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Research Paper

Understanding Depressive Symptoms in India: A Logistic Regression Analysis Using LASI Data

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Abstract
Depression is a leading global mental health challenge with significant personal and societal impacts, yet remains underdiagnosed and undertreated in India, especially among vulnerable groups. This study examines the prevalence and correlates of depressive symptoms in a nationally representative sample of Indian adults using data from the Longitudinal Ageing Study in India (LASI), Wave 1 (2017–18). The pooled sample includes 68,939 respondents aged 18 years and older. Depressive symptoms were measured using a validated scale and modeled as a binary outcome. Key predictors included sex, age, caste, education, household economic status (MPCE quintiles), and place of residence (urban/rural). Logistic regression analysis accounted for survey design and weights. Results indicate that approximately 25% of respondents reported depressive symptoms. Females had significantly higher odds of depression compared to males (OR=1.12). Increasing age was modestly associated with higher depressive symptom odds. Caste differences emerged: Scheduled Tribes had lower odds relative to Scheduled Castes, while Other Backward Castes and general category respondents also showed reduced odds. Education and higher economic status were protective factors, reducing the likelihood of depressive symptoms. Rural residence was linked to a slight increase in depressive symptoms.
These findings highlight the complex interplay of demographic, socioeconomic, and geographic factors influencing mental health in India. Addressing depression requires targeted, socially informed public health strategies that integrate mental health into primary care and tackle structural inequalities rooted in caste, gender, and poverty. This study underscores the urgent need for culturally appropriate interventions to improve mental well-being as India undergoes rapid demographic and epidemiological transitions.

Keywords- *Depression, Prevalence, Socioeconomic factors, Caste, Gender, disparities, Rural-urban divide, Mental health, Logistic regression, Public health policy.*

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I. Introduction

Depression ranks among the most widespread and debilitating mental health disorders globally, exerting profound effects on personal well-being, social relationships, and public health infrastructure. According to the World Health Organization (WHO), over 280 million individuals suffer from depression worldwide, with a growing concentration of cases emerging in low- and middle-income countries. In India, mental health has steadily gained visibility as a critical public health concern (World Health Organization, 2023). Yet, despite increased awareness, depression remains significantly underdiagnosed and inadequately treated, especially among high-risk groups such as older adults, rural populations, and individuals facing educational or economic disadvantages (Mitchell et al., 2009). Structural barriers, stigma, and gaps in service delivery continue to hinder early detection and effective care for those most in need.

India is currently undergoing a rapid demographic and epidemiological transition. As life expectancy increases and fertility rates decline, the proportion of older adults in the population is steadily growing. This aging trend, while indicative of improvements in health and longevity, also brings with it an increased risk of age-related chronic conditions, including mental health disorders. Depression in later life is often underreported due to stigma, lack of awareness, and the tendency to attribute emotional distress to aging or physical illness. Furthermore, social factors such as isolation, widowhood, financial insecurity, and limited mobility compound the risk of depressive

symptoms in older adults. Despite the growing awareness of mental health as a component of healthy aging, empirical research on the prevalence and correlates of depressive symptoms in India remains relatively limited, particularly at the national level. Most studies conducted in India have relied on small-scale, regional datasets or specific subpopulations, which limits their generalizability. Nationally representative studies that examine the complex interplay of demographic, socioeconomic, and geographic factors associated with depressive symptoms are essential for designing targeted mental health interventions.

The Longitudinal Ageing Study in India (LASI), launched in 2017–18, offers a unique opportunity to fill this gap. LASI is the first large-scale, nationally representative panel survey of older adults in India, modeled on the Health and Retirement Study (HRS) in the United States and similar studies in other countries. LASI collects extensive information on the health, economic, and social well-being of adults aged 45 and older, providing researchers with a rich dataset to examine the aging process in the Indian context. Given the breadth and depth of LASI, it is a valuable resource for understanding mental health outcomes, including depressive symptoms, among a diverse and aging population.

The determinants of depressive symptoms are multifaceted. Gender, for instance, plays a critical role. Studies have consistently shown that females are more likely than males to experience depressive symptoms (Salk et al., 2017), due to a combination of biological, psychological, and sociocultural factors (Albert, 2015). In the Indian context, this gender disparity may be further exacerbated by traditional gender roles, caregiving responsibilities, and unequal access to education and employment (Patel, Kirkwood, Pednekar, Pereira, et al., 2006). Age is another key factor, as older adults often face multiple stressors such as deteriorating physical health, bereavement, and reduced social engagement (Rodda et al., 2011). However, the relationship between age and depression is not linear, and some studies suggest that the oldest-old may report fewer symptoms, possibly due to greater resilience or selective survival (Jeste et al., 2013).

Caste is a unique and critical determinant in the Indian social structure. Historically marginalized communities such as Scheduled Castes (SCs) and Scheduled Tribes (STs) face systemic disadvantages in access to education, employment, and healthcare (Subramanian et al., 2006), which may contribute to poorer mental health outcomes. Other Backward Castes (OBCs), though relatively better positioned, still experience social and economic exclusion in many settings. Analyzing caste differences in depressive symptoms can shed light on the enduring effects of social stratification on mental health. Education has long been recognized as a protective factor against depression (Bauldry, 2015). Higher educational attainment is associated with better health literacy, coping strategies, and access to social and economic resources, all of which may buffer against psychological distress. In contrast, individuals with limited or no formal education may face barriers in navigating healthcare systems and seeking help for mental health issues.

Economic status, as measured by indicators such as Monthly Per Capita Expenditure (MPCE), also influences mental health. Economic insecurity can lead to chronic stress, reduced access to healthcare, and increased vulnerability to life events that trigger depressive symptoms (Lund et al., 2010). In India, where out-of-pocket healthcare expenditures are high, individuals from economically disadvantaged households may be particularly susceptible to depression. Place of residence, urban vs. rural, is another important dimension. Rural residents may experience poorer mental health due to geographic isolation, lack of mental health services, and entrenched social norms that discourage the expression of emotional distress (Saha et al., 2024). At the same time, social cohesion and traditional support systems in rural areas may offer protective benefits. The net effect of rural residence on depression remains an empirical question and warrants close investigation.

Given these multiple and intersecting factors, a comprehensive analysis of depressive symptoms in India requires a multivariable approach that can disentangle the unique contribution of each factor. Logistic regression is a widely used statistical technique for modeling binary outcomes and allows for the estimation of odds ratios while controlling for potential confounders. Applying logistic regression to LASI data enables us to quantify the associations between demographic, socioeconomic, and geographic variables and the likelihood of reporting depressive symptoms.

This study aims to fill an important research gap by examining the prevalence and correlates of depressive symptoms in a large, nationally representative sample of Indian adults using data from LASI Wave 1.

By analyzing data from over 68,000 respondents, this study offers a robust and comprehensive understanding of depressive symptoms in India's aging population. The findings have significant implications for public health policy, particularly in terms of designing culturally appropriate and targeted mental health interventions. Moreover, the study contributes to the growing body of literature that emphasizes the importance of mental health in the broader discourse on aging and well-being in low- and middle-income countries. In light of the ongoing demographic transition and the increasing visibility of mental health issues in India, this research is both timely and policy-relevant. A deeper understanding of the social determinants of depressive symptoms can inform the development of community-based mental health programs, guide resource allocation, and support efforts to integrate mental health services into primary care systems.

II. Methods

Data Source

This study utilized data from the Longitudinal Ageing Study in India (LASI), Wave 1, conducted in 2017–18. LASI is a nationally representative survey that collects comprehensive information on the health, economic, and social well-being of adults aged 45 years and older in India. The survey covers all states and union territories and is harmonized with international aging studies such as the Health and Retirement Study (HRS). For this analysis, a pooled sample of 68,939 respondents aged 18 years and above was used to assess depressive symptoms and their correlates.

Outcome Variable

The primary outcome variable was **depressive symptoms**, measured as a binary variable (0 = no depressive symptoms, 1 = presence of depressive symptoms). Depressive symptoms were assessed using a standard scale incorporated in the LASI questionnaire (e.g., CES-D), and responses were dichotomized based on established cut-off points.

Independent Variables

Key covariates included:

- **Sex** (male/female)
- **Age** (continuous)
- **Caste group**: categorized as Scheduled Caste (reference group), Scheduled Tribe, Other Backward Caste, and None of them.
- **Years of education** (continuous)
- **Monthly Per Capita Expenditure (MPCE)** quintile: a measure of household economic status, ranging from 1 (lowest) to 5 (highest).
- **Place of residence** (urban/rural)

Statistical Analysis

Descriptive statistics were used to summarize sample characteristics, presented as means or proportions. Logistic regression analysis was conducted to examine the association between the independent variables and the likelihood of reporting depressive symptoms. Results are reported as odds ratios (OR) with corresponding 95% confidence intervals (CI) and p-values. All analyses accounted for the complex survey design and sampling weights to ensure national representativeness.

III. Results:

Table 1 presents the descriptive characteristics of the study sample (N = 68,939). Approximately one-quarter (25%) of the sample reported experiencing depressive symptoms. The mean age was 57.9 years, and the sample was predominantly female (58%) and rural (65%). In terms of caste distribution, 17% belonged to Scheduled Castes (SC), 18% to Scheduled Tribes (ST), 39% to Other Backward Castes (OBC), and 25% to none of these categories. The average years of education among participants was 4.3 years.

Table 2 shows the results of logistic regression analysis assessing the association between individual characteristics and depressive symptoms. Females had significantly higher odds of reporting depressive symptoms than males (OR = 1.12, $p < 0.001$). Each additional year of age was associated with a slight increase in the odds of depressive symptoms (OR = 1.01, $p < 0.001$). Compared to Scheduled Castes (reference category), individuals from Scheduled Tribes had significantly lower odds of depressive symptoms (OR = 0.64, $p < 0.001$), while those from Other Backward Castes showed marginally non-significant lower odds (OR = 0.96, $p = 0.089$). Respondents who did not belong to any of the caste groups also had significantly lower odds (OR = 0.91, $p = 0.001$). Educational attainment was inversely associated with depressive symptoms; each additional year of schooling reduced the odds by 3.6% (OR = 0.96, $p < 0.001$). Similarly, higher MPCE was associated with lower odds of depressive symptoms (OR = 0.97, $p < 0.001$), indicating a protective effect of higher economic status. Rural residence was associated with a slight but significant increase in the odds of depressive symptoms (OR = 1.05, $p = 0.017$).

IV. Discussion:

This study provides comprehensive insights into the factors associated with depressive symptoms among Indian adults using nationally representative data from the Longitudinal Ageing Study in India (LASI). By analyzing a large and diverse sample, the findings underscore the complex interplay of gender, age, caste, education, economic status, and rural-urban residence in shaping mental health outcomes in India.

One of the key findings is the significantly higher odds of depressive symptoms among females compared to males. This result is consistent with global and national research that has documented higher rates of depression in women, often linked to biological, psychological, and sociocultural factors (Zhao et al., 2020). In the Indian

context, traditional gender roles, caregiving burdens, restricted autonomy, and limited access to mental health resources may exacerbate emotional distress in women (Patel, Kirkwood, Pednekar, Weiss, et al., 2006). Furthermore, the intersection of gender with other disadvantages, such as poverty or caste marginalization, can intensify mental health vulnerabilities. Age also emerged as a statistically significant predictor, with each additional year of age slightly increasing the likelihood of reporting depressive symptoms. This association aligns with prior studies indicating that aging is accompanied by multiple stressors, including declining physical health, loss of social roles, bereavement, and economic insecurity. However, the modest magnitude of the association suggests that while age is a factor, its effect is likely mediated by broader social and structural conditions.

Caste disparities in depressive symptoms were evident in the analysis. Individuals from Scheduled Tribes had significantly lower odds of reporting depressive symptoms compared to Scheduled Castes, while those from Other Backward Castes and general category groups also showed comparatively reduced odds, though the effect for OBCs was marginal. These findings merit careful interpretation. While it might be expected that marginalized groups such as SCs and STs would face similar mental health burdens due to structural exclusion, the relatively lower reported depressive symptoms among STs may reflect contextual or cultural differences in symptom perception, coping mechanisms, or underreporting due to stigma. It may also indicate differences in social cohesion and support systems that buffer psychological distress in tribal communities. On the other hand, the consistently higher burden among Scheduled Castes signals an urgent need for inclusive mental health strategies that account for caste-based inequalities.

Educational attainment was negatively associated with depressive symptoms, reaffirming the protective role of education in mental health (Patria, 2022). Education likely enhances psychological resilience, health literacy, and problem-solving abilities, and facilitates better navigation of healthcare systems. It may also expand employment opportunities and social networks, thereby reducing isolation and financial stress, two major risk factors for depression. Given that the average years of schooling in the sample was low (4.3 years), this finding highlights the long-term mental health dividends of investing in educational access and quality. Household economic status, measured by the Monthly Per Capita Expenditure (MPCE) quintile, also significantly predicted depressive symptoms. Individuals from lower economic strata had higher odds of experiencing depressive symptoms, suggesting the detrimental impact of financial insecurity, material deprivation, and limited access to healthcare. These results support previous research from India and other low- and middle-income countries indicating that poverty and mental illness are closely intertwined, often reinforcing each other in a cycle of disadvantage.

The study also found a statistically significant association between rural residence and increased odds of depressive symptoms. Rural residents may face multiple barriers to mental healthcare, including limited availability of mental health professionals, inadequate transportation, stigma, and reliance on informal care or traditional healers. Additionally, rural communities may be more vulnerable to economic shocks, agrarian distress, and social isolation, all of which can contribute to psychological distress. At the same time, it is important to recognize that the rural-urban gap in mental health could also reflect differences in reporting behavior, awareness, and diagnostic access. Together, these findings present a nuanced picture of mental health disparities in India. They suggest that depression among adults, particularly older adults, cannot be understood in isolation from the broader social determinants of health. Structural inequalities rooted in caste, education, income, and geography significantly shape the distribution and experience of depressive symptoms.

Limitations

Despite its strengths, this study has several limitations. First, the cross-sectional nature of the LASI Wave 1 data limits the ability to infer causal relationships. While associations between predictors and depressive symptoms are identified, it is not possible to determine directionality or temporality. Second, depressive symptoms were measured through self-reports and standardized screening tools, which, although validated, may not fully capture the clinical severity or spectrum of depression. Cultural factors, stigma, and variations in emotional expression may also affect reporting accuracy. Third, some potential confounders were not included in the analysis. Variables such as social support, chronic health conditions, and marital status could significantly influence depressive symptoms but were not accounted for in the current model.

Policy Implications

The findings of this study carry important implications for public health policy and mental health service delivery in India. First, the consistent association of depressive symptoms with gender, caste, economic status, and education underscores the need for a social determinants' framework in mental health planning. Interventions must move beyond individual-level treatment and address the root causes of mental distress, such as poverty, social exclusion, and lack of opportunity. Second, integrating mental health services into primary healthcare can improve access, especially in rural and underserved areas. Training community health workers, such as ASHAs and ANMs, in basic mental health screening and referral could help bridge the service gap in remote regions. Third, targeted mental health campaigns are needed to raise awareness, reduce stigma, and encourage help-seeking

behavior, particularly among marginalized groups. Campaigns must be culturally appropriate, linguistically inclusive, and accessible through community platforms and digital media.

V. Conclusion

This study adds to the growing body of evidence on the social patterning of mental health in India. By leveraging nationally representative data and applying a multivariate approach, it reveals how depressive symptoms are unequally distributed across gender, age, caste, education, income, and geography. As India continues to age and confront the dual burden of chronic and mental illness, prioritizing mental health within public policy is no longer optional. Addressing depression, particularly among vulnerable populations, requires coordinated efforts across health, education, and social sectors. With the right investments and strategies, India has the potential to promote not only longer but mentally healthier lives for its population.

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Table 1: Mean/Proportion of the selected sample (N=68,939)

	Mean/Prop	Minimum	Maximum
Depressive symptoms	0.25	0	1
Female	0.58	0	1
age	57.92	18	116
Caste			
Scheduled Caste	0.17	1	4
Scheduled Tribe	0.18		
Other Backward Caste	0.39		
None of them	0.25		
Education (yrs)	4.3	0	17
MPCE	3	1	5
Rural	0.65	0	1

Table 2: Logistic regression estimates of depressive symptoms in LASI sample					
Depressive symptoms	Odds ratio	Std. err.	P>z	[95% conf.	interval]
Female	1.12185	0.02162	0	1.080266	1.165035
age	1.011737	0.000797	0	1.010176	1.0133
Caste					
Scheduled Tribe	0.641162	0.019478	0	0.6041	0.680497
Other Backward Caste	0.958503	0.023884	0.089	0.912815	1.006477
None of them	0.907883	0.025719	0.001	0.858849	0.959717
Education (yrs)	0.963993	0.002185	0	0.95972	0.968285
MPCE	0.970511	0.006409	0	0.958031	0.983153
Rural	1.049711	0.021305	0.017	1.008774	1.09231
Constant	0.217681	0.013061	0	0.19353	0.244845