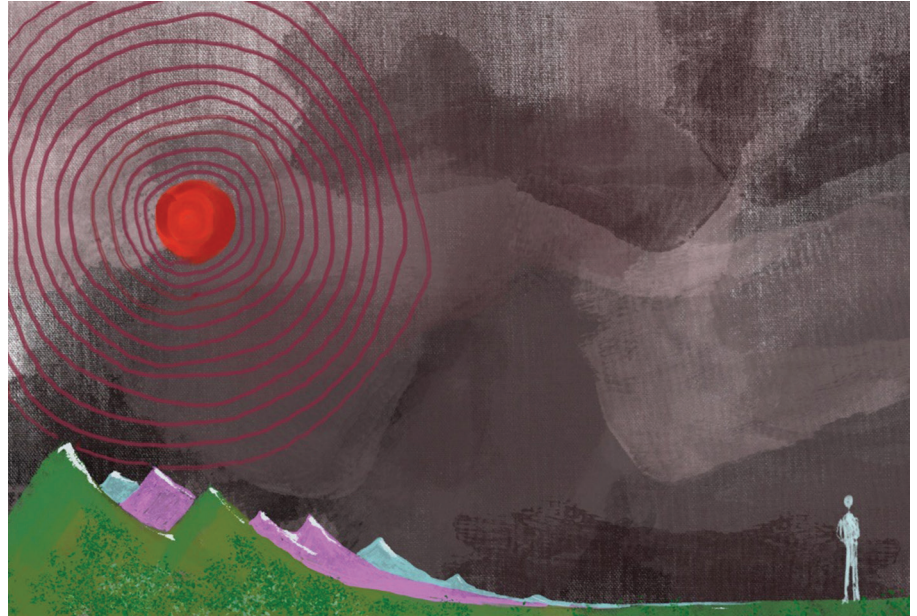


Climate Change, Disasters, and Mental Health of Adolescents in India

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The effects of global climate change are widely recognized as a potential threat to humanity and the sustainable growth of the ecosystem. Global research has documented that the detrimental effects of climate change are due to human anthropogenic activities, through incessant industrialization, enhanced metropolitan area, deforestation, fuel use, and associated pollution.¹ This has led to an increase in several erratic responses, such as extreme weather events and disasters like drought, food scarcity, floods, earthquakes, tsunamis, and so on. Such events have chronic consequences on human lives, be they economic, social, as well as physical or mental health effects.

Among the ill effects on health, the focus on the impacts of climate change has been primarily on its effects on physical health. However, coupled with the physical consequences, climate-change-associated frequent disasters cause anxiety-related responses as well as chronic and severe mental health disorders.² A global health burden affecting billions of people, mental health disorders impose an enormous liability towards functionality, disability, impaired quality of life, human misery, and even premature morbidity



and mortality. Global research has also documented that frequent disaster events negatively impact the mental health of individuals.^{3,4} On the occupational front, mental disorders would set off a loss in skill, productivity loss, sickness absenteeism, unemployment, and so on. This may sequentially prompt social stigmas like marginalization, deprivation, and exclusion, resulting in social isolation,

violence, or suicide. Although all age groups are prone to mental health issues, adolescents, in their crucial years of neuro-development towards stable adulthood, are particularly vulnerable to early life experiences. India is a developing economy with a population of over one billion and widely varying landscapes, including disaster-prone and ecologically fragile areas. This commentary provides a

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brief overview of the interaction between climate change and disasters and their association with the mental health issues of adolescents with reference to India.

Climate Change and Disasters

Among the nations susceptible to the impacts of climate change, India is ranked seventh⁵ due to its massive population, dependence on agriculture, and climatic variability. Among the Indian states, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Jharkhand, Manipur, Meghalaya, Mizoram, Uttar Pradesh, Uttarakhand, and West Bengal are the regions ecologically the most vulnerable to disasters, based on exposure, sensitivity, and adaptive capacity.⁶ Due to typical weather exposure based on geography and environment, the Sundarban delta in India is a hotspot of cyclones or storm surges, and floods, as well as a region regularly confronting sea level rise and saline intrusion.⁷ Often, instances of embankment failure and saline water entry in the agricultural field lead to the physical stress of restoring the situation, financial burden, and, thereby, mental distress. Thus, mental health effects of impacts of climate change depend on the local, cultural, and social features of the community and are responsive to locally perceived conditions and needs. Anecdotal evidence also reveals that communities in areas vulnerable to frequent disaster events are much more prepared for frequent natural disasters. Also, people in their advanced age may be more resilient to the effects of disaster events and in the immediate aftermath because of their significantly greater life experience navigating adversity.^{4,8,9}

Disasters and Mental Health

Over the last century, various natural calamities and disasters of high magnitude have frequently struck India. In the last three decades, between 1995 and 2020, around 400 flood and cyclone episodes have been reported in various parts of India,¹⁰ affecting millions of lives physically, mentally, and socio-economically. Although episodes of natural disasters recur frequently, each episode is an unusual combination of pre-disaster characteristics, disaster impact, and post-disaster recovery variables following management.⁴ Enduring fright

and distress during such events keep adding to the list of mental health vulnerability factors. The trauma and losses incurred due to a disaster, such as damage to the house, loss of job, and separation from friends and families, potentially contribute to mental health disorders. The combined adverse effects of both climate change and compromised mental health can destabilize human capital development, eventually affecting economic growth and prosperity, especially through productivity losses at both individual and societal levels. Having said that, it is noteworthy that inhabitants facing frequent disasters grow with resilience as an ability, to recover from constant disaster threats.¹ However, recognizing the potential threats and distress coping strategies needs organized re-orientation among the inhabitants.

Mental Health of Adolescents

There is considerable evidence that mental illnesses of adulthood have their onset during childhood and adolescence. In such challenging habitation, adolescent inhabitants are more susceptible to mental health ailments, and much of it depends on early life experiences and genetically determined vulnerability.⁸ Adolescence is a decisive period towards stable adulthood, besides being the most vulnerable phase for experiencing mental disorders, having long-term implications.¹¹ WHO estimated that ~2/5th of 10–14-year-olds and one out of two adolescents of 15–19 years' experience an anxiety disorder,¹⁰ which is one of the most common mental health symptoms. A study on the mental-health after-effects of the Tsunami in the Andaman & Nicobar Islands reported a PTSD prevalence of 10.8% among the surviving adolescents,³ while a study on the cyclone-hit Odisha reported a prevalence of 26.9% for PTSD and 12% for generalized anxiety disorders among school-going adolescents.⁹ These rates are higher than those observed among the adult Indian population in the National Mental Health Survey, 2016 (0.2% for PTSD and 1.3% for generalized anxiety disorders).¹² Stress during adolescence is thought to be the major contributor to the pathophysiology of mental health issues later in life as well.¹³ Any stressful challenges during infancy, early childhood, or even adolescence

affect the central nervous system, triggering short- and long-term physiological, cognitive, and behavioural damages.¹³

The evidence base on the burden of adolescent mental disorders with reference to frequent disaster events is relatively small due to factors like insufficient skilled human resources, low awareness about and low priority given for mental health, high service load, greater concern on child mortality than morbidity, and so on.^{3,14,15} Furthermore, unlike physical health problems, recognition and quantification of symptoms of mental illness has not got prominence in the community-based settings.¹⁴ With mental health occupying an important place in India's national developmental issues and the inclusion of a national program focused on adolescents in National Health Mission, the need of the hour is structured descriptive and analytical research in the domain of adolescent mental health, particularly in disaster-prone and ecologically vulnerable areas.

Pilot Study

Research has been conducted globally on disasters and their ecological and financial impacts, subsequent restoration and rehabilitation, and physical and mental health consequences. However, assessment of the mental milieu of adolescents before, during, and after frequent disasters as well as their resilience to tackle frequent disaster conditions is limited in the literature. Therefore, identifying the gaps in and barriers to psychological responses to frequent natural disasters is essential in formulating specific strategies to cope with mental stress among this vulnerable group.

Adolescents and concerned stakeholders of an Adolescent Clinic, like medical officers posted at the non-communicable disease (NCD) clinic and counsellors working there, were interviewed in a pilot study conducted at the Canning I block of the Sundarbans, West Bengal, India. The objective was to determine the mental health morbidity, substance abuse, and resilience to tackle frequent disaster conditions among the adolescents. Using the PHQ-9, over 2/5th of the participants were found to have mild depression. All of the participants had normal resilience measured on the Brief Resilience Scale.

Based on the information and insight gained during the pilot study and

literature review on mental health diversity among the adolescent population in the disaster-prone Sundarban delta, one large-scale study has been planned to estimate the mental health burden among adolescents aged between 18 and 19 years. This age group was selected purposively because they have experienced most of the disaster events cumulatively during their entire adolescence period. The convergent mixed methods research approach will find out the burden of common mental health disorders quantitatively and gaps and barriers to availing of relevant mental health services qualitatively. The findings will be a roadmap towards an innovative integrated service delivery model and provide knowledge to inform practice, research, and policy. Execution of the proposed project in the Sundarban delta will serve as a pilot project for widespread implementation across all disaster-prone vulnerable regions of India.

Way Forward

Adolescence is the transition period from childhood to adulthood, and indeed one of the formative periods of life. Exposure to stress from unforeseen circumstances might cause severe psychological impacts among adolescents. Especially in the long run, repeated disasters can have early and late windows of stress susceptibility for predisposing adolescents to mental health issues and triggering their consequences. In this backdrop, preserving these vulnerable populations' mental health is paramount. There is an urgent need for an increasingly accepted roadmap, with the available evidence and best practices, for adolescents living in ecologically vulnerable, disaster-prone areas of India. A series of initiatives in tandem would be necessary to achieve sustainable growth, especially in healthcare delivery. Strengthening the primary health care and referral system, coupled with efficient and fast transportation linkages, would reduce the burden of geographical constraints in case of natural disasters. The local players, such as self-help groups, local NGOs, and non-state health care providers,¹⁶ as well as motivating organizations towards more corporate social responsibility (CSR) activities in such regions, would boost the cause. The initiative to incorporate the Basic Occupational Health Services (BOHS) at the primary healthcare level would address the physical and psychological concerns of the occupational groups in the region. Feasibility

research on the tangibility of the "i-DRONE" project of the Indian Council of Medical Research (ICMR) (ICMR's Drone Response & Outreach for North East) can be explored by interested researchers, which would help in faster access to those difficult terrains in case of emergencies. Further, telepsychiatry through the traditional "hub-and-spoke model" would also be useful for online management with counseling, online training on parenting skills, and so on. In this model, the provider is located in one healthcare facility and meets a client, located in a second facility, through video.^{17,18} Such strategies may interact with potential risks and prevailing resilience among adolescents. Implementation research on these initiatives may guide future studies also to measure the influencers and assess the functioning of one or more models across a range of disaster-prone vulnerable environments.

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