IJPSR (2026), Volume 17, Issue 6 **(Research Article)**

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 03 January 2026; received in revised form, 23 January 2026; accepted, 24 January 2026; published 01 June 2026

EVALUATING THE COST OF ILLNESS AND HEALTH-RELATED QUALITY OF LIFE IN CLINICALLY DEPRESSED PATIENTS: A PILOT STUDY

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Keywords:

Cost of illness, Depression severity, Mental disorders, Quality of life, Health-related quality of life, Out-of-pocket expenditure, Utility values

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ABSTRACT: Mental disorders, particularly depression, substantially affect health by impairing daily functioning and lowering quality of life (QoL). This study assessed the relationship between depression severity, QoL, and cost of illness among 51 depressive patients. Regression analysis showed that age was the only significant demographic factor influencing QoL (β = -0.433, p = 0.043), while other factors, such as gender and education, showed no significant effects. A strong negative correlation was observed between depression severity and all QoL domains of WHOQOL-BREF (total r = -0.970, p< 0.001), indicating that QoL decreases markedly with increasing depression severity. One-way ANOVA further confirmed significant differences across severity groups (F = 63.20, p< 0.001). Cost analysis revealed a significant negative correlation between QoL and indirect costs (r = -0.472*, p = <0.001), suggesting that higher financial burden—especially from productivity loss was associated with poorer QoL. Overall, the findings emphasise that advancing age, greater depression severity, and increased indirect economic burden significantly reduce the quality of life in depressive patients.

INTRODUCTION: Clinical depression or Major Depressive Disorder (MDD) is a significant global public health concern, currently affecting over 280 million people, and is projected by the World Health Organisation to become the leading cause of disease burden by 2030. The disorder is typified by persistent sadness, cognitive dysfunction, and marked social and occupational impairment, often co-occurring with non-communicable chronic diseases (NCCDs) such as diabetes and cardiovascular conditions, which further exacerbate its health and economic burden [1, 2].

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.17(6).1888-94

This article can be accessed online on www.ijpsr.com

DOI link: https://doi.org/10.13040/IJPSR.0975-8232.17(6).1888-94

The economic impact of depression is typically assessed through the Cost of Illness (COI) framework, which incorporates both direct medical costs (hospitalisation, treatment) and indirect costs (lost productivity, absenteeism). COI analyses in India have revealed distinctive cost structures driven by under-resourced healthcare systems, high non-medical expenses (transportation and caregiver time), and social stigma that hinder early diagnosis and treatment [3, 4].

In India, MDD affects an estimated 56 million individuals; however, regional disparities in diagnosis and care accessibility persist. For instance, in states like Uttar Pradesh, the prevalence appears lower (1.5–2.5%) due to systemic underdiagnosis and mental health stigma rather than actual disease rates [5]. Discounting techniques, such as Net Present Value (NPV) and Discounted Cash Flow (DCF), are critical for

evaluating long-term interventions. Studies integrating these methods highlight how future economic benefits from early and integrated mental health interventions can outweigh the initial cost [6, 7]. Despite its known burden, depression often remains underdiagnosed and undertreated, particularly in primary care settings. Instruments such as the EuroQoL Five Dimensions Five Levels (EQ-5D-5L) and the WHO Quality of Life-BREF (WHOQOL-BREF) are used for quantification of health-related quality of life (HRQOL) and identifying those at risk [8]. Notably, untreated depression is associated with HRQoL deterioration equivalent to diagnosed cases, reinforcing the need for early detection and systemic support [9].

From a diagnostic standpoint, depression is assessed clinically using DSM-5 criteria and supported by standardised instruments such as the Pfizer PHQ-9, which provides a quick and validated measure of severity [10].

Effective mental health policies and context-specific economic evaluations are essential for equitable resource allocation, especially in regions grappling with socioeconomic constraints and healthcare inequity.

MATERIALS AND METHODS: A prospective observational study was conducted in the psychiatry department of a tertiary care hospital, Teerthanker Mahaveer Hospital, Moradabad.

Sample Size: The sample size was determined using a two-step method. First, the initial sample size (n_0) for a large population was calculated using the formula $n_0 = (Z^2 \times p\ (1 - p) / E^2$, with Z = 1.96 (95% confidence level), p = 0.5, and E = 0.05, yielding n_0 = 384. Next, the finite population correction (FPC) was applied: $n = n_0 / [1 + (n_0 - 1)/N]$. For a population (N) of 500, 1,000, and 5,000, the adjusted sample sizes were approximately 217, 278, and 357, respectively. When the population was 5,000, the corrected sample size was approximately 357.

A pilot study was conducted on 51 participants, representing approximately 15% of the calculated sample size of 357. This preliminary study aimed to assess the feasibility of the research design, test data collection tools, and identify potential logistical or methodological issues before the main study. Conducting a pilot with 10–20% of the total sample size is widely recommended in research methodology to ensure validity.

Patients aged 18 years and above, of either gender, diagnosed with depression with or without comorbidities, and admitted to or visiting the psychiatry outpatient department were considered eligible. Only those who provided written informed consent were included. Patients referred for psychiatric consultation or those unwilling to participate were excluded.

Data Collection: Data collection is started after getting ethical approval from Teerthanker Mahaveer Medical College and Research Centre, Teerthankar Mahaveer Univer (TMU) Moradabad, dated. 10.06.2024 (Ref. No. TMU/ICE/2024-25/PG/141). Data were collected using a specially designed data collection form, supplemented by patient interviews, which included demographic details, clinical history, treatment regimens, and relevant laboratory findings. Health-related quality of life was assessed by WHOQOL-BREF, and depression severity by Patient Health Questionnaire (PHQ-9).

Statistical Analysis: Outcomes were evaluated at the end of the study, and statistical analyses were performed using IBM SPSS Statistics version 31.0. Continuous variables were represented as mean ±SD, while categorical variables were presented as proportions. Results were presented as mean ± standard deviation (SD) for continuous variables and as frequencies (n, %) for categorical variables. The level of significance (α) was set at 0.05 for all analyses, and two-tailed tests were applied.

All continuous variables were examined for normality (using the Shapiro–Wilk test) and homogeneity of variances (using Levene's test) to ensure that the assumptions of parametric analysis were met.

Regression analysis was employed to determine the predictive influence of sociodemographic variables (e.g., age, gender, and education) on health-related quality of life (HRQoL) as measured by the WHOQOL-BREF instrument, justifying its use for identifying significant determinants of HRQoL among depressive patients. Pearson's correlation analysis was used to evaluate the strength and

direction of linear relationships between continuous variables specifically, depression severity (PHQ-9 scores), cost-of-illness parameters, and QoL domains. This method was chosen because the data met normality assumptions, allowing for a valid interpretation of linear associations.

Finally, One-Way ANOVA was conducted to assess mean differences in QoL scores across groups with varying depression severity (mild, moderate, moderately severe, and severe). This test was justified as it determines whether statistically significant differences exist between the mean values of more than two independent groups when assumptions of normality and homogeneity of variance are satisfied.

The study focused on investigating the relationship between depression severity, health-related quality of life and cost of illness among patients diagnosed with depression. Further, a comprehensive understanding of the financial impact of clinical depression and its implications for resource allocation, policymaking, and the development of cost-effective interventions.

RESULTS: A total of 51 participants were enrolled in the study, with a predominance of females, reflecting the higher prevalence of depression among women. No significant gender-based differences were observed in any demographic or clinical parameters (p = 0.76).

TABLE 1: CHARACTERISTICS OF THE STUDY PARTICIPANTS (N =51)

Characteristics	n=51	Percentage	Mean±SD
Gender			
Female	32	62.74%	-
Male	19	37.25%	
Education			
Secondary School	21	41.17%	12.75±7.93
Tertiary	17	33.33%	
Primary School	10	19.60%	
None	3	5.88%	
Age			
Mean	36.41	-	-
Range	18-72		
SD	14.02		
Marital Status			
Married	32	62.74%	-
Single	19	37.25%	
Occupation			
House Wife	15	29.41%	5.67±5.02
Private Job	9	17.64%	
Unemployed	3	5.88%	
Shopkeeper	8	15.68%	
Government Job	3	5.88%	
Student	10	19.60%	
Non-Working/ Retired	2	3.92%	
Business	1	1.96%	
Comorbidity			
Anxiety Disorders	40	66.67%	23.40±18.76
Chronic Medical Conditions	37	61.67%	
Obesity	34	56.67%	
Eating Disorders	4	6.67%	
Personality Disorders	2	3.33%	

Most participants had at least a secondary education, and the average schooling years suggested a moderately educated sample, with educational attainment showing no significant influence on quality-of-life outcomes (p = 0.68). Participants were primarily middle-aged (mean age = 36 years), representing a broad adult age range, and the majority were married, though marital status did not significantly affect study variables (p = 0.66). Occupationally, participants represented diverse categories, with homemakers and students being the most common, indicating a sample

spanning both economically active and dependent groups. However, occupational status showed no significant association with key outcome measures (p = 0.88). Comorbid psychiatric and medical conditions were frequent, particularly anxiety disorders and chronic physical illnesses, which are commonly observed in patients with major depressive disorder. This comorbidity pattern underscores the multidimensional health burden faced by individuals with depression and highlights the need for integrated psychosocial and medical care approaches.

TABLE 2: ANALYSIS OF THE SOCIODEMOGRAPHIC STATUS OF PARTICIPANTS WITH WHO QOL BREF TRANSFORMED SCALE N=51

Demographic Characteristics	R	F	β	t	Sig
Gender	0.374	1.192	-0.174	1.033	0.306
Education			-0.072	0.490	0.626
Age			-0.433	2.089	0.043
Marital Status			-0.181	0.822	0.415
Occupation			-0.113	0.586	0.561
Comorbidity			-0.168	1.185	0.242

Regression analysis revealed that age was the only significant predictor of quality of life, indicating a decline in well-being with increasing age. Other demographic variables such as gender, education, marital status, occupation, and comorbidity showed no significant associations, suggesting that participants' quality of life was largely comparable across these groups. The inverse trend observed for most variables reflects a general decline in QoL with advancing age, consistent with previous research linking older age to reduced physical and psychological health. These findings highlight the need to consider age-related factors when designing interventions to improve the quality of life among individuals with depression.

TABLE 3: ASSOCIATIONS OF DEPRESSION SEVERITY AND DOMAIN-SPECIFIC QUALITY OF LIFE AMONG DEPRESSIVE PATIENTS

Severity	Mild n=20	Moderate n=16	Moderately Severe n=11	Severe n=4	Overall n=51	Correlation (r)	p Value
Physical Health	51.07±3.66	33.26±4.83	20.78±3.12	11.61±3.42	35.85±14.37	-0.975**	<0.001
Psychological Health	53.33±6.84	28.91±4.68	18.94±4.70	8.33±3.40	34.72±17.01	-0.939**	<0.001
Social Relationships	67.50±10.44	42.18±6.43	22.73±7.53	14.59±4.17	45.75±21.30	-0.930**	<0.001
Environment	43.75±6.88	23.83±5.69	11.65±2.46	6.25±2.55	27.64±15.19	-0.929**	<0.001
QOL Total	46.77±7.98	26.62±7.41	14.39±4.31	16.93±2.87	31.13±15.07	-0.838**	<0.001

**Correlation is significant at the 0.01 level (2-tailed).

A strong negative correlation was observed between depression severity and all domains of quality of life (WHOQOL-BREF), indicating that higher symptom severity corresponded with poorer well-being across physical, psychological, social, and environmental dimensions. The association was particularly strong for physical and psychological health, underscoring the profound impact of depression on both bodily functioning and emotional stability. Overall, these results confirm that as depression intensifies, patients experience a consistent and significant decline in life satisfaction echoing previous findings on the broad, debilitating effects of depressive disorders.

TABLE 4: COMPARISON OF QUALITY-OF-LIFE SCORES ACROSS DEPRESSION SEVERITY LEVELS (ONE-WAY ANOVA ANALYSIS)

Depression Severity	Mean SD	Min	Max	F	p Value
Mild (n=20)	46.77±7.98	28.13	58.33	63.20	<0.001
Moderate (n=16)	26.63±7.41	14.46	39.58		
Moderately Severe (n=11)	14.39±4.44	8.33	22.92		
Severe (n=4)	16.93±2.87	13.54	19.79		
WHO QoL Bref (n=51)	31.13±15.07	8.33	58.33		

The Comparison of Quality-of-Life Scores Across Depression Severity Levels states that there is a significant difference in quality-of-life scores across depression severity levels (p < 0.001),

confirming that greater symptom intensity is associated with markedly poorer well-being. Quality of life declined consistently from mild to severe depression, reflecting the progressive impact of symptom burden on daily functioning. These findings align with prior evidence showing that depression profoundly impairs physical, psychological, and social domains, underscoring the importance of early identification and treatment to prevent further quality-of-life deterioration.

TABLE 5: CORRELATION BETWEEN QOL AND COST METRIC

Cost of illness	Mean±SD	r	p Value
Cost of Illness (Direct Medical Cost)	1755.31±955.42	-0.123	0.390
Cost of Illness (Direct Non-Medical Cost)	828.73±374.60	-0.237	0.095
Cost of Illness (Indirect cost)	5846.08±4943.45	-0.472**	<0.001
Cost of Illness (Total)	8430.12± 5365.25	0.474**	<0.001

**Correlation is significant at the 0.01 level (2-tailed).

Analysis revealed a significant negative association between indirect costs such as productivity loss and absenteeism and quality of life, indicating that greater financial burden corresponds with poorer well-being. The total cost of illness also showed a similar inverse trend, highlighting the compounded psychological and economic strain faced by depressive patients. Although direct medical and non-medical costs were not statistically significant, their negative patterns suggest that rising treatment expenses may still adversely affect overall quality of life.

These results highlight that the economic burden of depression, particularly through indirect costs, plays a substantial role in affecting patients perceived quality of life. The findings are consistent with previous research suggesting that financial strain and productivity loss exacerbate psychological distress and hinder recovery outcomes.

DISCUSSION: The sociodemographic composition of the present study, which included 51 clinically depressed patients (62.7% females; mean age = 36.4 years), closely parallels patterns observed in previous Indian and international investigations. Arvind *et al.* (2019) found that depressive disorders in India disproportionately affect females and individuals aged 30–45 years, highlighting gendered vulnerability linked to psychosocial stressors and caregiving burdens [11]. Similarly, the global review by Moitra *et al.* (2022) confirmed a higher prevalence of major depressive disorder (MDD) among women across 84 countries, with treatment gaps more pronounced in low- and middle-income nations [12]. Educational and marital trends in the current sample where most participants had secondary or tertiary education and were married mirror those in Indian psychiatric cohorts, as reported by Nisha *et al.* (2015), who noted similar profiles among unipolar depressive patients [13]. Occupationally, the predominance of homemakers and students corresponds with findings from tertiary-care studies emphasising socioeconomic dependency as a stress factor for depression in India (Ogbo *et al.*, 2018) [14].

Comorbidity patterns observed here anxiety (66.7%), chronic medical conditions (61.7%), and obesity (56.7%) are consistent with prior evidence. Ghogare & Patil (2020) reported that over 60% of MDD patients presented with comorbid anxiety in rural Indian settings, while Wang *et al.* (2019) demonstrated a strong bidirectional relationship between depression and metabolic illnesses such as Type 2 diabetes. These parallels strengthen the representativeness of the present cohort within the broader Indian MDD population [15, 16].

Regression analysis in **Table 2** identified age as the only significant predictor of quality of life (QoL), a finding echoed by Gutiérrez-Rojas & Porras-Segovia (2020), who emphasised that advancing age predicts poorer QoL due to accumulated physical limitations and reduced social engagement [17]. The lack of significance for other sociodemographic factors aligns with Nisha *et al.* (2015), suggesting that gender and education exert limited independent influence once depression severity is accounted [13]. Correlation analysis in Table 3demonstrated a strong negative relationship between depression severity and all QoL domains, corroborating evidence from Rathod *et al.* (2022), who reported comparable reductions in physical, psychological, and social functioning among

treatment-resistant depression patients [18]. Similarly, Günther *et al.* (2008) observed significant responsiveness of EQ-5D and WHOQOL measures to depressive symptom severity, confirming that increased depression intensity consistently predicts poorer life quality [19].

Comparison of Quality-of-Life Scores across Depression Severity Levels results **Table 4** further substantiated significant differences in QoL across severity groups ($p < 0.001$). This gradient relationship is consistent with Grover & Adarsh (2023), who observed that symptom burden directly influences psychosocial functioning in both unipolar and bipolar depression [20].

The negative association between cost of illness and QoL demonstrated in **Table 5** aligns with Emmert-Fees *et al.* (2023), who found that higher indirect economic burden particularly productivity loss significantly lowers health-related QoL in Indian patients with comorbid depression and diabetes (Diabetes Care) [21]. Collectively, these findings reaffirm that depression severity, age, and financial strain are the key determinants of diminished QoL among depressive patients, reflecting trends observed in both national and international studies.

CONCLUSION: This study concludes with a profound interconnection between depression severity, quality of life (QoL), and economic burden among patients diagnosed with clinical depression. The findings revealed that increased depression severity was strongly associated with significant deterioration across all QoL domains. A pervasive impact of clinical depression on patients' daily functioning and overall well-being. Older adults are particularly vulnerable to the compounded effects of depression and age-related decline.

Furthermore, indirect costs such as productivity loss and absenteeism exhibited a significant negative correlation with QoL. This emphasises the dual burden of clinical depression both psychological and financial.

These findings reinforce the need for early diagnosis, integrated pharmacological and psychosocial management, and accessible mental health care services to mitigate clinical depression. Implementing cost-effective, community-based interventions and strengthening primary care screening could substantially improve outcomes and reduce the broader societal burden. Future research with larger, multicentric samples and longitudinal designs is warranted to deepen understanding and resource allocation.

ACKNOWLEDGEMENT: We gratefully acknowledge the Department of Psychiatry, Teerthankar Mahaveer University Hospital, Moradabad, for their valuable support in facilitating the collection of clinical data for this research. We extend our sincere thanks to Prof. Anurag Verma, Principal, and Prof. Phool Chand, Coordinator, Ph.D. Program, Teerthankar Mahaveer College of Pharmacy, Moradabad, for their continuous guidance and providing essential research facilities. We are also thankful to the Management of Teerthankar Mahaveer University for their unwavering support and for extending the necessary infrastructure and resources required for the successful completion of this study.

Funding Source: This research was self-financed. No external funding or grants were received for the conduct and completion of this study.

CONFLICT OF INTEREST: The authors declare that there is no conflict of interest regarding the publication of this research. All authors confirm that they have no affiliations, financial or non-financial interests, including honorarium, grants, employment, membership, stock ownership, or any personal or professional relationships, that could be perceived as influencing the work reported in this study.

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How to cite this article:
Parashar A and Mittal P: Evaluating the cost of illness and health-related quality of life in clinically depressed patients: a pilot study. Int J Pharm Sci & Res 2026; 17(6): 1888-94. doi: 10.13040/IJPSR.0975-8232.17(6).1888-94.