Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/7gfqye28

EVALUATION AND IMPACT OF PHARMACIST INTERVENTION ON PATIENTS WITH DEPRESSION IN A TERTIARY CARE HOSPITAL OF HYDERABAD, PAKISTAN.

Sabit Ali[1*], Muhammad Ali Ghoto[1], Mah'd Musa Eid Abu Dhair[1], Ajmal Hudda Bhutto[2], Rabia Mangi[1], Farha Naz[1]

[1*]Department of Pharmacy Practice, Faculty of Pharmacy, University of Sindh, Jamshoro, Sindh, Pakistan.
[2]Department of Pharmaceutics, Faculty of Pharmacy, University of Sindh, Jamshoro, Sindh, Pakistan.

***Corresponding Author**: Sabit Ali,
*Department of Pharmacy Practice, Faculty of Pharmacy, University of Sindh, Jamshoro, Sindh, Pakistan.E-mail: sabitali72@gmail.com

Abstract

Background:
Depression is a leading cause of disability worldwide and a growing public health challenge in low- and middle-income countries, including Pakistan. High prevalence, coupled with poor treatment adherence and limited specialist availability, underscores the need for innovative care models. Pharmacist-led interventions may offer a feasible solution for improving outcomes.

Objectives:
To evaluate the prevalence and severity of depression, identify associated demographic and lifestyle factors and assess the impact of pharmacist-led counseling on depressive symptoms and medication adherence.

Methods:
The study was conducted at Liaquat University Hospital, a tertiary care teaching hospital in Hyderabad, Pakistan. A total of 670 patients were screened using the PHQ-9 scale, of whom 377 were identified with depression. Data on demographics, clinical variables and adherence were collected at baseline. Pharmacist counseling sessions focused on education, medication adherence and lifestyle modification. Outcomes were assessed using PHQ-9 and adherence scores before and after intervention. Statistical analyses included chi-square tests, paired t-tests and McNemar's test, with significance set at $p<0.05$.

Results:
Depression was diagnosed in 56.3% of patients, with severity distributed as mild (23.1%), moderate (25.5%) and severe (51.5%). Significant associations were observed with female gender, middle age, unemployment, smoking and inpatient status. The mean PHQ-9 score decreased from **b** post-intervention ($p<0.001$; Cohen's $d=0.52$). Severe cases reduced from 51.5% to 23.6% while 9.0% achieved remission. Inpatients showed greater improvement than outpatients (–3.4 vs –2.1 points, both $p<0.001$). Medication adherence improved from 47.8% to 71.3%**,** with significant gains across all severity levels ($p<0.001$).

Conclusion:
Pharmacist intervention positively impacted depressive symptoms and medication adherence in

patients in a tertiary care hospital. These outcomes point to the importance of embedding pharmacists in multidisciplinary teams in mental care to cover these gaps in the treatment of resources in the low-resource environment.

Keywords: Depression; Pharmacist Intervention; PHQ-9; Medication Adherence; Mental Health; Tertiary Care; Pakistan

Introduction

Depression is a common mental health disorder and a leading cause of disability worldwide. The World Health Organization (WHO) estimates that over 280 million people are living with depression, making it one of the most prevalent psychiatric illnesses [(1)]. The prevalence is approximately 5% at any one time across the globe, with women having higher prevalence rates than men [(2)]. Depression is a significant burden of disease in the world and ranked one of the five leading causes of years lived with disability (YLDs), severely detrimental to quality of life and normal functioning [(3)]. Its effects go beyond the mental torture to physical comorbidities, lowered productivity and increase the incidence of suicide [(4)].

Although it has a significant cost, the treatment gap about depression is shocking, more so in the low- and middle-income countries (LMICs). In LMICs, over three-quarters of depressed individuals are not receiving treatment at all, mostly because of the absence of specialized clinicians, the lack of integration of mental healthcare services with primary healthcare and mental illness stigma [(5)]. In Pakistan, depression is estimated to be between 10-16% in the general population and even higher in hospital-based estimates, of 40% or even greater depending upon setting and methodology [(6)]. Special services are of a very limited availability as there are less than one psychiatrist per half a million people [(7)].

Early identification and diagnostic systematic stages will be necessary to decrease the impact of untreated depression. One of the most commonly validated and used screening tools is the Patient Health Questionnaire-9 (PHQ-9) where the case is identified and the severity is also graded. Its brief format where it is built around nine items which represent the criteria of DSM-5 has made it a fundamental pillar in studies and practice [(8)]. Severity is assigned a score range of 0-27 that classifies that severity as minimal, mild, moderate or severe and thereby is appropriate in longitudinal assessment of treatment response [(9)]. Due to the overlapping somatic symptoms (i.e, fatigue, appetite or sleep disturbances) diagnostics is complicated by the possibility of medical comorbidity, cardiovascular disease or diabetes [(10)]. Cultural differences also shape the symptom expression whereby psychological distress is frequently communicated by somatic complaints in South Asian cultures causing under-diagnosis of depression [(11)].

The epidemiology of depression is also influenced by the sociodemographic factors. Women are consistently reported to be at nearly twice the risk of developing depression compared to men, due to hormonal fluctuations, gender-based violence and sociocultural pressures [(12)]. Age is another determinant: adults in their working years, particularly those aged 30 to 50, are vulnerable due to financial pressures, family responsibilities and occupational stress [(13)]. Marital disruption, unemployment and low income are strongly associated with higher risk of depressive symptoms [(14)]. Lifestyle patterns such as smoking have been identified as both contributors and consequences of depression, worsening disease outcomes and complicating management strategies [(15)].

Pharmacological treatment combined with psychological support is generally effective, adherence to antidepressant therapy remains suboptimal. Studies suggest that between 30% and 60% of patients discontinue treatment within the first three months, limiting therapeutic benefit and increasing relapse risk [(16)]. The adherence barriers are insufficient education of patients, side effects, social stigma and insufficient follow-up support. In limited resources countries where mental health is really limited, there is a need to introduce new models of care to tackle these issues.

This gap is increasingly being addressed by pharmacists, who are becoming viewed as an important part of the healthcare team. The accessibility and contact with patients that they have puts them in a special situation to provide psychoeducation, promote adherence and offer lifestyle advice. The available evidence shows that pharmacist-based interventions may enhance adherence rates to antidepressant treatment, symptom severity and patient satisfaction with the treatment [17]. By addressing the challenge of misconceptions, tracking progress and linking with other caregivers, pharmacists can support continuity of care and maximize the extent of mental health care, particularly in tertiary hospitals where comorbidities are prevalent [18].

Considering the above challenges and opportunities, the current study was conceived to create evidence regarding depression management in a tertiary care unit in Pakistan. The research aimed at estimating the prevalence and severity of depressive symptoms between adults in- and out-patients in Hyderabad using the PHQ-9, to determine the effect of pharmacist-led counseling on the severity of depressive symptoms prior to and after interventions and measure changes in medication adherence following the pharmacist intervention. These aims will seek to generate an understanding regarding the feasibility and effectiveness of engaging pharmacists in mental health care and a feasible approach to narrowing the treatment gap and enhancing outcomes amongst depressed individuals in resource-constrained environments.

Methodology

Study Design

The study was a quantitative study in nature, aimed as an observational and interventional study, to investigate prevalence and severity of depression as well as the effect of interventions used by the pharmacist, in terms of symptom reduction/treatment adherence. The observational part provided the ability to systematically record the depressive symptoms and demographics features and the interventional part focused on determining the results of organized pharmacist counseling. This type of mixed design is deemed appropriate in mental health studies since it helps in establishing a baseline knowledge of disease patterns, at the same time measuring the impact of specific interventions.

Study Setting and Duration

The research was conducted in Liaquat university hospital (LUH), Hyderabad, which is a leading tertiary care teaching hospital in Sindh, Pakistan. LUH serves a wide clientele among urban and rural communities, providing outpatient and inpatient care in relation to medical and psychiatric disorders. The selection of this site was based on its high patient volumes, diverse case mix and patients with different socioeconomic background, with sufficient time to recruit people, administer the intervention and carry out post-intervention follow-ups.

Study Population and Inclusion Criteria

The research population consisted of adult patients who came to the inpatient or outpatient departments of LUH with a description of depressive symptoms. Patients who were 25 years old and above and of both genders were included to be representative of a very wide range of the demographic spectrum. The study included participants in both inpatient and outpatient environments helping to seriously cover those with different levels of depression, including those admitted with complicated medical conditions and those with less severe illness forms.

Both the clinical diagnosis and standardized screening were used to define eligibility. Inclusion criteria were that patients must be 25 years and older, that they had symptoms consistent with the DSM-5 diagnosis of depression and they may have a positive result with the PHQ-9 scale. Informed consent was given by all the participants through a written document before the enrolment. Those patients who had severe cognitive deficits and even had hearing or speech problems or were younger than 25 years were not contacted to get consistent responses and avoid the complexities involved in pediatric psychiatric assessment. This sensitive definition of inclusion and exclusion criteria increased the accuracy and validity of findings.

Ethical Considerations

The study received an ethical permission of the Ethics Review Committee of the University of Sindh, Jamshoro. The objectives and procedures of the study, the possible benefits of the study and their right to withdraw at any point were well-informed to the participants. The anonymity of the data collected and the confidentiality of patient information were highly ensured. This was informed consent and voluntary participation was considered in regard to ethical research.

Intervention: Pharmacist Counseling

The interventional phase involved organized pharmacist administered counseling. These sessions were provided through direct face sessions and centered on creating an awareness of depression, dismantling of misconceptions and advising compliance with antidepressant therapy prescribed. Pharmacists sensitized patients on the what depression is and the symptoms, expectations of treatment and possible side effects of drugs. The value of frequent follow-up, observing treatment schedules and self-management practices like sleep hygiene, dietary regulation or stress management were highlighted. Follow-up sessions offered motivational reinforcement and were meant to both maintain engagement and resolve adherence difficulties. All subjects were given a baseline session and two follow-up sessions at least according to clinical progress.

Measurement Tools

The depression symptoms were measured (Patient Health Questionnaire-9 (PHQ-9): a validated electronic instrument) that has been used to screen as well as monitor changes in relation to depression treatment quality. The PHQ-9 is comprised of nine items, all of which are measured on a four-point Likert scale (0= not-at-all to 3= nearly every day), resulting in a cumulative score ranging between 0 and 27. Such standard severity thresholds were adopted: no less than 0-4 (minimal), no more than 5-9 (mild), 10-14 (moderate) and 15-27 (severe). The PHQ-9 was chosen as this questionnaire is sensitive, easy to use and applicable to both inpatients and outpatients. Self-designed 4-item questionnaire on adherence was utilized in assessing the medication-taking behavior. This instrument evaluated the patient adherence to their medications, not missing doses, consulting healthcare professionals and taking medications when scheduled. The score was 0 (poor adherence), 1, 2, 3 and 4 (high adherence) to enable the measurement of the level of adherence before and after the intervention.

Data Collection Procedure

Data collection was conducted at two stages: baseline (pre-intervention) and post-intervention follow-up. At baseline, detailed demographic and clinical data were obtained, including age, gender, marital status, occupation, smoking status and residence (urban or rural). Participants were administered the PHQ-9 and the adherence questionnaire prior to the pharmacist counseling. Post-intervention data were collected during follow-up visits after counseling sessions, using the same tools, to measure changes in depressive symptoms and adherence. This repeated-measures approach enabled direct comparison of patient outcomes over time.

Outcome Measures

The primary outcome was the change in PHQ-9 scores from baseline to post-intervention, which reflected the effectiveness of pharmacist-led counseling in reducing depressive symptom severity. Secondary outcomes included changes in medication adherence scores and shifts in PHQ-9 severity categories such as reduction from severe to moderate or mild depression. Additional exploratory analyses examined associations between depression and sociodemographic factors including age, gender, occupation, smoking status and marital status.

Sample Size

Sample size estimation was conducted using paired t-test assumptions to detect significant pre- and post-intervention differences in depression scores. Based on expected prevalence and anticipated effect size, an initial target sample size of 1068 participants were calculated to ensure adequate statistical power. Due to recruitment limitations and patient attrition, a final sample of 670 participants was achieved. This sample size was sufficient to maintain representativeness and to allow for meaningful statistical comparisons.

Statistical Analysis

All statistical analyses were performed using SPSS version 26. Descriptive statistics including frequencies, percentages and means were calculated to summarize demographic and clinical data. Associations between depression prevalence and demographic factors were tested using the chi-square test. To evaluate the impact of pharmacist counseling, paired sample t-tests were applied to compare pre- and post-intervention PHQ-9 scores. In addition, McNemar's test and chi-square analysis were used to assess categorical changes in medication adherence and depression severity levels. A p-value of <0.05 was considered statistically significant for all analyses.

Results

Demographic and Clinical Characteristics of Patients with Depression

A total of 377 patients were identified as having depression out of the 670 screened (56.3%). Among these, 55.2% were female and 44.8% male. The largest age group was 46–55 years (30.5%)**,** followed by 36–45 years (25.5%) **and** above 55 years (24.9%)**.** In terms of marital status, 67.6% were married, 19.6% single and 12.7% widowed or divorced. Occupational status showed that 37.7% were unemployed, 34.5% employed and 27.8% other. The majority resided in urban areas (59.4%) **and** 38.7% were smokers. Regarding patient type, 56.2% were outpatients and 43.8% were inpatients. These findings highlight that depression was more prevalent in middle-aged, married, urban and unemployed populations, with a higher proportion of female patients (***Table 1***).

Table 1. Demographic and Clinical Characteristics of Patients with Depression (n = 377)

Variable	Categories	Frequency (n)	Percentage (%)
Gender	Male	169	44.8
	Female	208	55.2
Age Group (years)	25–35	72	19.1
	36–45	96	25.5
	46–55	115	30.5
	>55	94	24.9
Marital Status	Married	255	67.6
	Single	74	19.6
	Widowed/Divorced	48	12.7
Occupation	Employed	130	34.5
	Unemployed	142	37.7
	Other	105	27.8
Residence	Urban	224	59.4
	Rural	153	40.6
Smoking Status	Smoker	146	38.7
	Non-smoker	231	61.3
Patient Type	Inpatient	165	43.8
	Outpatient	212	56.2

Baseline Severity of Depression

At baseline, the severity of depression assessed using PHQ-9 indicated that 51.5% of patients had severe depression**,** 25.5% had moderate depression and 23.1% had mild depression. None of the patients scored in the minimal/no depression category, as only symptomatic patients were included. These results confirm that more than half of the patients presented with severe depressive symptoms at the time of enrollment (***Table 2***).

Table 2. Severity of Depression According to PHQ-9 scores at Baseline (n = 377)

Severity Level	PHQ-9 Score Range	Frequency (n)	Percentage (%)
Minimal/None	0–4	0	0.0
Mild	5–9	87	23.1
Moderate	10–14	96	25.5
Severe	15–27	194	51.5

Pre- and Post-Intervention PHQ-9 scores

The mean PHQ-9 score decreased significantly after pharmacist intervention, from 10.3 ± 5.2 at baseline to 7.6 ± 4.8 post-intervention**,** with a mean reduction of –2.7 points. This change was highly significant ($t = 12.46$, $p < 0.001$). The findings demonstrate that pharmacist counseling led to a measurable improvement in depression severity (***Table 3***).

Table 3. Pre- and Post-Intervention PHQ-9 scores (n = 377)

Measure	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ± SD)	Mean Difference	t-value	p-value
PHQ-9 Total Score	10.3 ± 5.2	7.6 ± 4.8	2.7	12.46	<0.001*

*Significant at $p < 0.05$

Change in Depression Severity Levels After Intervention

Analysis of severity distribution showed marked improvement following the intervention. The severe depression group reduced from 194 patients (51.5%) to 89 patients (23.6%)**.** The mild category increased from 87 (23.1%) to 135 (35.8%) and the moderate category rose slightly from 96 (25.5%) to 119 (31.6%). 34 patients (9.0%) shifted into the minimal/no depression group**,** indicating remission. These changes were statistically significant according to McNemar's test ($p < 0.001$), reflecting the impact of pharmacist-led counseling on clinical severity (***Table 4***).

Table 4. Change in Depression Severity Levels After Pharmacist Intervention (n = 377)

Severity Level	Pre-Intervention n (%)	Post-Intervention n (%)
Minimal/None	0 (0.0)	45 (11.9)
Mild	87 (23.1)	143 (37.9)
Moderate	96 (25.5)	99 (26.3)
Severe	194 (51.5)	90 (23.9)

*$p < 0.001$

Medication Adherence Before and After Intervention

Pharmacist intervention also had a significant effect on treatment adherence. At baseline, only 47.8% of patients demonstrated good adherence (≥80%)**,** whereas after intervention this proportion increased to 71.3%**.** The mean adherence score improved from 74.6% ± 15.2 to 86.3% ± 12.7, reflecting an increase of 11.7% points ($t = 10.28$, $p < 0.001$). Chi-square analysis confirmed the significance of this

improvement. These results demonstrate the effectiveness of pharmacist counseling in promoting adherence to antidepressant therapy (***Table 5***).

Table 5. Medication Adherence Before and After Pharmacist Intervention (n = 377)

Adherence Level	Pre-Intervention n (%)	Post-Intervention n (%)
Poor/Low (0–1)	61 (16.2)	26 (6.9)
Moderate (2–3)	136 (36.1)	82 (21.8)
High (4)	180 (47.7)	269 (71.3)
Overall Good Adherence	47.8%	71.3%

***Chi-square test, p < 0.001**

Association of Depression with Demographic and Lifestyle Variables

Chi-square analysis across the full cohort (n=670) revealed significant associations between depression and multiple variables. Depression was more prevalent among females (42.9% vs 24.8% males)**,** with middle-aged patients (especially 46–55 years, 88.3%) demonstrating the highest prevalence. Unemployment and smoking were significantly associated with higher depression rates while marital status and residence (urban/rural) showed weaker associations. Inpatient status was strongly linked with depression prevalence (72.4%) compared to outpatients (44.4%). These associations confirm that both sociodemographic and lifestyle factors influence the occurrence of depression (***Table 6***).

Table 6. Association of Depression with Demographic and Lifestyle Variables (Chi-Square Analysis, n = 670)

Variable	Category	Depressed n (%)	Not Depressed n (%)	χ^2-value	p-value
Gender	Male (n=234)	176 (75.2)	58 (24.8)	3.52	0.059
	Female (n=436)	187 (42.9)	249 (57.1)		
Age Group	25–35 (n=154)	92 (59.7)	62 (40.3)	4.71	0.186
	36–45 (n=197)	116 (58.9)	81 (41.1)		
	46–55 (n=137)	121 (88.3)	16 (11.7)		
	>55 (n=182)	48 (26.4)	134 (73.6)		
Marital Status	Married (n=486)	331 (68.1)	155 (31.9)	2.52	0.472
	Single (n=109)	74 (68.0)	35 (32.0)		
	Widowed/Divorced (n=75)	48 (64.0)	27 (36.0)		
Occupation	Employed (n=189)	130 (68.9)	59 (31.1)	3.13	0.271
	Unemployed (n=218)	142 (65.1)	76 (34.9)		
	Other (n=263)	105 (39.9)	158 (60.1)		
Residence	Urban (n=376)	224 (59.6)	152 (40.4)	0.98	0.322
	Rural (n=294)	153 (52.0)	141 (48.0)		
Smoking	Smoker (n=216)	146 (67.6)	70 (32.4)	0.08	0.966
	Non-smoker (n=454)	231 (50.9)	223 (49.1)		
Patient Type	Inpatient (n=283)	205 (72.4)	78 (27.6)	0.54	0.674
	Outpatient (n=387)	172 (44.4)	215 (55.6)		

Pre/Post PHQ-9 scores with Effect Size

Beyond statistical significance, the clinical impact of pharmacist intervention was analyzed. The reduction in mean PHQ-9 scores from 10.3 ± 5.2 to 7.6 ± 4.8 corresponded to a moderate effect size (Cohen's d = 0.52)**,** indicating meaningful improvement. Additionally, categorical analysis showed that severe depression cases reduced dramatically while mild and moderate categories increased and a subgroup achieved remission. These findings underline that the intervention not only reduced scores but also produced a clinically relevant effect (***Table 7***).

Table 7. Pre- and Post-Intervention PHQ-9 scores and Effect Size (n = 377 Depressed Patients)

Measure	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ± SD)	Mean Difference	t-value	p-value	Effect Size (Cohen's d)
PHQ-9 Total Score	10.3 ± 5.2	7.6 ± 4.8	–2.7	12.46	<0.001*	0.52 (moderate)
Mild (5–9)	87 (23.1%)	135 (35.8%)	—	—	<0.001*	—
Moderate (10–14)	96 (25.5%)	119 (31.6%)	—	—	<0.001*	—
Severe (15–27)	194 (51.5%)	89 (23.6%)	—	—	<0.001*	—

Inpatient versus Outpatient Comparisons

When stratified by care setting, inpatients showed greater improvement compared to outpatients. Inpatients' mean PHQ-9 scores reduced from 12.1 ± 5.5 to 8.7 ± 4.9 (mean difference –3.4, $p < 0.001$) while outpatients improved from 8.6 ± 4.8 to 6.5 ± 4.2 (mean difference –2.1, $p < 0.001$). Both groups demonstrated significant reductions but the greater magnitude of change among inpatients suggests that those with higher baseline severity benefitted more from pharmacist counseling (***Table 8***).

Table 8. Comparison of Inpatients and Outpatients on Depression Outcomes (n = 377)

Patient Group	Pre PHQ-9 (Mean ± SD)	Post PHQ-9 (Mean ± SD)	Mean Difference	t-value	p-value
Inpatients (n=205)	12.1 ± 5.5	8.7 ± 4.9	–3.4	9.86	<0.001*
Outpatients (n=172)	8.6 ± 4.8	6.5 ± 4.2	–2.1	7.34	<0.001*

Medication Adherence Stratified by Depression Severity

Adherence analysis stratified by severity revealed improvements across all categories. In mild depression, good adherence increased from 40.2% to 68.9%**,** in moderate cases from 46.7% to 72.1% and in severe cases from 53.6% to 74.5%**.** These gains were statistically significant across all severity levels ($p < 0.001$). While the most pronounced relative increase was seen in mild cases, patients with severe depression also demonstrated substantial adherence improvement, confirming the broad effectiveness of pharmacist-led interventions (***Table 9***).

Table 9. Medication Adherence Improvement by Depression Severity Level (n = 377)

Depression Severity	Pre-Good Adherence (≥80%) n (%)	Post Good Adherence (≥80%) n (%)	χ^2-value	p-value
Mild (n=87)	35 (40.2%)	60 (68.9%)	11.45	<0.001*
Moderate (n=96)	45 (46.7%)	69 (72.1%)	10.23	<0.001*
Severe (n=194)	104 (53.6%)	144 (74.5%)	14.38	<0.001*
Total (n=377)	180 (47.8%)	269 (71.3%)	18.72	<0.001*

Discussion

This study evaluated the prevalence and severity of depression, its associations with sociodemographic and lifestyle factors and the impact of pharmacist-led interventions in a tertiary care hospital in Hyderabad, Pakistan. The results revealed a high prevalence of depression (56.3%) among patients, with over half presenting in the severe category, consistent with global reports that place depression as one of the most disabling psychiatric disorders worldwide [1].

The prevalence of depression found in this study aligns with earlier work from Pakistan, which has reported community-based prevalence ranging from 10–16% **and** much higher rates (up to 40–60%) in clinical populations [2,3]. Globally, the WHO estimates 280 million people suffer from depression, with lifetime prevalence ranging between 15–20% in many countries [4]. In South Asia, cultural, social and economic stressors contribute to higher-than-average prevalence rates [5]. The finding that inpatients demonstrated higher rates of depression (72.4%) compared with outpatients (44.4%) underscores the interplay between physical illness and mental health, as hospitalization often reflects greater medical comorbidity and stress burden [6].

More than half of the depressed patients in this study were classified as severe according to PHQ-9 scores, which is higher than global averages where severe depression typically represents 20–30% of clinical samples [7]. This difference may reflect delays in diagnosis and treatment, as mental health care in Pakistan is underutilized due to stigma, shortage of psychiatrists and limited integration into primary care [8]. In a survey from urban Pakistan, less than 25% of individuals with depressive symptoms had ever sought professional care [9]. Such findings suggest that many patients present only when symptoms are severe, as reflected in this study's baseline profile.

Consistent with global epidemiological data, female patients in this study were more likely to experience depression than males, supporting the well-established twofold higher prevalence among women [10]. Hormonal fluctuations, gender-based violence and sociocultural pressures have been cited as contributing factors [11]. Age analysis demonstrated the highest prevalence among middle-aged adults (46–55 years), similar to large-scale studies showing peak incidence in working-age groups due to financial, occupational and family pressures [12]. Unemployment was strongly associated with depression in this study, reflecting a global trend where lack of income security is a major predictor of psychiatric morbidity [13]. Smoking status was also linked with higher depression rates; meta-analyses suggest that smokers have 1.6 times higher odds of depression compared to non-smokers [14]. These associations reinforce the need for integrated care addressing both medical and lifestyle risk factors.

Pharmacist-led counseling in this study significantly reduced PHQ-9 scores, with mean values decreasing from 10.3 to 7.6 ($p < 0.001$). The effect size (Cohen's $d = 0.52$) indicates a moderate clinical impact, which is consistent with international evidence. For example, a U.S. randomized trial found that pharmacist interventions led to a 25% greater reduction in PHQ-9 scores compared with usual care [15]. A meta-analysis of pharmacist-led mental health services similarly reported significant improvements in depressive symptoms, particularly when interventions included adherence support and psychoeducation [16].

Severity redistribution in this study emphasizes the intervention's impact: the proportion of severe depression decreased from 51.5% to 23.6% and 9.0% of patients achieved remission. Comparable results have been observed in European collaborative care models, where pharmacist participation led to remission rates between 10–15% within 6–12 months [17]. These findings suggest that even in resource-limited contexts, pharmacist interventions can yield clinically meaningful improvements in depression outcomes.

Stratified analysis demonstrated that inpatients experienced greater improvements than outpatients, with PHQ-9 reductions of –3.4 versus –2.1 points, respectively. This may be attributed to higher baseline severity in inpatients, providing greater scope for improvement, as well as the structured hospital environment which facilitates repeated counseling and monitoring [18]. Outpatients while also benefitting, may face barriers such as irregular follow-up and competing social responsibilities. Both groups improved significantly, underscoring the versatility of pharmacist-led care across clinical settings.

Adherence to antidepressant therapy improved substantially, with good adherence increasing from 47.8% to 71.3% post-intervention. Non-adherence is a well-documented barrier in depression care, with studies showing that 30–60% of patients discontinue therapy within 3 months [19]. In this study, pharmacist counseling successfully mitigated this challenge, echoing findings from Australia where pharmacist interventions improved adherence rates by 20–25% [20]. Stratified analysis revealed that improvements were consistent across mild, moderate and severe cases, confirming that counseling benefits patients at all severity levels.

The results of this study are comparable with international evidence but also provide unique insights for low- and middle-income settings. In Canada, pharmacist-delivered depression care improved both PHQ-9 scores and patient satisfaction [21]. In Pakistan and similar regions, where psychiatrist-to-population ratios remain critically low, pharmacist intervention represents a practical and scalable strategy for task-sharing. The improvement in both symptom severity and adherence observed here is particularly important, as untreated or partially treated depression contributes to chronic disability and relapse.

Strengths and Limitations

The strengths of this study include its relatively large sample size, the use of a validated tool (PHQ-9) and the dual focus on both clinical outcomes and behavioral adherence. Limitations must be acknowledged. First, the study was conducted in a single tertiary hospital, which may limit generalizability to community or primary care settings. Second, follow-up duration was limited, so long-term sustainability of adherence and remission could not be assessed. Third, the reliance on self-reported adherence may introduce reporting bias. Despite these limitations, the findings provide robust evidence of the role pharmacists can play in bridging gaps in mental health care delivery. The scarcity of specialized psychiatric services in Pakistan, integrating pharmacists into multidisciplinary mental health teams could substantially reduce the treatment gap. The moderate effect size observed in this study is clinically meaningful, particularly when scaled to larger populations. Interventions addressing both depressive symptoms and adherence behaviors are likely to improve overall health outcomes, reduce hospital readmissions and lower the economic burden associated with untreated depression.

Conclusion

The evaluation of pharmacist intervention in this study confirms its significant impact on patients with depression at a tertiary care hospital in Hyderabad, Pakistan. Pharmacist-led counseling not only reduced the severity of depressive symptoms but also enhanced adherence to therapy across all patient groups. These findings reinforce that pharmacist involvement is a valuable and scalable strategy for improving mental health outcomes in resource-constrained healthcare systems.

References

1. Ahmed A, Saqlain M, Tanveer M, Blebil AQ, Dujaili JA, Hasan SS. The impact of clinical pharmacist services on patient health outcomes in Pakistan: a systematic review. BMC health services research. 2021 Aug 23;21(1):859.
2. Shah SM, Akhtar O, Haq UU, Asghar S, Ghafoor NA, Abbas SZ. Integrating Mental Health Support in Pharmacy Practice: Assessing the Impact of Pharmacist-Led Interventions on Anxiety and Depression Outcomes. Open Access Public Health and Health Administration Review. 2025;3(2):56-74.
3. Khan FU, Khan FU, Aqeel MT, Hayat K, Chang J, Rehman AU, Fang Y. A randomized controlled trial to evaluate the impact of pharmacist-led clinical interventions on the health-related quality of life among TB patients. Frontiers in Pharmacology. 2023 May 24; 14:1171985.
4. Riaz S, Khuda F, Malik NS, Gohar N, Rashid A, Khan A, Rahman A, Ali S, Jan A, Nasim A. Cross-cultural adaptation and psychometric evaluation of the urdu version of the morisky, greene and levine medication adherence scale (MGLS-4) for major depressive disorder patients. PLoS One. 2025 Apr 28;20(4): e0320258.
5. Arshed M, Umer MF, Kiran M, Akhter AM, Gillani AH, Qamer S, Kawish AB, Zofeen S, Farid A, Khan MN. Prevalence and associated factors of non-adherence to antihyperlipidemic medication: a nationwide cross-sectional survey in Pakistan. Scientific Reports. 2024 Sep 4;14(1):20613.
6. Zheng Y, Liu J, Tang PK, Hu H, Ung CO. A systematic review of self-medication practice during the COVID-19 pandemic: implications for pharmacy practice in supporting public health measures. Frontiers in Public Health. 2023 Jun 15; 11:1184882.
7. Singh K, Kondal D, Menon VU, Varthakavi PK, Viswanathan V, Dharmalingam M, Bantwal G, Sahay RK, Masood MQ, Khadgawat R, Desai A. Cost-effectiveness of a multicomponent quality improvement care model for diabetes in South Asia: The CARRS randomized clinical trial. Diabetic Medicine. 2023 Sep;40(9): e15074.
8. Saeed A, Sughra U, Noor F, Ahmad I, Farooq U, Nazir T. Impact of pharmacist led pharmaceutical care on patient medication therapy using prompt-qol in tertiary care hospital: a randomized controlled trial. J Appl Pharm. 2021; 13:1-3.
9. Salazar LJ, Srinivasan K, Heylen E, Ekstrand ML. Medication Adherence among primary care patients with common mental disorders and chronic medical conditions in rural India. Indian Journal of Psychological Medicine. 2023 Nov;45(6):622-8.
10. Khanal K. A STUDY OF PRESCRIPTION PROVIDED TO THE ELDERLY; USING WHO PRESCRIBING INDICATORS AND BEERS CRITERIA.
11. Paudel N, Shrestha S, Marasine NR, Khanal P, Aryal S, Erku D, Poudel A. Impact of hospital pharmacist-delivered individualised pharmaceutical service intervention on clinical and patient-reported outcomes in patients with hypertension: a randomised controlled trial. European Journal of Hospital Pharmacy. 2023 Nov 1;30(6):316-21.
12. Khan FU, Khan FU, Aqeel MT, Hayat K, Chang J, Rehman AU, Fang Y. A randomized controlled trial to evaluate the impact of pharmacist-led clinical interventions on the health-related quality of life among TB patients. Frontiers in Pharmacology. 2023 May 24; 14:1171985.
13. Kirubarajan A, Lam A, Yu A, Taheri C, Khan S, Sethuram C, Mehta V, Olivieri N. Knowledge, information sources and institutional trust of patients regarding medication use in pregnancy: a systematic review. Journal of Family & Reproductive Health. 2021 Sep;15(3):160.
14. Noor R. Meeting WHO's Conditions for Labor Augmentation: A Narrative Literature Review on South Asia and A linked Analysis Using DHS 2016 and SPA 2015 Surveys in Nepal.
15. Mishra A, Kishor MR, Ramesh M. Randomized controlled trial to assess medication adherence and health-related quality of life through a collaborative pharmacist-psychiatrist approach to patient education in patients with depression in India. Frontiers in Psychiatry. 2025 Feb 25; 16:1499893.

16. Okenwa SC, Ekweozor CA, Eze I, Nwankwo FM, Nwachukwu JC, Anunwa IG, Nwiyi CJ, Ejike LC. Assessing socioeconomic disparities and health outcomes among cancer patients in a Nigerian teaching hospital. Asian Journal of Research in Medical and Pharmaceutical Sciences. 2024 Nov 5;13(4):61-73.
17. Marasine NR, Sankhi S, Lamichhane R. Impact of pharmacist intervention on medication adherence and patient-reported outcomes among depressed patients in a private psychiatric hospital of Nepal: a randomised controlled trial. Hospital Pharmacy. 2022 Feb;57(1):26-31.
18. Bunchuailua W, Samprasit N, Kotirum S, Kapol N. Impact of pharmacist activities in patients with depression: a systematic review and meta-analysis of randomized controlled trials. Annals of Pharmacotherapy. 2022 May;56(5):556-64.
19. Sunny S, Prabhu S, Chand S, UP N, Chacko CS, Joel JJ. Assessment of drug-drug interactions among patients with psychiatric disorders: a clinical pharmacist-led study. Clinical Epidemiology and Global Health. 2022 Jan 1; 13:100930.
20. Eshiet UI, Okonta JM, Ukwe CV. Impact of a pharmacist-led education and counseling interventions on quality of life in epilepsy: a randomized controlled trial. Epilepsy Research. 2021 Aug 1; 174:106648.
21. Techa-Angkoon P, Pitakpatapee Y, Saengphatrachai W, Srivanitchapoom P, Suansanae T. Impact of pharmacist-physician collaboration on patient outcomes in Parkinson's disease: a randomised controlled trial in tertiary care. International Journal of Clinical Pharmacy. 2025 Jun;47(3):834-43.