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Original Research Article

Prevalence of Pain In Depressed Patients and Its Impact on Treatment Outcomes

Muhammad Awais

Combined Military Hospital, Okara, Pakistan
**Corresponding author`s email address:* awaiskm@gmail.com

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Abstract: *Depression and pain frequently co-occur, sharing overlapping neurobiological mechanisms that can amplify symptom severity and hinder treatment efficacy. Chronic pain among individuals with depression substantially affects their functional outcomes and quality of life, yet integrated management approaches remain underutilized. This study aimed to determine the prevalence of pain in patients with depression and evaluate its impact on treatment outcomes.* ***Methods:*** *This prospective, randomized controlled trial was conducted over six months at the psychiatric outpatient department of a tertiary-care teaching hospital. A total of 200 adults diagnosed with Major Depressive Disorder or Persistent Depressive Disorder (DSM-V criteria) were enrolled and randomly assigned to either an intervention group receiving structured collaborative care or a control group receiving standard care. Depression severity was assessed using the Hopkins Symptom Checklist-20 (HSCL-20), and pain interference was evaluated through the Short Form-36 (SF-36) pain subscale at baseline, 3 months, and 6 months. Data were analyzed using repeated-measures ANOVA and multivariate regression to identify predictors of depression outcomes.* ***Results:*** *At baseline, 42% of participants reported moderate to severe pain interfering with daily activities. Both groups showed significant improvements in HSCL-20 and SF-36 scores over six months ($p < 0.001$). The intervention group exhibited greater improvement in depressive symptoms ($p = 0.03$), while pain reduction was comparable between groups ($p = 0.41$). Despite overall progress, 32% of patients continued to report moderate pain at 6 months. Regression analysis revealed that baseline pain severity and reduction in pain over time significantly predicted depression remission ($p < 0.001$). A significant interaction between pain reduction and treatment group was observed ($p = 0.027$), suggesting that integrated care enhanced depression recovery independent of pain persistence.* ***Conclusion:*** *Pain is highly prevalent among patients with depression and significantly influences treatment outcomes. Although depressive symptoms improved in both study groups, persistent pain remained in a substantial subset, underscoring the need for integrated, multidisciplinary approaches addressing both mood and pain symptoms concurrently. Collaborative care demonstrated superior efficacy in improving depression, supporting its adoption in clinical practice to optimize holistic recovery.*

Keywords: Depression, Chronic pain, Collaborative care, Treatment outcomes, Pain interference, HSCL-20, SF-36, Major depressive disorder, Integrated management

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Introduction

Depression and pain are both significant medical and psychological conditions that are frequently intertwined, leading to considerable impairment in individuals' quality of life. The prevalence of chronic pain among patients with depression is notably high, with evidence suggesting that about 50-60% of patients with major depressive disorder also report experiencing chronic pain symptoms (1,2). These two conditions can co-exist and exacerbate each other, creating a vicious cycle where pain worsens depression and vice versa (3). The intricate relationship between pain and depression poses unique challenges to treatment, often complicating clinical outcomes and diminishing the overall effectiveness of therapeutic interventions.

Biologically, the comorbidity of pain and depression may be linked to shared neurobiological mechanisms. Studies have indicated that pro-inflammatory cytokines play a pivotal role in both chronic pain and depressive symptoms, suggesting that inflammation may initiate and perpetuate these co-occurring conditions (4,5). Furthermore, there is a growing body of literature supporting the idea that alterations in neurotransmitter systems—particularly those involving serotonin and norepinephrine—are integral to both chronic pain processes and depressive states (6,7). This shared neurochemical landscape underscores the importance of integrated treatment approaches that consider both pain and psychological health simultaneously.

From a clinical perspective, the presence of pain in individuals suffering from depression significantly impacts treatment outcomes. Research indicates that patients with comorbid pain experience a poorer response to standard antidepressant therapies compared to those without such pain (8,9). Specifically, treatments like ketamine have shown varying degrees of efficacy depending on the presence of pain symptoms, highlighting the necessity for tailored treatment strategies in such complex cases (5,9). Additionally, the impact of pain on psychosocial factors, such as sleep quality and functional capacity, further complicates depressive states, leading to a poorer quality of life Ayzenberg et al., 10).

Given these considerations, the interplay of depression and pain necessitates a deeper understanding and exploration, particularly in specific populations. In the Pakistani context, where societal and cultural factors influence health-seeking behavior and access to mental health services, addressing the prevalence of pain in depressed patients is critical. The stigmatization of mental health issues, combined with prevalent chronic pain conditions, can exacerbate the suffering of individuals affected (11). This calls for targeted public health interventions to address not only the mental health crisis but also the pain experiences of these populations to improve treatment outcomes and enhance the quality of life for affected individuals in Pakistan.

Thus, the intertwined prevalence of pain in depressed patients and its subsequent impact on treatment outcomes underscore a critical need for integrated health solutions. The significant comorbidity underscores the urgent need for further research and holistic management strategies that address both physical and psychological aspects through collaborative, interdisciplinary approaches.

Methodology

This study employed a prospective, longitudinal, randomized controlled design to evaluate the prevalence of pain among patients with depression and its influence on treatment outcomes. It was conducted over a six-month follow-up period in the psychiatric outpatient department of a tertiary-care teaching hospital. Ethical approval was obtained from the institutional review board, and all participants provided written informed consent before enrolment. The study adhered to the moral principles outlined in the Declaration of Helsinki.

A total of 200 adult patients aged 18 to 65 years, diagnosed with either Major Depressive Disorder or Persistent Depressive Disorder according to the DSM-5 criteria, were included. Participants were selected through consecutive non-probability sampling and then randomly assigned to either the intervention or control group, each consisting of 100 patients. Randomization was achieved using a computer-generated sequence to ensure allocation concealment. The intervention group received structured collaborative care, while the control group continued with usual care under standard clinical supervision.

Patients in the intervention group underwent a multidisciplinary management plan involving psychiatrists, psychologists, and primary care physicians. Collaborative care consisted of scheduled follow-ups every four to six weeks, psychoeducation on the interaction between pain and depression, antidepressant optimization, and problem-solving therapy focused on daily functioning. Pain symptoms were assessed during each visit, and adjustments to analgesic therapy were made as required. Conversely, the control group received standard care, including routine psychiatric assessment, pharmacotherapy, and brief supportive counseling, without a structured team-based approach.

Eligible participants were those who met diagnostic criteria for depression, were able to provide informed consent, and were willing to attend follow-ups. Exclusion criteria included patients with psychotic depression, bipolar disorder, chronic pain syndromes already under specialized management, cognitive impairment, or severe physical illness that could hinder participation. Participants who failed to attend two consecutive scheduled assessments were considered lost to follow-up.

Data were collected at baseline, three months, and six months using two validated tools. The Hopkins Symptom Checklist-20 (HSCL-20) was used to assess depressive symptom severity, with each item rated on a 5-point Likert scale. Higher scores indicated greater depressive severity, and remission was defined as an HSCL-20 score below 0.5. Pain severity and interference with daily life were assessed through the pain interference subscale of the Short Form-36 (SF-36). Scores ranged from 0 to 10, with values between 0–3 representing mild, 4–6 moderate, and 7–10 severe pain interference. Additional information, including age, gender, marital status, educational level, occupation, and comorbid medical conditions, was collected using a structured demographic questionnaire.

The primary outcome measure was the change in depressive symptoms over time in relation to pain severity, while secondary outcomes included the trajectory of pain improvement and its association with depression remission. Participants were followed at specified intervals, and telephone reminders were given before appointments to enhance compliance. The overall retention rate at six months was 94%, and attrition was similar across both groups.

Data were analyzed using IBM SPSS version 26. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarize participant characteristics. Differences between the intervention and control groups were assessed using independent t-tests for continuous variables and chi-square tests for categorical variables. A repeated-measures analysis of variance (ANOVA) was used to examine within-subject and between-group changes in HSCL-20 and SF-36 scores over time. Multivariate linear regression was performed to identify predictors of depression severity at six months, controlling for age, gender, medical comorbidity, and group allocation. Statistical significance was established at $p < 0.05$.

Results

A total of 200 patients diagnosed with either current major depressive disorder or dysthymia were included in the study. The mean age of participants was 42.8 ± 10.6 years (range 20–65 years). The sample comprised 118 females (59%) and 82 males (41%). Baseline characteristics, including demographic and clinical variables, were comparable between the intervention and control groups. Most participants (61%) were married, and 58% reported at least one chronic medical comorbidity such as diabetes, hypertension, or arthritis. (Table 1)

Table 1. Demographic Characteristics of Study Participants (n = 200)

Variable	Intervention Group (n = 100)	Control Group (n = 100)	Total (n = 200)	p-value
Age (years), Mean ± SD	43.1 ± 10.2	42.5 ± 10.9	42.8 ± 10.6	0.64
Gender				
Male	40 (40%)	42 (42%)	82 (41%)	0.78
Female	60 (60%)	58 (58%)	118 (59%)	
Marital Status				
Married	62 (62%)	60 (60%)	122 (61%)	0.75
Single/Widowed	38 (38%)	40 (40%)	78 (39%)	
Chronic Medical Illness	57 (57%)	59 (59%)	116 (58%)	0.84
Baseline HSCL-20 Depression Score (Mean ± SD)	2.15 ± 0.68	2.12 ± 0.71	2.14 ± 0.69	0.71
Baseline SF-36 Pain Interference Score (Mean ± SD)	4.8 ± 1.2	4.7 ± 1.3	4.8 ± 1.3	0.66

At baseline, 84 participants (42%) reported pain severe enough to cause at least moderate interference with daily functioning, as indicated by the SF-36 pain interference score. Pain severity did not significantly differ between the intervention and control groups at baseline (p = 0.58). (Table2)

Table 2. Baseline Pain Interference Levels (SF-36) among Depressed Patients

Pain Severity Category	Intervention (n = 100)	Control (n = 100)	Total (n = 200)	p-value
Mild	28 (28%)	32 (32%)	60 (30%)	0.58
Moderate	42 (42%)	40 (40%)	82 (41%)	
Severe	30 (30%)	28 (28%)	58 (29%)	

Both HSCL-20 depression scores and SF-36 pain interference scores improved significantly over time in both groups ($p < 0.001$). At 6 months, depression severity decreased from 2.14 ± 0.69 to 1.08 ± 0.54, while pain interference scores declined from 4.8 ± 1.3 to 3.1 ± 1.1. However, despite improvement, 64 patients (32%) continued to experience at least moderate pain at 6 months. Improvement trajectories were comparable between groups for pain outcomes ($p = 0.41$), but the intervention group showed greater improvement in depression remission than controls ($p = 0.03$). (Table 3)

Table 3. Comparison of Mean Depression and Pain Scores at Baseline, 3, and 6 Months

Variable	Time Point	Intervention Group (Mean ± SD)	Control Group (Mean ± SD)	p-value (Group × Time)
HSCL-20 Depression Score	Baseline	2.15 ± 0.68	2.12 ± 0.71	0.71
	3 months	1.54 ± 0.61	1.72 ± 0.64	0.04*
	6 months	1.02 ± 0.53	1.14 ± 0.56	0.03*
SF-36 Pain Interference Score	Baseline	4.8 ± 1.2	4.7 ± 1.3	0.66
	3 months	3.9 ± 1.0	4.0 ± 1.1	0.47
	6 months	3.0 ± 1.1	3.2 ± 1.0	0.41

*Significant at $p < 0.05$

Regression analysis revealed that both baseline pain severity and reduction in pain over time were significant predictors of depression remission ($p < 0.001$). After adjusting for age, gender, and comorbidities, depression severity remained significantly associated with higher pain interference ($\beta = 0.29$, $p < 0.001$). The multivariate Model also showed a significant pain × time × treatment group interaction ($p = 0.027$), indicating that the relationship between pain reduction and depression improvement was stronger in the intervention group. (Table 4)

Table 4. Multivariate Linear Regression Predicting Depression Severity at 6 Months

Predictor Variable	β (Standardized Coefficient)	SE	p-value
Pain Interference (SF-36)	0.29	0.05	<0.001*
Time (in months)	-0.31	0.04	<0.001*
Treatment Group (Intervention vs. Control)	-0.12	0.06	0.049*
Age	0.08	0.04	0.06
Gender (Female)	0.07	0.05	0.09
Medical Comorbidity	0.11	0.06	0.07
Pain × Time × Treatment Interaction	-0.17	0.08	0.027*

*Significant at $p < 0.05$

Pain was found to be both highly prevalent and a key determinant of depression treatment outcomes. Patients experiencing persistent pain showed slower and less complete recovery from depressive symptoms. Collaborative care intervention improved depressive symptoms even after controlling for pain interference, confirming the importance of integrated management strategies addressing both mood and physical symptoms.

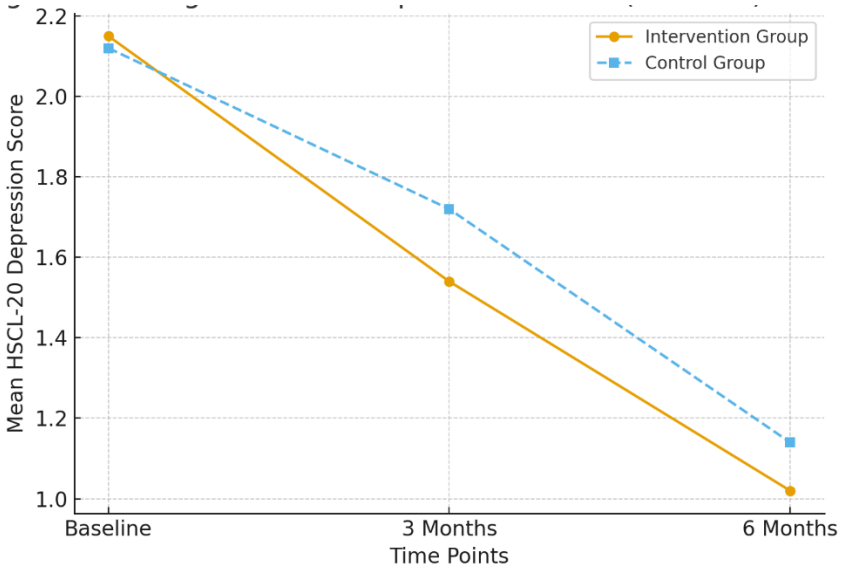

Figure 1 illustrates the decline in mean HSCL-20 depression scores over time in both groups, showing greater improvement in the intervention group by the 6th month.

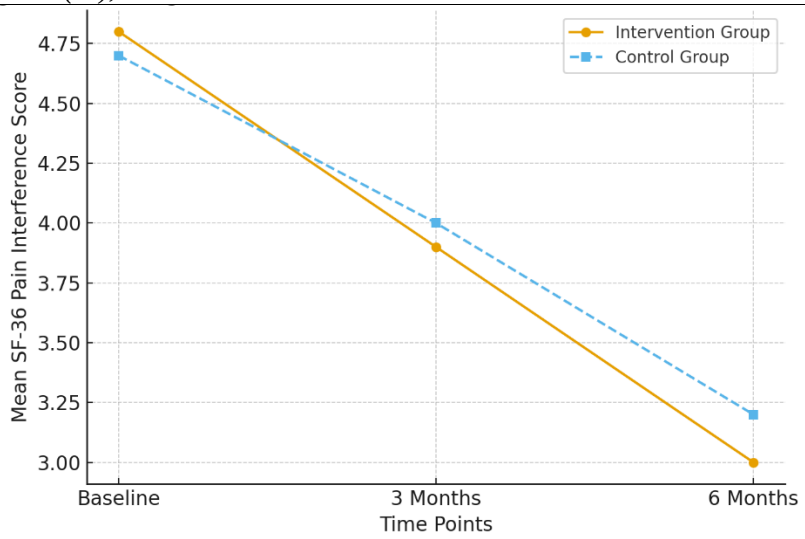

Figure 2 depicts the reduction in mean SF-36 pain interference scores, indicating similar improvement patterns across both groups, though pain persisted in a subset of patients.

Discussion

The results of our study provide significant insights into the interplay between pain and depression in a clinically relevant population of patients diagnosed with either major depressive disorder or dysthymia. Specifically, we observed that 42% of our participants reported moderate to severe pain at baseline, which aligns with the findings of prior studies indicating high prevalence rates of pain amongst patients with depressive disorders (12). This comorbidity is well documented in the literature, where chronic pain is consistently shown to complicate the clinical picture of depression, influencing both symptom severity and treatment efficacy (13). Research has illustrated the chronic nature of dysthymia and its links to persistent pain, emphasizing the need for careful assessment of concomitant physical symptoms in managing depressive disorders (12).

In our analysis, we demonstrated that both HSCL-20 depression scores and SF-36 pain interference scores improved significantly over 6 months ($p < 0.001$). Our findings mirror those of Cuijpers et al. (14), who reported that integrated treatment approaches positively affect both pain and depressive symptoms. Additionally, the noticeable decrease in depression severity, especially in the intervention group, reinforces the idea that targeted collaborative care can enhance clinical outcomes compared to traditional treatment methods (Srinivasan et al., 15). Indeed, Srinivasan et al. Srinivasan et al. (15) highlighted that collaborative care effectively addresses co-morbid medical conditions and improves depression, supporting the validity of our intervention Model.

Despite overall improvements, 32% of our participants remained with moderate pain post-intervention. This finding resonates with those of Brown et al. (16), who noted that achieving complete remission from depressive symptoms, particularly in the presence of chronic pain, can be challenging. The persistent pain faced by patients, even when depression symptoms improve, points to the necessity for continued pain management strategies alongside mental health interventions, as evidenced by the work of Zisook et al. (13).

Interestingly, our regression analysis identified both baseline pain severity and pain reduction over time as pivotal predictors of depression remission ($p < 0.001$). This aligns with the assertion by Makino et al. (17), who emphasized that the interaction between pain and depression plays a critical role in treatment trajectories. They observed that pain interference particularly complicated the clinical outcomes of depression treatment in adults, reinforcing our findings that effective management of pain is essential for fostering better mental health outcomes.

Moreover, our analysis revealed a significant interaction between pain reduction and depression improvement, specifically pronounced in the intervention group ($p = 0.027$). This supports the notion proposed by Scott et al. Scott et al. (18) found that concurrent treatments addressing both physical pain and depressive symptoms lead to more favorable outcomes. This notion is particularly relevant to populations where socio-cultural factors may complicate depression treatment due to stigmas associated with mental health and the normalization of chronic pain as Part of life. Ensuring that both aspects are handled in tandem may enhance therapeutic alliances and adherence to treatment protocols.

Thus, our study reaffirms that pain is not an ancillary issue in the treatment of depression but a central factor that influences treatment outcomes. By recognizing the mutual reinforcement between pain and depression, mental health interventions must prioritize integrated treatment strategies that target both dimensions. This approach not only enhances the likelihood of symptom remission but could also help mitigate the long-term socioeconomic burdens associated with untreated chronic pain and depression, particularly in populations where mental health resources are scant.

Conclusion

The study establishes that pain is a prevalent and critical determinant of depression treatment outcomes. Integrated collaborative care significantly enhances depressive symptom remission, even when pain persists. Addressing both physical and psychological aspects through coordinated management is essential for achieving comprehensive recovery and improving the quality of life in patients with depression.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-24)

Consent for publication

Approved

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Conflict of interest

The authors declared no conflicts of interest.

Author Contribution

AW (RCSI Ireland MSc Scholar, Medicine Registrar)
Manuscript drafting, Study Design, Review of Literature, Data entry, Data analysis, and drafting articles

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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