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Impact of Climate Change and Extreme Weather Events on Psychological Well-Being: A Case Study of Jaipur (Rajasthan)

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ABSTRACT

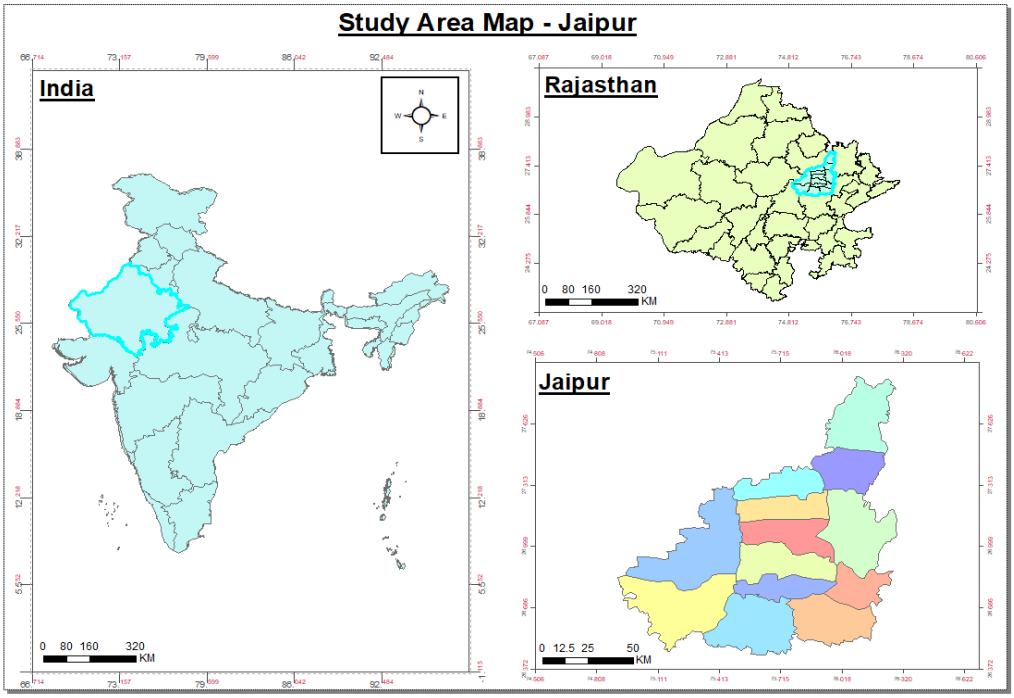
Climate change has emerged as a major environmental and public health concern, with increasing evidence linking extreme weather events to adverse psychological outcomes. Jaipur, a rapidly urbanizing semi-arid city, experiences recurring heatwaves, dust storms, and irregular rainfall - all of which disrupt daily life and contribute to emotional distress. This study assesses the psychological impacts of these climatic stressors through a mixed-method design integrating survey data (N = 156), India Meteorological Department (IMD) climate records (1985–2023), and secondary mental-health datasets. Findings indicate high levels of fatigue, stress, irritability, sleep disturbances, anxiety, and reduced motivation during extreme heat periods. Younger adults (18–25) and older respondents (60+) exhibited the strongest psychological responses. Women reported more emotional symptoms than men. Hospital and Tele-MANAS data further show seasonal spikes in depression, anxiety, and stress-related cases during peak summer months. These results highlight how climatic variability intersects with socio-economic and demographic vulnerabilities to shape mental-health risks. The study stresses the need for climate-informed mental-health policies, improved awareness, and localized interventions for vulnerable populations in Jaipur.

***Keywords**: Climate Change, Mental Health, Heatwaves, Jaipur, Psychological Well-being.*

Introduction

Climate change is no longer viewed solely as an environmental phenomenon; it increasingly influences human health and well-being. Rising temperatures, extreme weather events, and climatic instability have been linked to emotional distress, reduced productivity, sleep disturbances, anxiety, and long-term psychological impacts (Clayton, 2021). India is exceptionally vulnerable due to its climatic diversity, rapid urbanization, and socio-economic inequalities. Semi-arid regions such as Rajasthan face compounded risks due to frequent heatwaves, dust storms, and irregular rainfall patterns.

Jaipur, the capital city of Rajasthan, has recorded dangerously high temperatures exceeding 48°C in recent years, along with erratic climatic events. These disruptions affect quality of life, especially for vulnerable groups such as students, elderly individuals, outdoor workers, and low-income populations. Existing literature establishes a link between climatic stressors and mental distress; however, research specific to Indian cities remains limited.



This study bridges that gap by examining the psychological effects of extreme weather events on Jaipur residents. Using a combination of surveys, IMD climate trends, and mental-health records, the research analyzes how climate-induced discomfort translates into emotional strain and reduced mental well-being.

Literature Review

A growing body of research demonstrates that climate change contributes to psychological strain across populations. International studies show that heatwaves and climatic disruptions increase symptoms such as irritability, fatigue, anxiety, and sleep difficulties (Cianconi et al., 2020; Hayes et al., 2018). Clayton (2023) found that women and younger individuals often report stronger worry and emotional distress related to climate uncertainty, while Reyes et al. (2021) highlight rising eco-anxiety among youth globally.

In the Indian context, Pailler and Tsaneva (2018) reported significant associations between weather variability and reduced emotional well-being across rural areas. Patel et al. (2020) observed heightened stress among disaster-affected communities due to livelihood losses and instability. Amutha and Juliet (2017) examined indirect pathways of climate impacts through displacement, disease, and economic strain.

Institutional bodies including WHO (2021), NIMHANS (2022), and the National Centre for Disease Control (2019) emphasize that psychological vulnerabilities are intensified among socio-economically disadvantaged populations during extreme weather events. Yet, most Indian studies largely focus on physical health, leaving mental-health dimensions relatively unexplored.

The existing literature underscores the urgent need for localized, city-level studies - making Jaipur a critical case for understanding climate-related psychological impacts.

Methodology

This research employed a mixed-method, cross-sectional approach combining primary and secondary data.

Primary Data

A structured survey (N = 156) was administered online (n = 104) and offline (n = 52). The questionnaire captured:

- Demographic information,
- Exposure to extreme weather,
- Emotional and physical symptoms,
- Perceived impacts on daily life,
- DASS-21 indicators of depression, anxiety, and stress.

Sampling techniques included convenience, snowball, and purposive sampling to ensure diverse representation across age, gender, and occupation.

Secondary Data

Secondary datasets used included:

- IMD climate records (temperature trends, heatwaves, rainfall variability, storms: 1985–2023),
- SMS Hospital mental-health admissions (2020–2025),
- Tele-MANAS helpline data (2025),
- National Mental Health Survey (2015–2016).

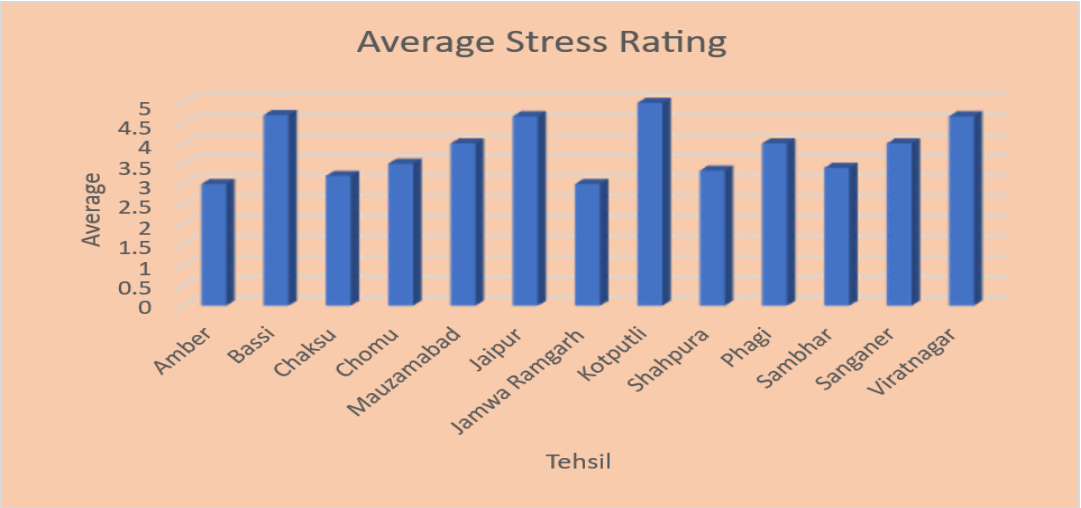
Analytical Approach

Data were analyzed using descriptive statistics, correlations, and frequency distributions. Graphs from IMD and survey results were used to visualize patterns.Ethical protocols ensured confidentiality and voluntary participation.

Results

Survey Findings

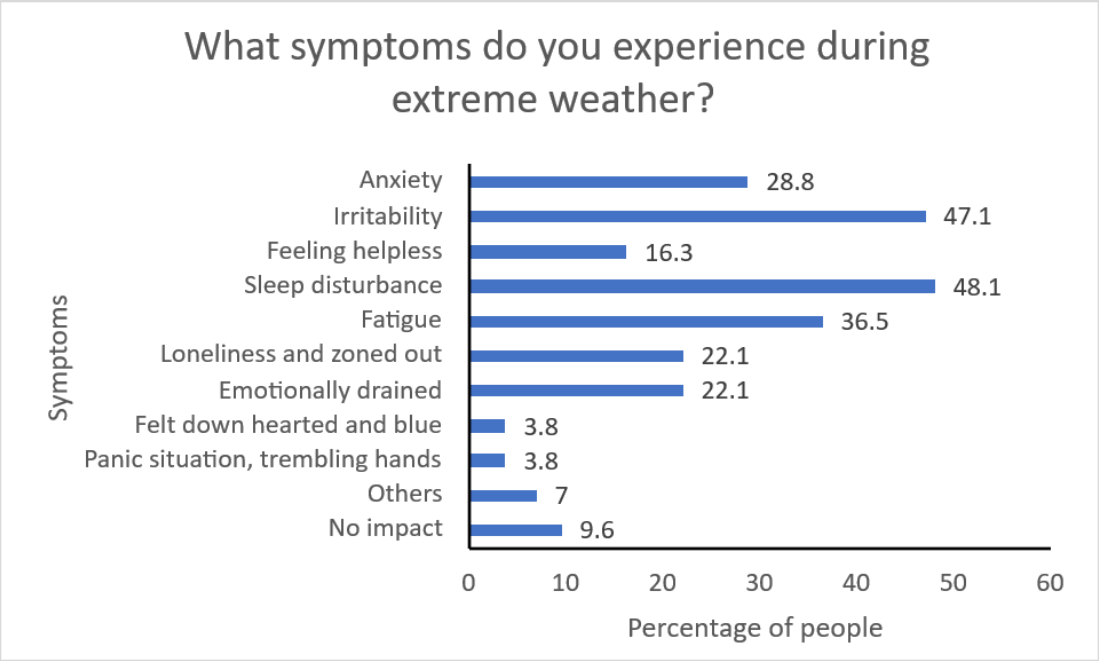
Respondents aged 18–25 years reported the highest stress scores (M = 3.68), followed closely by individuals aged 60 years and above (M = 3.67). Women consistently reported higher emotional distress - including fatigue, crying spells, low motivation, and irritability - compared to men.



Across the sample:

- More than 70% reported difficulty sleeping during heatwaves.
- Many experienced headaches, restlessness, and difficulty concentrating.
- Dust storms and prolonged rainfall increased feelings of confinement, demotivation, and social withdrawal.
- A substantial proportion expressed fear about future climatic conditions, reflecting growing eco-anxiety.

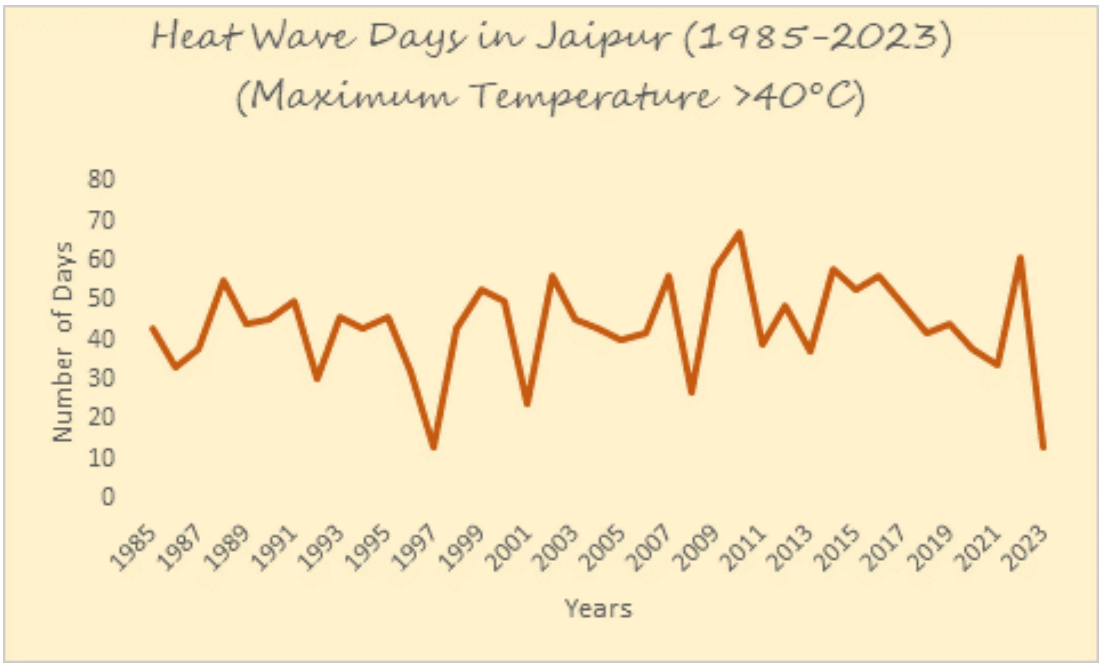
(Data collected through Google forms participants)



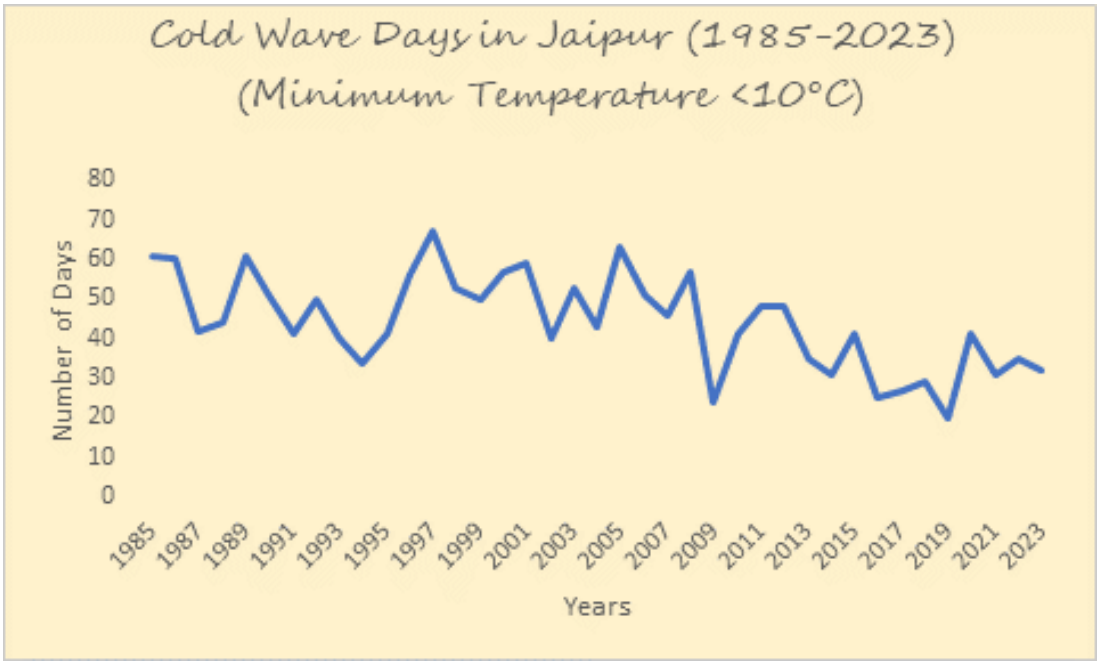
Climatic Trends

IMD data show:

- Significant increase in heatwave intensity across decades,
- Peak heatwave years: 2012, 2015, 2018, and 2020 (above 55 days of extreme heat),



- Steady decline in cold-wave occurrences,



- Recurring dust storms in 1988, 2009, 2015–16, and 2020.

These climatic conditions correspond closely with reported psychological discomfort among Jaipur residents.

Mental-Health Records

Hospital and Tele-MANAS data reveal:

- Higher admissions for depression, anxiety, schizophrenia, and psychiatric emergencies during April–June,
- 79% of Tele-MANAS callers were aged 18–45,
- Stress and depression constituted the majority of telephonic consultations.

The synchronization between heat peaks and mental-health case spikes suggests a climate-linked aggravation of psychological distress.

Discussion

The study's findings align with global literature indicating that extreme heat and weather variability elevate psychological distress. Jaipur's climatic profile - marked by prolonged summers, heatwaves, and dust storms - creates conditions that significantly impact emotional stability and cognitive functioning. The heightened vulnerability of younger individuals may stem from academic pressure, digital connectivity, and rising climate awareness, while older adults face greater physical and physiological strain.

Gender differences align with prior studies showing women's greater emotional sensitivity to environmental stress (Clayton, 2023). The association between climatic peaks and hospital admissions indicates that climatic events indirectly influence mental-health pathways through fatigue, dehydration, lifestyle disruption, and socio-economic stress.

Urban factors such as poor green cover, high population density, and heat-island effects further intensify discomfort. The results highlight a clear need for climate-aware mental-health policy frameworks.

Conclusion

This study demonstrates that climate change significantly affects psychological well-being among Jaipur residents. Heatwaves, storms, and irregular rainfall contribute to stress, anxiety, fatigue,

and reduced productivity. Vulnerable groups - including youth, elderly individuals, women, and outdoor workers - show disproportionately strong emotional responses.

The alignment of survey findings with IMD and hospital data reinforces the emerging connection between climatic instability and mental-health risks. There is an urgent need for:

- Climate-informed mental-health services,
- Awareness campaigns,
- Heat-stress mitigation planning,
- Expanded access to tele-mental-health support,
- Long-term monitoring of climate-related mental-health trends.

Localized research such as this is essential for designing interventions tailored to Jaipur's socio-environmental context.

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