improved energy levels (p<0.001). These findings highlight the strong correlation between improved adherence and better mental well-being, reinforcing the intervention's role in enhancing both medication consistency and overall health outcomes (Table 2).

Table 2: Summarized Results of the Wilcoxon Signed Rank Test

Variables	Negative Ranks (Post <Pre)	Positive Ranks (Post >Pre)	Ties (No Change)	Test Statistic (Z)	p-Value	Significant Change	Notes
Little Interest in Doing Things	30	5	25	-4.443	<0.001	Yes	Improved Interest in Activities
Feeling Depressed	18	15	27	-1.145	0.252	No	No Significant Change in Depression Symptoms
Trouble Falling Asleep	33	6	21	-3.672	<0.001	Yes	Enhanced Sleep Patterns
Feeling Tired	22	21	17	-0.578	0.563	No	No Significant Change in Energy Levels
Trouble Concentrating	29	7	24	-3.925	<0.001	Yes	Improved Concentration Levels
Feeling Bad About Yourself	33	5	22	-3.917	<0.001	Yes	Increased Self-Confidence
Suicidal Wishes	20	5	35	-2.147	0.032	Yes	Decrease in Suicidal Ideation

This analysis identifies three key themes influencing medication adherence: patient attitude, knowledge, and external challenges, each with distinct sub-themes. Attitude of Patient: Medication Adherence–Some patients discontinue medication when they feel "normal," leading to inconsistent adherence. Stigma of Psychiatric Treatment – Fear of judgment causes patients to hide their medication use, reinforcing non-adherence. Patient's Knowledge: Understanding Medication Benefits – Many patients take medicines solely on a doctor's advice without understanding their necessity. Awareness of Side Effects – Concerns like weight gain lead to intentional skipping of doses. Knowledge of Withdrawal Effects – Patients are unaware of the risks of sudden discontinuation, which increases relapse chances. Challenges in Adherence: Financial Constraints – Some patients cannot afford their medications, causing treatment gaps. Social Support – A lack of emotional

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and practical support makes adherence difficult. Medication Availability – Stock shortages force patients to delay or stop treatment. Multi-dimensional factors influencing medication adherence have been highlighted in this analysis. This is a psychological fact that when we feel better, we sometimes stop taking medicine. This analysis also testifies to it, alongside patients admitting a significant lack of knowledge regarding their treatment regimen. "I know I need them, but I don't fully understand why" - Patient 4. Lifestyle modifications were preferred by some patients over long treatment regimens, as we saw variations in their coping mechanisms. Support from caregivers also encouraged medication adherence in many patients, especially after pharmacist-led interventions (Table 3).

Table 3: Detailed Codebook of Themes and Sub-Themes

Theme	Sub-Theme	Code	Description	Example Quotes
Participants' Attitude	Attitude toward medication adherence	ATT-ADH	Patients' perspectives on the necessity and consistency of taking medications.	"Sometimes I stop taking my medication when I feel normal." (P3)
	Trust in psychiatric medications	ATT-TRUST	Level of confidence in the effectiveness and necessity of psychiatric medications.	"I believe these medicines help me, but I still have concerns about their long-term effects." (P2)
	Stigma associated with psychiatric treatment	ATT-STIG	Fear of judgment or discrimination due to taking psychiatric medications.	"I don't want my family to know I take these medicines." (P1)
Participants' Knowledge	Understanding medication benefits	KNOW-BEN	Awareness of how medications contribute to mental health improvement.	"I just take them because my doctor says so." (P5)
	Awareness of side effects	KNOW-SE	Knowledge of potential adverse effects that may impact adherence	"I have gained weight since I started taking these medications, so I skip them sometimes." (P6)
	Knowledge of withdrawal effects	KNOW-WD	Awareness of symptoms or risks when stopping medication abruptly.	"I didn't know stopping my medicine suddenly could cause problems." (P4)
	Consistency in medication in take	PRAC-CONS	Regularity and adherence in taking prescribed psychiatric medications.	"I take my medicine regularly, but sometimes I forget." (P1)
Participants' Practice	Consistency in medication intake	PRAC-CONS	Regularity and adherence in taking prescribed psychiatric medications.	"I take my medicine regularly, but sometimes I forget." (P1)
	Following the healthcare provider's instructions	PRAC-HCP	The extent to which patients follow prescribed dosages and recommendations.	"Sometimes I take less than what is prescribed because I feel better." (P5)
	Use of reminders or support systems	PRAC-REM	Strategies used for remembering medication intake (alarms, family reminders, etc.).	"I set alarms on my phone to remind me." (P2)
Challenges in Medication Adherence	Financial constraints	CHAL-FIN	Economic difficulties in affording psychiatric medications.	"Sometimes I can't afford to buy my medicine." (P2)
	Availability of medications	CHAL-AVAIL	Barriers related to medication stock shortages or pharmacy access.	"Sometimes my medicine is out of stock, so I have to wait." (P3)
	Social support	CHAL-SOC	Influence of family, friends, or caregivers on adherence behavior.	"I feel alone in managing my condition." (P7)

DISCUSSION

The societal stigma surrounding mental health is one significant barrier to medication adherence. Stigma leads to reluctance to ask for help and adhere to treatment, forming a toxic cycle and worsening mental health challenges [2]. Individuals fear judgment and feel shame, as this perception of our society discourages them from even understanding their condition and their medication needs [4]. As a result, the pharmacist's role is also further complicated as the pharmacist also has to relieve the psychological stress of the patient while educating them about their medicines [5]. The findings of this study align with the principles of the Health Belief Model (HBM), reinforcing the role of patient perceptions in medication adherence. Our results indicate that perceived severity and benefits strongly correlate with adherence levels, while perceived barriers, such as side effects and financial constraints, negatively impact compliance [8, 9].These insights underscore the necessity of patient-centered interventions that specifically target these adherence barriers, thereby reinforcing the practical applicability of the HBM in real-world healthcare settings [10, 11]. Inadequate access to mental health resources further hinders medication adherence, being a systemic challenge in addition to the societal stigma [1].The lack of trained healthcare professionals in many regions limits the efficacy of interventions aimed at increasing medication adherence [12, 13].By offering education and support tailored to individual patient needs, pharmacists, as responsible healthcare providers, can bridge this gap [14, 15].Their involvement in medication therapy management has shown positive outcomes in chronic illness adherence, suggesting that similar approaches could be beneficial in mental health contexts [4].Moreover, innovative

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strategies, including the use of digital tools, have emerged as effective methods to enhance adherence, particularly in low- and middle-income countries (LMICs).Costa *et al.* highlight that electronic health interventions can significantly improve patient engagement and adherence rates [16, 17].These tools provide reminders and educational resources, which can be particularly beneficial for patients who may forget or misunderstand their medication regimens [12, 13].Globally, this has been observed that when pharmacists sit with patients in one-to-one discussions and educate them about their medication regimes, it improves medication adherence rates [18, 19].These strategies empower patients by enhancing their understanding of the importance of consistent medication use, thereby fostering a sense of ownership over their treatment [20].Such approaches are particularly vital in the context of mental health, where patients may struggle with the perception of their illness and the necessity of ongoing treatment [3]. A notable limitation of this study is that it does not account for the variations in medication regimes of patients, including differences in formulations, dosage types, and pharmacokinetic properties, which can influence adherence patterns, as the focus of this study was on overall adherence trends rather than drug-specific effects. Future research should incorporate an in-depth assessment of medication characteristics to provide a nuanced understanding of their impact on adherence behaviors. Another limitation of this study is the possible presence of interviewer bias in qualitative responses. Additionally, investigating the integration of digital health tools and tele-pharmacy within clinical practice could provide insights into enhancing adherence strategies.

CONCLUSIONS

It was concluded that this mixed-methods quasi-experimental pre-post intervention study effectively highlights the significance of pharmacist-led interventions in improving medication adherence in chronic psychiatric patients. Quantitative data analysis reveals a 46% improvement in medication adherence after interventions by pharmacist, cementing the importance of their role in mental health clinics. Patients' in-depth interviews reveal insights into societal stigma, socio-economic barriers, and financial constraints in the management of their chronic mental illnesses. The integration of qualitative and quantitative findings helps in the in-depth understanding of how much of important role pharmacists can play in improving medication adherence if they are provided with an opportunity to conduct counseling sessions in mental health clinics.

Authors Contribution

Conceptualization: UUH
Methodology: UUH, ZK
Formal analysis: UUH, AM
Writing review and editing: SE

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

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