

## DEPTH Study: A Retrospective Study on the Demographic Characteristics, Clinical Profile, Triggering Factors, Quality of Life and Treatment Patterns of Depression in Indian Patients

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### Abstract:

**Introduction:** Depression is a significant global health concern, causing personal distress, functional impairment, and increased healthcare burden. Understanding its specific characteristics in the Indian population is vital for effective management. This study aimed to assess the demographic and clinical profile, triggering factors, quality of life, and treatment patterns among Indian patients with depression.

**Methods:** This retrospective, multi-centric cross-sectional study collected data from healthcare facilities across India on patients diagnosed with depression per ICD-10 criteria. Information on demographics, triggers, symptoms, quality of life impact, and treatment was analyzed using IBM SPSS Statistics

**Results:** The study included 7,888 patients, with a mean age of 48.0 years. The prevalence of depression was slightly higher in males (56.5%). Key triggering factors included stressful events, chronic illness or pain, and social isolation. Commonly reported symptoms were fatigue or low energy, persistent sadness or low mood, and disturbed sleep. Depression significantly affects patients' quality of life, particularly sleep quality, financial/social functioning, and daily chores. Cognitive behavioral therapy (CBT) and pharmacotherapy were the most common treatments. Among antidepressants, escitalopram was most frequently prescribed (47.7%), followed by vortioxetine (2.6%), while bupropion and the bupropion-dextromethorphan combination were each prescribed in 0.05% of cases.

**Conclusions:** The study highlights the considerable clinical and psychosocial burden of depression among Indian patients, particularly middle-aged individuals. Key triggers such as stress and chronic illness demand early recognition and tailored interventions. Although CBT and pharmacotherapy remain the mainstays of treatment, the underutilization of multimodal strategies indicates a gap in optimal care. These findings underscore the need for integrated, culturally sensitive, and patient-centered approaches to improve depression management and outcomes in India.

**Keywords:** Depression, demographics, clinical profile, triggering factors, quality of life, treatment patterns, India.

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### Introduction

Depression is a multifaceted and pervasive mental health disorder that significantly impairs an individual's emotional, cognitive, and physical functioning. It is recognized as a leading cause of disability worldwide, affecting over 264 million people, according to the World Health Organization (WHO) [1].

In India, the burden of depression is considerable, with epidemiological surveys estimating a lifetime prevalence between 5% and 10%, though these numbers may be underreported due to stigma, limited mental health literacy, and barriers to accessing care. [2,3] The disorder manifests as a persistent low mood, loss of interest in daily activities, fatigue, difficulty in concentration,

feelings of guilt or worthlessness, sleep disturbances, and in severe cases, suicidal ideation. These symptoms can lead to significant impairment in occupational, social, and personal domains, exacerbating the individual's suffering and increasing the societal and economic costs associated with mental illness. [4]

Aside from its psychological and functional consequences, depression has a significant economic impact on individuals and nations. Globally, it is estimated to cost the economy over US \$1 trillion per year in lost productivity [5] In India, this burden is increased by indirect expenses including absenteeism, presenteeism, and revenue loss. [6] Furthermore, depression frequently co-

occurs with other chronic medical conditions such as cardiovascular disease, diabetes, and chronic pain, which increases total morbidity, complicates disease management, and increases healthcare utilization. [7,8] Integrating mental health services within primary care and chronic disease management frameworks is therefore essential to improve holistic outcomes and reduce the dual burden of mental and physical illness.

The etiology of depression involves a complex interplay of biological, psychological, and environmental factors. The monoamine hypothesis has long dominated the understanding of depression, positing that deficiencies in neurotransmitters such as serotonin, norepinephrine, and dopamine contribute to mood dysregulation. [9] More recent insights highlight the role of neuroplasticity and neurotrophic factors, particularly brain-derived neurotrophic factor (BDNF), which is often reduced in individuals with depression and plays a critical role in neuronal survival and synaptic modulation. [10,11] Dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, leading to elevated cortisol levels and heightened stress responses, has also been implicated in the pathophysiology of depression. [12]

Furthermore, a growing body of evidence suggests that chronic inflammation, characterized by increased levels of pro-inflammatory cytokines such as IL-6, TNF- $\alpha$ , and CRP, may contribute to the onset and persistence of depressive symptoms by affecting neurotransmission and neuroplasticity. [13,14] Genetic predispositions, early life stress, trauma, and social determinants such as poverty and isolation further increase susceptibility to the disorder. [15]

Diagnosing depression is primarily clinical, based on standardized criteria from the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) or the International Classification of Diseases (ICD-10). Screening tools such as the Patient Health Questionnaire-9 (PHQ-9), Hamilton Depression Rating Scale (HDRS), and Beck Depression Inventory (BDI) are frequently used to assess symptom severity and monitor treatment response. [16]

Treatment options include pharmacological therapy, psychotherapy, and neurostimulation modalities. First-line pharmacologic agents for the treatment of depression are typically selective serotonin reuptake inhibitors (SSRIs) and serotonin-norepinephrine reuptake inhibitors (SNRIs), due to their proven efficacy, safety, and tolerability profiles. Common SSRIs include escitalopram, sertraline, fluoxetine, and paroxetine, which are widely prescribed for a broad range of depressive and anxiety disorders. Among SNRIs,

desvenlafaxine, venlafaxine, and duloxetine are frequently utilized, especially in cases with comorbid somatic symptoms or in patients who do not achieve adequate response with SSRIs. Tricyclic antidepressants (TCAs), such as amitriptyline and nortriptyline, and monoamine oxidase inhibitors (MAOIs), including phenelzine and tranylcypromine, are generally considered second- or third-line options, primarily reserved for treatment-resistant depression due to their less favorable side effect profiles, which may include anticholinergic effects, cardiovascular risks, and dietary restrictions in the case of MAOIs.

Recent advances have introduced novel therapeutics such as esketamine, vortioxetine and Dextromethorphan- buprenorphine an N-methyl-D-aspartate receptor (NMDA) receptor antagonist, which offers rapid antidepressant effects in patients with treatment-resistant depression.

Psychotherapeutic approaches such as cognitive-behavioral therapy (CBT), interpersonal therapy (IPT), and mindfulness-based cognitive therapy (MBCT) have shown robust efficacy, either as monotherapy in mild to moderate depression or in combination with pharmacotherapy for more severe cases. [18] In treatment-resistant cases, electroconvulsive therapy (ECT), repetitive transcranial magnetic stimulation (rTMS), and vagus nerve stimulation (VNS) provide viable options, with significant symptom relief documented in various studies. [19,20] Recent innovations in digital mental health such as smartphone applications, telepsychiatry, and artificial intelligence-based monitoring have improved access to psychological services, especially in remote and underserved regions. [21]

Despite the availability of effective treatments, a large treatment gap remains, particularly in low- and middle-income countries like India, where up to 80% of individuals with mental illness do not receive adequate care. [3,22] Contributing factors include inadequate infrastructure, shortage of mental health professionals, cultural stigma, and lack of integration between mental and primary health services. Public health strategies that promote mental health awareness, train primary care providers in basic psychiatric care, and increase investment in mental health infrastructure are crucial for reducing this gap. [23] Moreover, the future of depression management lies in precision psychiatry, which aims to tailor treatments based on genetic, biochemical, and environmental profiles. Biomarker research, neuroimaging advances, and pharmacogenomics are expected to improve diagnosis and predict treatment response, thus optimizing patient outcomes. [24,25]

As our understanding of depression deepens, a biopsychosocial model is essential for addressing the condition comprehensively. Efforts must continue to enhance early detection, reduce stigma, and ensure equitable access to evidence-based treatments, thereby improving quality of life and functional outcomes for those affected by this debilitating illness.

This study aimed to characterize the demographic and clinical profile, triggering factors, Quality of Life and treatment patterns of patients diagnosed with depression.

## Methods

**Rationale for the DEPTH Study:** While global advancements in depression care are notable, real-world data from India on clinical presentations, comorbidities, treatment practices, and longitudinal outcomes remain scarce. Most available studies are either population-based or derived from small clinical cohorts with limited generalizability. The DEPTH Study (Depression Evaluation of Patients' Treatment History) aims to bridge this gap through a retrospective analysis of patient records across multiple tertiary healthcare centers in India. By capturing demographic, clinical, and therapeutic profiles, this study provides valuable insights into prevailing treatment patterns and unmet needs in depression care in India.

**Study Design & Population:** This retrospective, multi-centric, cross-sectional, observational study gathered information from diverse healthcare facilities, including hospitals, clinics, and institutes across India. Physicians, psychiatrists, and psychologists obtained data retrospectively using the DEPTH study case record form. The study population primarily comprised patients diagnosed with depression according to the ICD-10 criteria.

The selection of patients for inclusion in the study was solely at the treating physician's discretion, and no additional diagnostic procedures or patient interviews were conducted specifically for the purpose of data collection. While this approach aligns with real-world clinical practice, it carries an inherent risk of selection bias, as physicians may unintentionally favor patients with certain clinical characteristics, treatment adherence, or record completeness.

To address this potential bias, participating physicians were instructed to consecutively enroll all eligible patients who met the predefined inclusion and exclusion criteria during the data collection period. This method was employed to ensure a more representative sample of the general patient population and to limit the influence of subjective decision-making. Furthermore, no incentives or directives were given to prioritize or exclude patients based on disease severity,

treatment outcome, or demographic profile, thus minimizing the risk of preferential selection

**Data Collection:** The following retrospective data were collected in the DEPTH study: demographic details, including age, gender, smoking history, weight, height, disease duration, any pre-existing comorbidities, and family history of Psychiatric disorders; triggering factors such as genetic predisposition, hormonal changes, chronic illness or pain, stressful events, substance abuse, trauma or abuse, and social loneliness; symptoms, noting the presence of at least one of the persistent sadness or low mood and/or loss of interests or pleasure for most of the time over a period of at least two weeks, as well as fatigue or low energy, disturbed sleep, poor concentration or indecisiveness, low self-confidence, poor or increased appetite, suicidal thoughts or acts, agitation or slowing of movements, and guilt or self-blame; the impact on quality of life, considering quality of sleep, suicidal thoughts and behavior, financial/social functioning, work or academic performance, daily functioning, and overall life satisfaction; and treatment options, including pharmacotherapy, cognitive behavioral therapy, and psychotherapy.

Data collected from all participating centers across India were compiled at Alkem. Basic statistical analysis was performed on all the collected data. The following preliminary outcomes were analyzed at the end of the study: the demographic characteristics of patients suffering from depression; the trend of depression symptoms in male and female patients; the age-based prevalence of depression-related symptoms; the prevalence of triggering factors and their association with age and gender; the impact of depression on quality of life; and the trend of treatment approaches in patients with depression.

**Handling of Missing Data:** Given the retrospective design, some degree of missing data was anticipated. All available data were included in the analysis. For variables with missing entries, the number of non-missing observations was reported. No data imputation techniques (such as mean substitution or regression imputation) were applied, to preserve the integrity of real-world clinical documentation. Descriptive statistics were calculated based on valid cases per variable. Analyses involving associations (e.g., between triggering factors and demographics) were performed using pairwise deletion to maximize the use of available data without introducing bias through artificial estimation.

**Ethical Considerations:** The study was conducted in accordance with the Indian Council of Medical Research (ICMR) ethical guidelines and received approval from the appropriate Ethics Committee (EC). Given the retrospective design and the use of

de-identified data, a waiver of informed consent was granted by the EC. Patient confidentiality was maintained, with access to identifying information restricted to essential investigator personnel and, when necessary, to the Institutional Ethics Committee (IEC) and relevant regulatory authorities. The study sponsor was permitted access to the data for monitoring and auditing purposes without compromising patient confidentiality, as per applicable laws and regulations. All project-related data were securely maintained by the designated investigators. The independent ethics committee, sponsor, quality assurance units, and regulatory agencies had access to the case record forms for inspection and audit purposes.

**Statistical Analysis:** All statistical analyses were performed using IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp., Armonk, NY). Continuous variables such as age, height, and weight were summarized using mean and standard deviation (SD), while categorical variables, including gender, smoking status, presence of comorbidities, and family history of Psychiatric disorders, were described using frequencies and percentages.

To ensure data quality, only patients aged 18 to 80 years, with a height ranging from 76 to 195 cm and weight from 45 to 120 kg, were included in the final analysis. Subgroup analyses were conducted by age group and gender. Graphical visualizations were employed to illustrate trends in triggering factors, symptom profiles, and quality of life

impacts. No inferential statistical tests (e.g., chi-square tests, t-tests, ANOVA) were conducted in the current analysis. However, future analyses may include such methods to evaluate statistically significant differences between subgroups and identify predictors of treatment choice and symptom severity.

## Results

The study population comprising a total of 7,888 patients, data was summarized after removing potentially abnormal values for age, height, and weight. Specifically, only patients aged between 18 years and 80 years, with a height ranging from 76 to 195 cm and weight between 45 and 120 kg, were included in the analysis. The mean age of the population was 48.0 years. The average height was 163.0 cm, and the average weight was 67.8 kg.

The gender distribution showed in Table No.01 that 56.5% of the patients were male (n = 4,456), while 43.5% were female (n = 3,432). Most patients (83.7%) reported not being active smokers. Among those who did report smoking were 16.2%, 7.2% had been smoking for 1 to 5 years, 3.6% for 6 years to 10 years, 3.5% for more than 10 years, and 1.9% for less than 1 year. A very small number (0.0%) reported smoking without specifying the duration. Regarding comorbidities, 95.6% of patients had no pre-existing medical conditions, while 4.4% reported comorbidities. A family history of Psychiatric disorders was reported by 1.3% of the patients, with the remaining 98.7% indicating no such history.

**Table 1: Summary of Demographic Characteristics**

Parameter	Summary Statistics	Overall Total (N=7888) n (%)
Age (Years)	Mean $\pm$ SD	48.0 $\pm$ 13.5
Height (cm)	Mean $\pm$ SD	163.0 $\pm$ 8.8
Weight (kg)	Mean $\pm$ SD	67.8 $\pm$ 10.7
Gender, n (%)	Male	4456 (56.5)
	Female	3432 (43.5)
Active Smoker, n (%)	No	6605 (83.7)
	Yes-1-5	567 (7.2)
	Yes-6-10	284 (3.6)
	Yes->10	280 (3.5)
	Yes-< 1	148 (1.9)
	Yes	4 (0.05)
Pre-existing Comorbidities, n (%)	No	7542 (95.6)
	Yes	346 (4.4)
Patients with Family History of Psychiatric Disorder, n (%)	No	7782 (98.7)
	Yes	106 (1.3)

The Figure No.01 shows that patients aged 45 years–59 years are the most affected across all triggering factors, particularly stressful events, chronic illness or pain, and social loneliness. The 30–44 age group follows closely in most categories. The 60 years and above group shows

moderate involvement, while the 18 years–29 years age group consistently has the lowest numbers, though stress and loneliness are still prominent. Overall, individuals in the 45 years –59 years age range appear to be the most impacted by these factors.

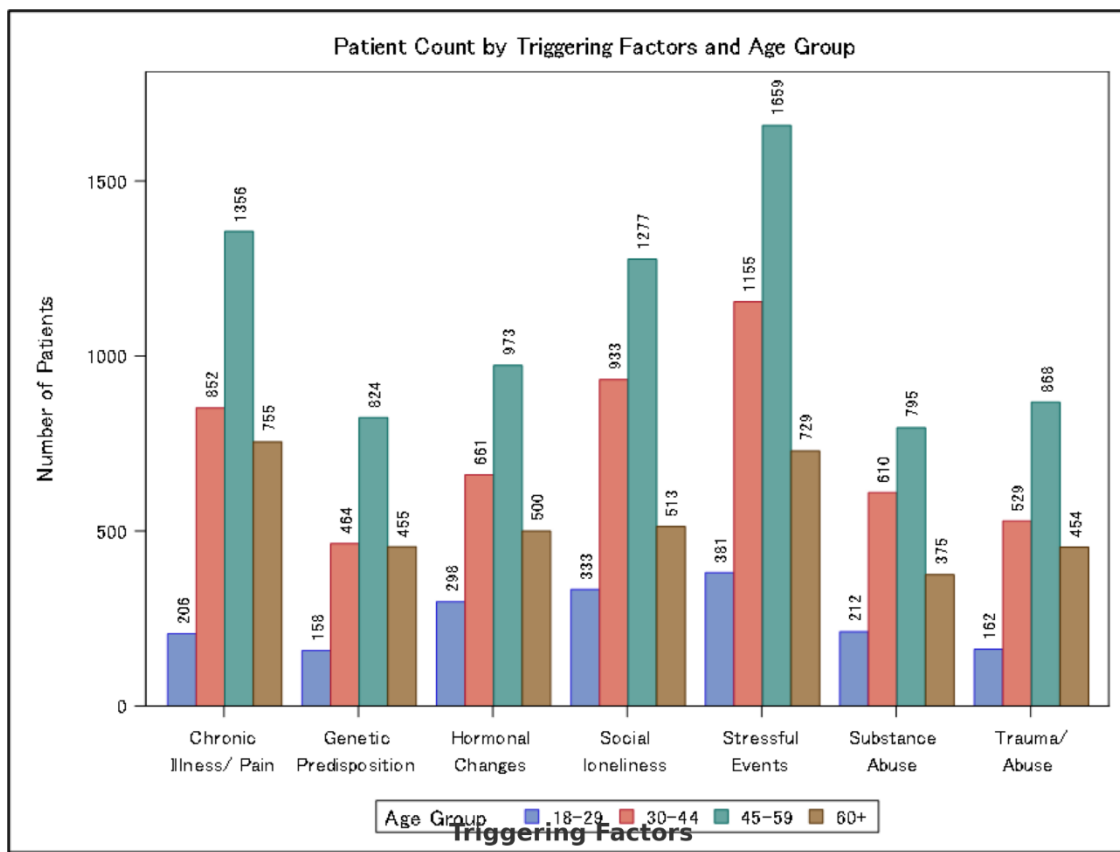


Figure 1: Patient Count by Triggering Factors and Age Group

The average age of male patients is consistently higher than that of female patients across all triggering factors. The highest average ages are observed for chronic illness/pain post genetic predisposition and trauma or abuse among males, both exceeding 50 years. In contrast, females generally show lower average ages, with the lowest for hormonal changes. This suggests that males tend to experience these triggers slightly later in life compared to females.

Table No.02 shows most reported symptoms among both male and female patients were persistent sadness or low mood (76.41% vs 77.58%) and loss of interest or pleasure (74.41% vs

74.17%). Disturbed sleep was more frequently reported by females than males (76.01% vs 72.33%), whereas fatigue or low energy was comparable between genders (65.95% in males vs 66.51% in females). Poor concentration or indecisiveness (54.38% vs 53.69%) and low self-confidence (51.34% vs 49.45%) showed similar prevalence across genders. Symptoms such as poor or increased appetite, agitation or psychomotor slowing, and guilt or self-blame were relatively less common, with minimal gender differences.

Notably, suicidal thoughts or acts were more commonly reported by females (32.47%) compared to males (28.93%).

Table 2: Symptoms Prevalence by Gender (%)

Symptom	Male n (%)	Female n (%)
Persistent sadness or low mood	76.41	77.58
Loss of Interests or pleasure	74.41	74.17
Fatigue or Low energy	65.95	66.51
Disturbed Sleep	72.33	76.01
Poor concentration or indecisiveness	54.38	53.69
Low self confidence	51.34	49.45
Poor or increased appetite	46.51	47.23
Suicidal thoughts or acts	28.93	32.47
Agitation or slowing of movements	31.01	30.54
Guilt or self-blame	31.45	27.31

Table no. 03 Age-wise distribution of core depressive symptoms among study participants (N=7888). The table presents the frequency and percentage of key depressive symptoms across different age groups. Middle-aged individuals (45–

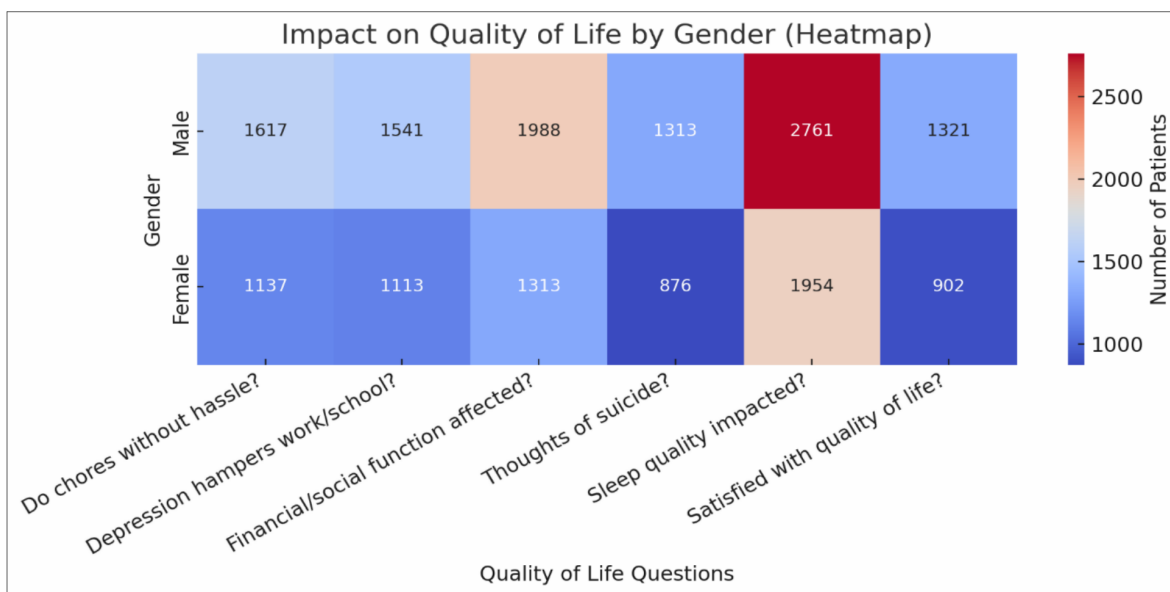
59 years) reported the highest prevalence of most symptoms, particularly disturbed sleep, fatigue or low energy, and loss of interest or pleasure. Younger adults (18–29 years) had comparatively lower symptom frequencies across all domains.

**Table 3: Summary of symptoms by age group**

Symptoms	Age group	n (%)
<b>Trauma of Abuse</b>	<18	11.1
	18-29	23.4
	30-44	21.6
	45-59	25
	60+	28.6
	<b>Social Loneliness</b>	<18
18-29		30.9
30-44		32
45-59		35.8
60+		29.7
<b>Persistence sadness or low mood</b>		<18
	18-29	56.7
	30-44	49.7
	45-59	50.4
	60+	50.9
	<b>Loss of interests or pleasure</b>	<18
18-29		56.5
30-44		47.7
45-59		46.7
60+		42.1
<b>Fatigue or low energy</b>		<18
	18-29	42.9
	30-44	42
	45-59	41.3
	60+	39.7
	<b>Disturbed sleep</b>	<18
18-29		46.7
30-44		47.7
45-59		56.5
60+		52.7
<b>Poor Concentration or indecisiveness</b>		<18
	18-29	32.3
	30-44	34
	45-59	37.6
	60+	35.6
	<b>Low self confidence</b>	<18
18-29		31.1
30-44		26.6
45-59		26.8
60+		27.3
<b>Poor or increased appetite</b>		<18
	18-29	25.9
	30-44	31.4
	45-59	33.5
	60+	33.6
	<b>Suicidal thoughts or acts</b>	<18
18-29		15.6
30-44		20.3
45-59		23.6
60+		20.1

<b>Agitation or slowing of movements</b>	<18	8.9
	18-29	11.6
	30-44	16.1
	45-59	17.8
	60+	22.9
<b>Guilt or self-blame</b>	<18	6.7
	18-29	13.8
	30-44	16
	45-59	15.3
	60+	17.8

Figure No.02 highlights that male patients consistently report a higher impact of depression on various aspects of quality of life compared to females. The most affected domain for both genders is sleeping quality, followed by financial/ social functioning and ability to perform daily chores. Females' responses are lower across all areas.



**Figure 2: Patients with Quality of Life Impacted by Gender**

Figure No.03 shows that the average age of patients reporting quality of life gradually increases across different domains. Those struggling with suicidal thoughts tend to be younger, while older patients more often report difficulties with daily chores and overall satisfaction with life, suggesting age-related variation in how depression affects quality of life.

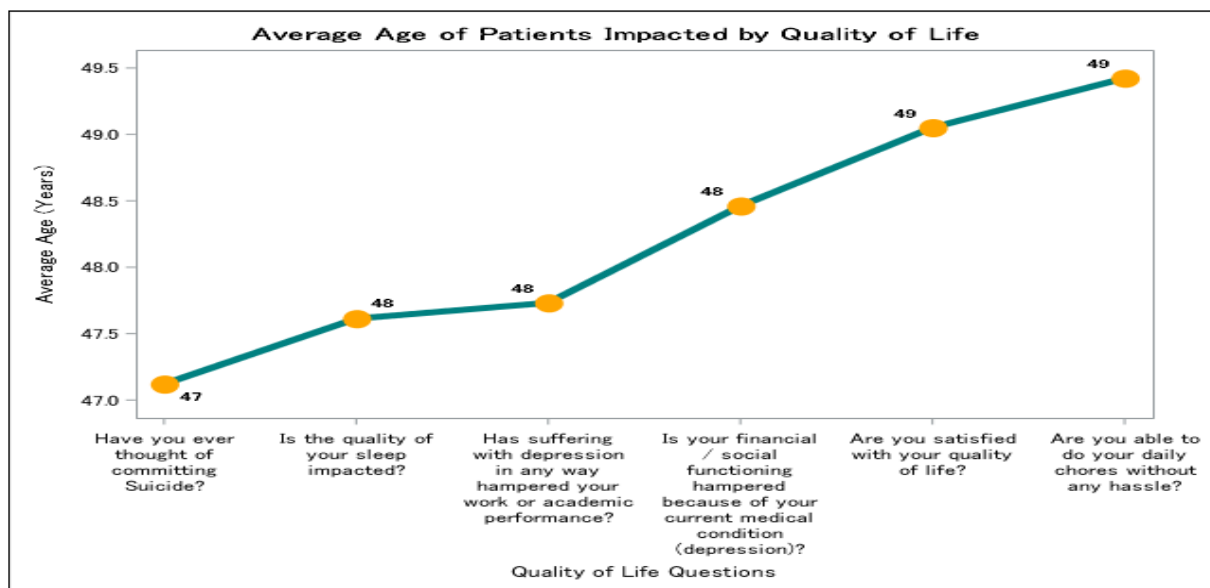


Figure 3: Average Age of Patients Impacted by Quality of Life

Figure No. 04 shows Pharmacotherapy and Cognitive Behavioral Therapy (CBT) were the most used treatments across all age groups, especially among individuals aged 45–59 years. Younger patients (18–29 years) more frequently received counseling alone, while combination therapies (CBT with counseling and/or

pharmacotherapy) were used less frequently across all age groups. The most prescribed antidepressant was escitalopram (47.7%), followed by vortioxetine (2.6%). Bupropion and the bupropion-dextromethorphan combination were each prescribed in 0.05% of cases.

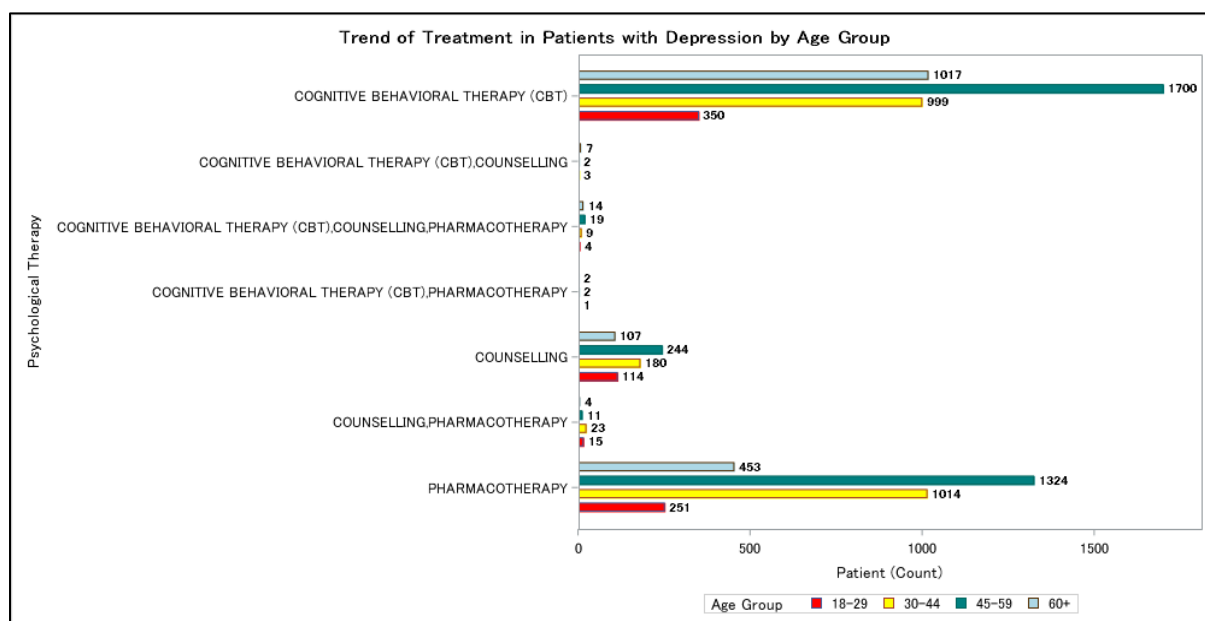


Figure 4: Trend of treatment in Patients with Depression by Age Group

**Discussion**

The study reveals several important insights into the demographic and clinical profile of depression patients. The mean age of the study population was 48 years, with a slightly higher prevalence in males (56.5%) than females (43.5%). This aligns with studies indicating a high burden of depression in

middle-aged adults facing work-related stress and life transitions [2], However, other research reports a higher prevalence of depression among women, potentially due to hormonal changes, postpartum changes, and social stressors. [15] Additionally, the impact of disease burden on women's mental health, particularly in low-income countries, highlights the need for gender-sensitive

interventions. [26] Smoking was not prevalent among the patients in this study, 83.7% of patients reported being non-smokers. This contrasts with literature suggesting smoking as a risk factor for depression.

The relationship between smoking and depression is complex, involving an interplay of neurobiological mechanisms and lifestyle factors. [13] This discrepancy may reflect regional, Cultural, or reporting differences. Furthermore, research has explored the association between smoking cessation and subsequent risk of depression, providing further context to this issue. [27]

A significant majority of patients (95.6%) reported no pre-existing comorbidities, while 4.4% had at least one. This is consistent with the understanding that depression can occur independently but can also be exacerbated by or co-occur with chronic health conditions like cardiovascular disease, diabetes, and chronic pain. [4] Comorbidities can complicate depression management and worsen outcomes. [18] Studies have also examined the link between specific comorbidities, such as chronic pain, and the risk of developing depression. [28]

Only 1.3% of patients reported a family history of Psychiatric disorders. Although genetic predisposition is a recognized risk factor for depression, the low rate in our study suggests that environmental stressors and personal history may be more influential in this population. [25] The role of specific genetic factors, such as the serotonin transporter gene, influencing susceptibility to depression has been extensively studied. [29]

Stressful events, chronic illness or pain, and social isolation were prominent triggers of depression in this study. Stressful life events like job loss, financial difficulties, and relationship problems are well-established triggers for depressive episodes. [15] Chronic illness and pain can contribute to depression through persistent physical discomfort and functional limitations [13].

Social isolation, particularly in older adults, is increasingly recognized as a significant risk factor for depression [21] Research has also focused on the impact of early life stress on brain development and the subsequent risk of depression in adulthood. [30] Fatigue or low energy, persistent sadness or low mood, and disturbed sleep were the most reported symptoms, aligning with depressive disorder criteria for major depressive disorder and highlighting depression's impact on psychological and physiological functioning [16]. Sleep disturbances have been shown to be both a symptom and a potential causal factor in depression. [31] Depression significantly affects quality of life, with sleep quality, financial/social functioning, and daily chores being most affected.

These findings underscore the pervasive and debilitating nature of depression, which impairs work, social relationships, and daily activities [22]. Studies have used various measures, such as the WHO Quality of Life-BREF, to assess the impact of depression on different life domains. [32]

CBT and pharmacotherapy were the most common treatments. CBT helps patients change negative thought patterns and behaviors, while pharmacotherapy uses antidepressants to correct neurochemical imbalances [17] The relatively low use of combined treatments and counseling alone suggests potential areas for improving treatment practices and tailoring interventions. The effectiveness of different psychotherapeutic approaches, including IPT and mindfulness-based interventions, has also been examined in treating depression. [33,34] This study's limitations include its retrospective design, tertiary-care sample, and absence of a control group, which restrict causal interpretations. Future research could benefit from employing longitudinal designs and including control groups to address these limitations and provide more robust evidence.

Despite these limitations, the study offers valuable insights into the demographic and clinical profile of depression patients in India. It emphasizes the importance of considering various triggers, including stressful events, chronic illness/pain, and social isolation, in depression management. The study also highlights depression's significant impact on quality of life and the need for comprehensive treatment approaches. Further investigation into the specific cultural factors that influence the experience and treatment of depression in India is warranted.

## Conclusion

This study provides a comprehensive overview of the demographic and clinical profile, triggering factors, quality of life, and treatment patterns among Indian patients with depression.

The findings highlight the significant psychosocial and functional burden associated with depression, particularly among middle-aged individuals. Key triggers such as chronic illness, stressful events, and social isolation were commonly reported and underscore the need for early identification and holistic management.

While pharmacotherapy and cognitive behavioral therapy were the most frequently utilized treatments, the underuse of integrated approaches suggests opportunities for optimizing care.

These insights emphasize the importance of individualized, culturally sensitive, and multidisciplinary interventions to address the complex needs of patients with depression in India. Further longitudinal and interventional research is

warranted to guide future strategies for improved outcomes.

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