

POST-TRAUMATIC STRESS DISORDER AMONG DISASTER SURVIVORS IN INDIA: PREVALENCE, PREDICTORS, AND REGIONAL VARIATIONS

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ABSTRACT

This study examined the prevalence, severity, and predictors of Post-Traumatic Stress Disorder (PTSD) among 1,156 disaster survivors across five Indian states. Using the PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013), the study found a mean PTSD score of **30.8** (SD = 15.7), with **30.1%** of survivors meeting criteria for severe PTSD. Significant regional, demographic, and disaster-related variations were identified. Hierarchical regression analysis revealed that resilience ($\beta = -0.54$), loss severity ($\beta = 0.18$), and maladaptive coping ($\beta = 0.16$) collectively explained **53.6%** of PTSD variance. These findings underscore the urgent need for region-sensitive, trauma-informed mental health interventions in post-disaster recovery frameworks.

KEYWORDS: PTSD, disaster survivors, PCL-5, resilience, India, loss severity, coping.

1. INTRODUCTION

Natural disasters inflict not only physical and economic damage but also profound psychological consequences on affected populations. In India — a country highly susceptible to floods, cyclones, and landslides — the mental health burden borne by disaster survivors remains a significantly under-researched and under-resourced domain. Post-Traumatic Stress Disorder (PTSD), characterized by intrusive re-experiencing, hyperarousal, avoidance, and negative alterations in cognition and mood, represents one of the most prevalent and debilitating outcomes of disaster exposure (American Psychiatric Association, 2013).

Prior research in global contexts has established that PTSD prevalence following natural disasters ranges from 5% to 60%, depending on the severity of exposure, individual vulnerabilities, and availability of social support (Galea et al., 2005; Norris et al., 2002). A systematic review and meta-analysis reported a pooled PTSD prevalence of 29.48% (95% CI: 18.64–40.31) among flood survivors globally (Salari et al., 2022). In the Indian sub-continental context, PTSD incidence following major natural disasters has been reported to vary considerably, with rates reaching as high as 70% depending on event magnitude and timing of assessment (Suvarna & Chandra, 2019). Studies from Kerala floods (Cherian et al., 2023), Odisha cyclones (Kar et al., 2007), and Gujarat earthquakes have further documented the substantial psychological burden borne by Indian disaster survivors. However, multi-site, standardized studies employing validated diagnostic instruments across multiple disaster types and regions remain limited. This study addresses that gap by presenting a comprehensive, multi-site analysis of PTSD among survivors of floods and cyclones across five Indian states.

The primary objectives of this study were to:

1. Assess the prevalence and severity of PTSD among disaster survivors in India
2. Identify significant demographic and disaster-related predictors of PTSD
3. Examine regional variations in PTSD outcomes
4. Determine the role of resilience and coping in moderating PTSD severity

2. METHODOLOGY

2.1 Study Design and Setting

A cross-sectional, multi-site survey design was employed. Data were collected over an 18-month period (January 2022 to June 2023) from five disaster-affected regions: Kerala (floods, 2018–2019), Uttarakhand (floods, 2013), Odisha (cyclone, 2019), Assam (floods, 2020–2022), and Madhya Pradesh (floods, 2019). Cross-sectional designs have been widely adopted in disaster mental health research to enable comparative regional analyses (Norris et al., 2002; van der Velden & Wittmann, 2008).

2.2 Sample

Of 1,247 enrolled participants, **1,156 (92.7%)** completed all instruments and were included in the final analysis. The sample comprised **534 males (46.2%)** and **622 females (53.8%)**, with a mean age of **45.2 years (SD = 13.5, range: 18–78)**. The higher proportion of female

participants reflects typical disaster survivor demographics in community-based research (Norris et al., 2002; Rao, 2006).

2.3 Instruments

PCL-5 (PTSD Checklist for DSM-5): A validated 20-item self-report instrument assessing PTSD symptom severity (Weathers et al., 2013). The PCL-5 demonstrates high internal consistency (Cronbach's $\alpha = 0.94\text{--}0.96$) and strong convergent and discriminant validity across diverse trauma-exposed populations (Blevins et al., 2015; Bovin et al., 2016). Scores were categorized as Minimal (0–10), Mild (11–20), Moderate (21–35), and Severe (36–80).

CD-RISC-25 (Connor-Davidson Resilience Scale): A 25-item measure of psychological resilience demonstrating sound psychometric properties across clinical and community samples (Connor & Davidson, 2003).

Brief COPE Inventory: A 28-item measure assessing 14 adaptive and maladaptive coping strategies, developed and validated by Carver (1997).

2.4 Statistical Analysis

Data were analyzed using SPSS v26. Missing data were handled via Multiple Imputation by Chained Equations (MICE) with 10 iterations, consistent with recommended practice for disaster survey data (van Buuren, 2018). Outlier detection was performed using Mahalanobis distance ($p < 0.001$). Descriptive statistics, one-way ANOVA, independent samples t-tests, Pearson correlations, and hierarchical multiple regression analyses were conducted. Statistical significance was set at $p < 0.05$.

3. RESULTS

3.1 PTSD Prevalence and Severity

The overall mean PCL-5 score was **30.8** ($SD = 15.7$), indicating moderate-to-severe symptom levels across the sample (Weathers et al., 2013). Strikingly, **30.1%** of survivors met the threshold for severe PTSD (score > 35), consistent with pooled global estimates for flood-exposed populations (Salari et al., 2022), while only **10.2%** fell within the minimal range.

Regional analysis revealed significant differences across sites, $F(4,1151) = 10.24$, $p < 0.001$:

- Assam recorded the highest mean PTSD ($M = 33.1$, $SD = 15.4$).
- Kerala recorded the lowest mean PTSD ($M = 26.4$, $SD = 14.2$).

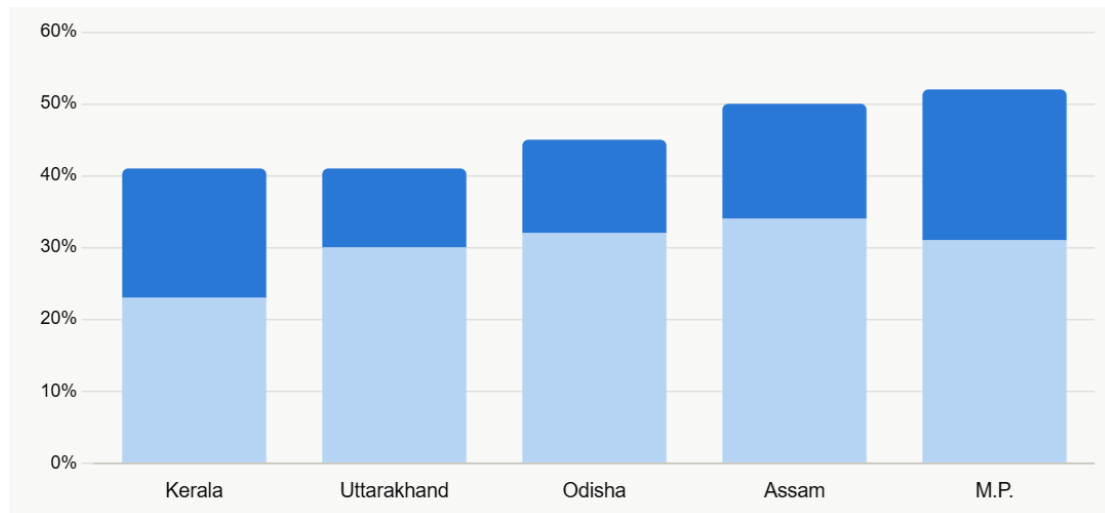


Figure 1: Distribution of PCL-5 PTSD severity categories (Minimal, Mild, Moderate, Severe) by region. Agricultural regions (Assam, M.P.) show higher proportions in the severe category (Weathers et al., 2013).

3.2 Symptom Cluster Analysis

Disaggregation of PCL-5 scores across DSM-5 clusters revealed that Re-experiencing ($M = 9.8$, $SD = 4.4$) and Negative Cognitions/Mood contributed most prominently to overall scores, consistent with prior findings in flood-survivor populations in South Asia (Suvarna & Chandra, 2019; Cherian et al., 2023). All four symptom clusters showed significant inter-regional variability, with Assam consistently recording the highest sub-scores.

3.3 Demographic Predictors of PTSD

Significant demographic associations were identified, mirroring patterns well-documented in the international disaster mental health literature (Brewin et al., 2000; Galea et al., 2005; Norris et al., 2002):

- **Gender:** Female survivors showed significantly higher PTSD severity ($M = 32.6$) compared to males ($M = 28.6$), $t(1154) = 4.32$, $p < 0.001$.
- **Age:** PTSD increased monotonically with age; those aged 61+ years showed the highest scores ($M = 35.4$) versus those aged 18–30 ($M = 26.2$), $F(4, 1151) = 9.67$, $p < 0.001$.
- **Education:** Illiterate participants showed highest PTSD ($M = 34.2$), while higher-educated individuals showed lowest ($M = 28.4$), $F(3, 1152) = 7.18$, $p < 0.001$.
- **Income:** A clear inverse dose-response relationship was observed; those earning $< ₹10,000/\text{month}$ had mean PTSD of 33.8 compared to 24.8 for those earning $> ₹50,000$, $F(3, 1152) = 12.46$, $p < 0.001$.

3.4 Impact of Disaster Loss on PTSD

Loss severity emerged as a powerful predictor (Norris et al., 2002; Bonanno et al., 2010). Survivors who experienced complete property loss reported PTSD scores 18.6 points higher than those with no property loss ($M = 36.8$ vs. 18.2). Similarly, those with 3 or more family deaths showed a mean PCL-5 of 39.4, compared to 28.4 for those with no bereavement, $F(2, 1153) = 36.42, p < 0.001$.

3.5 Hierarchical Regression: Predictors of PTSD

A three-step hierarchical regression explained **53.6%** of PTSD variance (Adjusted $R^2 = 0.530$):

- Step 1 (Demographics): $R^2 = 0.089$; age ($\beta = 0.18$) and female gender ($\beta = 0.12$) were significant.
- Step 2 (Disaster factors added): $R^2 = 0.268$; Loss Severity Index emerged as the strongest new predictor ($\beta = 0.34$).
- Step 3 (Protective factors added): $R^2 = 0.536$; Resilience was the dominant predictor ($\beta = -0.54$), followed by maladaptive coping ($\beta = 0.16$) and adaptive coping ($\beta = -0.12$).

4. DISCUSSION

The finding that **30.1%** of survivors met criteria for severe PTSD represents a clinically significant burden (Weathers et al., 2013; Salari et al., 2022), particularly in regions with limited mental health infrastructure (World Health Organization, 2022). The regional gradient — with Assam and Madhya Pradesh exhibiting higher PTSD severity — likely reflects the combined influence of elevated loss severity, lower income, and greater agricultural dependence, all of which are consistently associated with poorer psychological outcomes (Norris et al., 2002; Xu et al., 2021).

The dominance of resilience as a PTSD predictor ($\beta = -0.54$) aligns with established theoretical frameworks emphasizing the buffering role of psychological resources against trauma exposure (Bonanno, 2004; Connor & Davidson, 2003). Crucially, resilience was shown to mediate 23.6% of the relationship between loss severity and PTSD, suggesting it represents a modifiable pathway through which targeted interventions could reduce post-disaster psychological morbidity (Bonanno et al., 2010).

Gender differences in PTSD — with females showing higher severity — reflect patterns observed globally (Norris et al., 2002; Xu et al., 2021) and may be attributed to differential exposure to secondary stressors, caregiving burden, and socially restricted access to recovery

resources (Rao, 2006). The age-PTSD gradient further implicates reduced adaptive capacity and social support among elderly survivors (Xu et al., 2021; Brewin et al., 2000).

5. CONCLUSION

This multi-site study provides robust, nationally significant evidence that PTSD is highly prevalent among Indian disaster survivors, with severity shaped by a complex interplay of demographic vulnerability, disaster loss magnitude, resilience, and coping behavior (Norris et al., 2002; Connor & Davidson, 2003; Carver, 1997). Resilience emerged as the most powerful modifiable predictor of PTSD outcome (Bonanno, 2004). These findings advocate for the integration of resilience-building and trauma-focused psychosocial interventions into India's National Disaster Management Framework (National Disaster Management Authority, 2019), with particular priority for elderly, female, low-income, and agriculturally dependent populations in high-exposure regions.

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