

RESEARCH AND DEVELOPMENT JOURNAL

VOL 28 No. 2 | MAY 2025



Mission

To work for the cause and care of disadvantaged aged persons and to improve their quality of life

SPECIAL EDITION

Impact of Climate Change on Older Persons in India

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Editorial

Climate Change and Older Persons: Advancing Research, Policy and Resilience

Climate change is no longer a distant environmental concern; it is a public health, social justice and development challenge with profound implications for vulnerable populations. Among those most affected are older persons, whose health, wellbeing, livelihoods and social support systems are increasingly threatened by extreme weather events, rising temperatures, environmental degradation and climate-induced disasters. Yet, despite growing recognition of these risks, the intersection of ageing and climate change remains under explored, particularly in low- and middle-income countries such as India. This special edition of the *HelpAge India Research and Development Journal* seeks to contribute to this emerging discourse by bringing together evidence, perspectives and solutions that place older persons at the centre of climate action and resilience-building.

The three articles featured in this issue offer valuable and complementary insights into the multifaceted relationship between climate change and ageing. In “*Psychological Impact of Climate Change on Older Adults in India: A Clinical Perspective*,” the authors highlight the often-overlooked mental health consequences of climate-related stressors on older adults. The article underscores how anxiety, grief, uncertainty and trauma resulting from environmental changes and disasters can significantly affect psychological wellbeing, while drawing

attention to the need for age-sensitive mental health interventions and support systems.

The second article, “*Disaster Risk Reduction and Age-Friendly Societies: Building Resilience through Community in India*,” shifts the focus to preparedness and adaptation. It demonstrates the importance of inclusive disaster risk reduction strategies that recognize older persons not merely as vulnerable beneficiaries but as active contributors to community resilience. By examining age-friendly approaches and community-led initiatives, the article offers practical pathways for creating safer, more inclusive and resilient societies in the face of increasing climate-related hazards.

Completing this edition, “*Ageing in a Changing Climate: A Systematic Review of Health Vulnerabilities and Resilience*” provides a comprehensive synthesis of existing evidence on how climate change affects the health of older populations. The review identifies key vulnerabilities while highlighting factors that enhance resilience, offering important directions for policy, practice and future inquiry.

Together, these contributions illuminate the urgent need for integrated approaches that connect climate adaptation, healthy ageing, disaster preparedness and social inclusion. They also point to several priorities for future research. There is a need for longitudinal studies that examine the long-term

Despite growing recognition of these risks, the intersection of ageing and climate change remains underexplored, particularly in low- and middle-income countries such as India

As policymakers, practitioners and researchers grapple with the realities of a changing climate, it is imperative that the voices, experiences and capacities of older persons are not overlooked

physical, psychological and social impacts of climate change on older persons across diverse geographic and socio-economic contexts. Greater attention should be paid to the experiences of older women, persons with disabilities, indigenous communities and those living alone, whose vulnerabilities may be compounded during climate-related crises. Research is also needed to evaluate the effectiveness of age-responsive adaptation measures, early warning systems, social protection mechanisms and community-based resilience programmes. Furthermore, interdisciplinary studies that bridge gerontology, public health, climate science and social policy can generate more holistic and actionable evidence.

As policymakers, practitioners and researchers grapple with the realities of a changing climate, it is imperative that the voices, experiences and capacities of older persons are not overlooked. We hope this special feature stimulates further scholarship, informed dialogue and evidence-based action, ultimately contributing to climate-resilient, age-inclusive societies where older persons are protected, empowered and recognized as essential partners in building a sustainable future for all.

We acknowledge with gratitude the patience and diligence of the reviewers who evaluated the articles, assessed methodology and provided constructive feedback for revisions and improvement.

Psychological Impact of Climate Change on Older Adults in India: A Clinical Perspective

- Dr. Deepika Nambiar¹

Abstract

Climate change is increasingly recognized as a major public health concern with significant psychological implications. While older adults are physically vulnerable to environmental stressors such as heat waves, air pollution, and extreme weather events, the mental health impact of these exposures remains underexplored, particularly in the Indian context. This article examines the psychological impact of climate change on older adults from a clinical perspective. The study adopts a qualitative, conceptual approach, integrating clinical observations, existing literature, and established psychological theories. Both chronic stressors (e.g., pollution and heat) and acute events (e.g., floods and displacement) are found to contribute to anxiety, depressive symptoms, emotional dysregulation, and trauma-related responses. Ageing-related factors such as reduced mobility, medical comorbidities, and social isolation further increase vulnerability. The analysis is guided by Erikson's psychosocial theory, the stress-diathesis model, and emotion regulation theory, which together explain how environmental stressors interact with individual vulnerabilities and internal psychological processes. The clinical vignettes from the Indian context illustrate common patterns of distress, including anticipatory anxiety, disruption of routine, and persistent trauma responses. The article proposes a brief clinical framework outlining practical strategies such as emotion regulation, restoration of routine, psychoeducation, and trauma-informed care. It argues that addressing climate change only as an environmental issue overlooks its psychological consequences. Integrating mental health into climate adaptation and ageing policies is essential for supporting the well-being of older adults.

Addressing climate change only as an environmental issue overlooks its psychological consequences. Integrating mental health into climate adaptation and ageing policies is essential for supporting the well-being of older adult

Keywords: *Climate change; Older adults; Mental health; Climate anxiety; Emotional regulation; Pollution; India.*

Introduction

Climate change refers to the long-term changes in the weather patterns and environmental conditions such as rising temperature, changes in rainfall pattern, worsening air quality as well as extreme weather events

like flood, draught, etc. These changes occur due to both natural processes and human activities such as deforestation, industrialisation and the release of pollutants in the atmosphere (Intergovernmental Panel on Climate Change [IPCC], 2023). Over the last few years climate change is increasingly being recognized as a major public health

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Vulnerable populations such as children, women, rural communities and elderly persons were among the most affected by the mental health impact of climate change

issue with important psychological consequences rather than just being viewed only as an environmental concern (World Health Organization [2022]). In India, the effect of climate change is becoming more visible through rising temperatures, worsening air pollution, irregular monsoon patterns, floods, draughts and other extreme weather events. These environmental changes are affecting not only physical health and livelihoods; but it's also impacting emotional well-being and sense of safety. Recent Indian studies suggest that climate related experiences are now part of everyday life for many individuals. Large number of people report unhealthy levels of exposure to severe heat waves, air pollution, water shortages and floods (Verner et al., 2025).

Earlier discussions on climate change were mainly focused on physical health risks, degradation of the environment and economic loss (D'Orazio, 2025). Clyton et al. (2017) and Basistha et al. (2025) in their study reported that climate related stresses tend to worsen anxiety, depression, trauma-related symptoms, feelings of helplessness and chronic stress. It was also found that the emotional functioning and coping abilities were also getting impacted over time due to factors such as environmental instability, frequent exposure to disasters, routine disturbances, limited mobility, financial pressure and concerns about health and safety. The studies further highlighted that individuals who were already struggling with social isolation or health related issues were more vulnerable to the psychological effects of natural disasters such as heat waves, cyclones and floods (Walinski et al., 2023; Basistha et al., 2025).

According to the study done by Basistha et al. (2025), vulnerable populations such as children, women, rural communities and elderly persons were among the most affected by the mental health impact of climate change. Out of these, the elderly

were at a higher risk of experiencing adverse events due to age related factors such as decreased mobility, increased reliance on care-givers, social isolation, diminished capacity to adapt in the face of environmental stress and chronic sickness. Due to this, coping with climate change situation may become more challenging during old age. When it comes to the mental health impact of climate change on elderly, a number of studies in India found a link between air pollution and mental health issues (Jana et al., 2022; Kaur & Pandey, 2021). They found that air pollution was linked to feelings of sadness, insomnia, respiratory issues and cognitive impairment in the elderly. The review of literature also indicated that older adults who were impacted by disasters such as floods kept feeling anxious, insecure and even showed symptoms connected to trauma even after a significant time passed after the incident happened (Sackesen et al., 2025).

The review of literature pointed towards another major issue in the area of climate change. It was found that approaches for responding to disaster and adapting to climate change frequently failed to address the psychological needs of older adults. Even though there is growing evidence that environmental stresses do exacerbate psychological issues, mental health remains relatively unaddressed within climate policy frameworks (Basistha et al., 2025; Makwana, 2025). The majority of current solutions towards handling the impact of climate change still prioritize physical survival and infrastructure over the emotional and psychological effects.

The current study thus aimed to fill this gap by taking a clinical look at how climate change is affecting the mental health of Indian seniors. This study examines the pathway through which climate related stresses cause anxiety, depression, emotion dysregulation and in extreme cases trauma

related reactions by taking reference from previous research in this field, psychological theories explaining the mechanism as well as clinical observation giving practical understanding. This research draws on both theoretical and clinical knowledge to argue that climate change is a major environmental problem that contributes to serious mental health issues for the world's ageing populations.

Method

Research Design

This study uses qualitative and conceptual approaches to study the psychological impact of climate change on older persons in India. It is grounded in clinical practice and current theoretical and research-based literature rather than direct empirical findings.

Sources of Data

The analysis is based on three key sources: a) review of literature on climate change and mental health to identify key patterns; b) clinical observation from psychotherapy practice with older adults who present with anxiety, depression and stress related concerns associated with environmental factors; and c) established psychological theories to understand the environmental impact on mental health and guide interpretation.

Theoretical Framework

The current study is grounded in Erikson's theory of psychosocial development (Erikson, 1963) focusing on the stage of ego integrity versus despair, the stress- diathesis model (Lazarus and Folkman, 1984) which focuses on the interplay between stressors and vulnerability and components from theory of emotion regulation by Gross (1998) to understand how older adults manage distress in the context of ongoing environmental stress.

Literature Review Process

A narrative review approach was used with a structured search for relevant literature on climate change, environmental stressors and mental health outcomes among the older adults. Electronic databases including PubMed, Scopus, Google Scholar and PsycINFO were searched for articles published primarily between 2010 and 2026. Key search terms included climate change, older adults, ageing, mental health, air pollution, heat waves disaster trauma. Both Indian and international studies were reviewed to understand the psychological impact of chronic and acute climate related events. However, preference was given more to studies highlighting the Indian population. Publications from organizations such as World Health Organization (WHO), Lancet Countdown and the National Disaster Management Authority (NDMA) were also included to support findings within public health and policy framework. The studies that focused exclusively on the physical health outcomes without psychological relevance were excluded. Priority was given to peer reviewed studies.

Clinical Vignettes

The article also presents anonymous case illustrations from psychotherapy with elderly persons to highlight the impact of climate change on their psychological and emotional well-being by identifying recurring themes. The two cases are presented to give a more realistic understanding of how climate related stressors can impact the elderly in their day-to-day functioning.

Results

Climate Change as a Psychological Stressor in Older Adults

An integrated review of the literature and the clinical insights indicate that climate

Climate change is a major environmental problem that contributes to serious mental health issues for the world's ageing populations

Climate change was also found to be linked to chronic emotional responses such as helplessness, hopelessness, eco-anxiety and feelings of loss associated with environmental degradation and reduced community stability

change operates both as a chronic as well as acute psychological stressor especially among older adults, influencing the psychological well-being of older adults through multiple pathways. Chronic stressors include prolonged exposure to rising temperatures, worsening air pollutions, environmental degradation, water scarcity which in turn causes uncertainty regarding safety and livelihood. The acute stressors on the other hand include sudden and disruptive events such as floods, cyclones, droughts, landslides and heat waves. Unlike other life stressors, climate related stressors are repetitive, cumulative and often unpredictable thus creating a prolonged sense of insecurity and reduced control over one's environment (Clayton et al., 2017; Cianconi et al., 2020)

The review of literature showed that climate change tends to affect mental health through both direct and indirect pathways. Direct exposure to extreme weather events were found to be associated to anxiety, depression, post-traumatic stress disorder (PTSD), emotional shock, grief and trauma related symptoms (Walinski et al., 2023). Indirect effects on the other hand emerges through displacement, disruption of routines, financial insecurity, loss of social support, food and water insecurity and fear of uncertainty (Cianconi et al., 2020). The psychological burden of climate change could extend beyond immediate disasters and continue long after the environmental event has passed.

Climate change was also found to be linked to chronic emotional responses such as helplessness, hopelessness, eco-anxiety and feelings of loss associated with environmental degradation and reduced community stability (Clayton et al., 2017). When it comes to ageing adults, such emotional responses may become more intense when they combine with the

natural consequences of ageing process such as declining health, reduced independence, bereavement and limited social network. Environmental instability therefore; intensifies pre-existing emotional vulnerabilities and contributes to psychological strain

A combination of biological, psychological and social factors increases the vulnerability of older adults. Physiological ageing which is associated with reduced adaptive capacity, chronic illness causes lower tolerance to heat and pollution exposure. Many older adults experience isolation, financial dependency, reduced access to healthcare and disaster related resources which tends to limit their coping ability during climate related crises (Basistha et al., 2025). Studies have further shown that displacement, material loss and lack of social support significantly increased the risk of depression, anxiety and trauma related symptoms following climate disasters (Walinski et al., 2023).

This becomes more important within the Indian context because a large proportion of older adults continue to depend on climate sensitive conditions for health, livelihood and social functioning. Rapid urbanization, overcrowding and weakening of traditional support system have further increased vulnerability among ageing population (Basistha et al., 2023). Evidence from the Longitudinal Ageing Study in India (LASI) indicated that depression among older adults was closely associated with poor physical health, reduced social participation, limited mobility and loneliness (Paul et al., 2025). Climate related stressors tend to interact with these existing vulnerabilities and intensify emotional distress.

Indian studies have also shown association between air pollution and psychological outcomes such as depression, sleep disturbances, respiratory distress and cognitive decline among older adults (Kaur

and Pandey, 2021). Heat waves were also found to be linked with increased psychiatric emergencies emotional exhaustion, irritability and reduced psychological well-being (Walinski et al., 2023). The findings suggest that climate change acts not only as an environmental threat but as an ongoing psychosocial stressor that significantly affects the emotional well-being and quality of life of older adults.

Theoretical Perspective

Established psychological theories further helps to understand the psychological impact of climate change in older adults. These frameworks help understand why older adults may respond differently to stressors such as pollution, extreme heat, displacement and disasters.

Analyzing from Erikson's theoretical perspective, older adulthood involves the developmental task of achieving ego integrity i.e. a sense of meaning, stability and acceptance of one's life (Erikson, 1963). Climate related disruptions tends to interfere with their sense of continuity and stability. Research suggests that older adults affected by disaster often experience loss of place attachment, insecurity and withdrawal especially when familiar environments and social connections are disrupted (Cianconi et al., 2020; Kar, 2020).

According to Lazarus and Folkman's (1984) stress- diathesis model environmental stressors interact with existing vulnerabilities to produce psychological distress. Older adults with prior emotional difficulties, chronic illness tends to be more vulnerable to the psychological impact of climate change. Indian study by Jana et al. (2022) showed that exposure to air pollution was associated with greater depressive symptoms and cognitive difficulties among older adults with poor health status. Climate stress thus intensifies existing emotional and

physical vulnerabilities rather than acting as an isolated cause of distress.

Emotion regulation theory by Gross (1998) also provides useful insights into how older adults cope with environmental stress. Although ageing is generally associated with improved emotional regulation and greater preference for emotional stability (Charles and Carstensen, 2010), prolonged and uncontrollable environmental events can overwhelm coping capacity. Pollution related restrictions and environmental uncertainty lead to irritability, loss of sense of control, sleep issues and withdrawal (Burke et al., 2018; Lancet Countdown India, 2023). This reduced sense of control then contributes to helplessness, fear and emotional exhaustion (Clayton et al., 2017)

These frameworks collectively suggests that climate- related distress in later life emerges through the interaction of environmental exposure, ageing related vulnerabilities and psychological coping processes.

Clinical Vignettes: Lived Experiences of Climate Stress

The following vignettes illustrate how climate related stressors are experienced by older adults in real life contexts. These vignettes are intended to provide clinical examples rather than represent the experiences of all older adults. They were selected because they reflected recurring themes and patterns observed in review of literature.

Case 1: Air Pollution (Urban Context- Delhi)

Mr. R a 62-year-old retired professional from Delhi who was pre-morbidly well-functioning but had mild respiratory issues. He presented with complaints of persistent low mood, excessive health related worry, sleep disturbances and reduced interest in daily activities. During interview he reported feeling "mentally stuck" and increasingly irritable over the past few

Older adults with prior emotional difficulties, chronic illness tends to be more vulnerable to the psychological impact of climate change

Air pollution, a chronic stressor interacted with ageing related vulnerabilities such as health concern and reduced flexibility in routine leading to a disruption of daily structure and caused hyper vigilance

months. On further exploration it could be seen that his symptoms started during the time when Delhi was experiencing extreme air pollution. Visible smog, continuous media coverage and medical advice to stay indoors led him to feel anxious, increased his feelings of instability and loss of control as it restricted his outdoor activities. Previously he had a well-structured routine which involved morning walks and social interaction which now stopped. This resulted in reduced physical activity, social isolation and perceived loss of independence. The client reported that he began to frequently monitor air quality and became preoccupied with bodily symptoms particularly related to breathing.

Clinical understanding : In this case, air pollution, a chronic stressor interacted with ageing related vulnerabilities such as health concern and reduced flexibility in routine leading to a disruption of daily structure and caused hyper vigilance which then contributed to anxiety and depressive symptoms.

Case 2: Trauma following Flood Experience (Kerala Floods Context)

Mrs. S, 68-year-old women presented with disturbed sleep, recurrent fear and social withdrawal. She was currently living with her son in Bangalore but had previously resided in a flood affected area in Alappuzha during the Kerala floods of 2018. On clinical case history taking, she reported of experiencing

heightened anxiety with significant physical symptoms like palpitation, excessive sweating, breathlessness, crying spells, giddiness. This happened more during periods of heavy rainfall which was accompanied by intrusive memories of water entering home and the urgency of evacuation. Occasional nightmares were also reported. She reported of avoiding discussions around the topic of flood and refrained from watching news related to natural disaster. When spoken to her family they said that even they observed increased withdrawal and reduced engagement from her side during the monsoon season, during which she would also show fear and anxiety of being left alone. Despite being in a safer environment, the patient was continuing to express a sense of insecurity and fear. Although the event occurred several years earlier, she continued to experience distress.

Clinical understanding: This case reflects persistent trauma related symptoms that followed an acute climate related disaster. Her symptoms indicate incomplete processing of traumatic experience. The vignette highlights the long-term psychological impact of climate disasters which tends to effect feelings of safety, place attachment and continuity in later life.

Integrated Understanding of the Vignettes

As seen in table 1, across the two cases it

Table 1 : Themes Emerging from Clinical Vignettes

Case	Climate Stressor	Trigger	Themes Identified	Psychological Impact on Older Adults
Case 1 (Delhi)	Air Pollution (Chronic)	Restricted outdoor activity, premorbid respiratory issue	Loss of routine, health anxiety and social withdrawal	Anxiety, Depressive symptoms and sleep disturbances.
Case 2 (Alappuzha Floods)	Flood (Acute)	Rainfall cues, trauma memory	Unresolved trauma, fear conditioning, avoidance	Hypervigilance, PTSD symptom, emotional dysregulation, withdrawal

Note: Themes derived from composite clinical vignettes illustrating climate related psychological stress in older adults

is evident that climate- related stressors whether chronic (air pollution) or acute (floods) interacted with ageing related vulnerabilities to produce varied psychological outcomes. The distress is often mediated by factors such as loss of routine, perceived threat to health and life, reduced autonomy and social disconnection.

Discussion

Integrated Understanding of Findings

The findings of the current study suggests that climate related stress does not function as a single isolated factor; but, it operates by intensifying already existing emotional and social difficulties which are part of later life. Both literature as well as clinical observation showed that climate related acute and chronic stressors were strongly associated with psychological symptoms such as depression, anxiety, hypervigilance, sleep disturbance, emotional outbursts, mental exhaustion, intrusive thoughts and memories and avoidance behavior. The findings further suggested that the psychological impact of climate stress is often mediated through experiences of uncertainty, reduced autonomy, routine disruption and perceived threat to safety and health. Older adults with prior physical health issues, lack of financial independence, absence of adequate social circle and interpersonal connections find it more difficult to cope with these challenges.

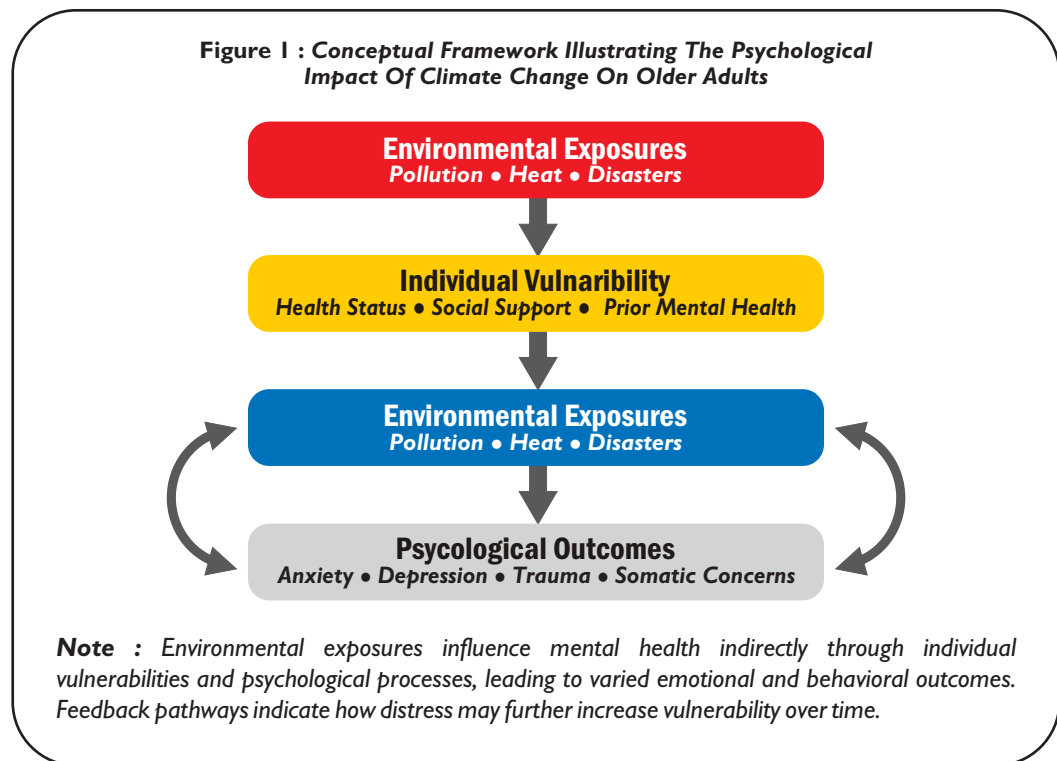
This interaction between environmental factors and existing vulnerabilities was one of the most important things highlighted both in review of literature and clinical cases. Another important observation was that climate related distress often tends to continue even after the passage of the immediate environmental threat and comes in the

way of older adults healthy functioning. As noticed in one of the clinical cases where trauma induced responses persisted years after the incident, causing the client to feel emotionally and physically unsafe, increased her insecurity, sensitivity to environmental cues and gave feelings of lack of stability. Health anxiety was seen as a major consequence of chronic stressors like air pollution, heat waves. Older adults also showed problems in regulating their emotions which was contributed largely due to feeling of loss of control and fear of uncertainty. Thus, the findings of the current study show that climate change affects older adults not only through direct environmental exposure but also through its influence on emotional security, coping ability and sense of control in life.

Conceptual Synthesis

The current study presents a conceptual pathway explaining the psychological impact of climate change on older adults. As seen in Figure 1, this impact happens through three interconnected layers. These three layers interact dynamically rather than independently. The first layer consists of environmental exposure (pollution, heat, disaster) which consists of stressors that create uncertainty, disruption and perceived threat to health and safety. Second layer is of individual vulnerability (health status, social support, prior mental health) which are the ageing related vulnerabilities that increase psychological risk. These vulnerabilities intensify emotional responses to climate related events. Lastly, the third layer is psychological mediation (perceived threat, fear, loss of control, emotion regulation) which involves processes through which distress is experienced and maintained. Depending on the type and durations of stressor these processes may contribute to anxiety, depression, withdrawal, irritability or persistent

Climate related acute and chronic stressors were strongly associated with psychological symptoms such as depression, anxiety, hypervigilance, sleep disturbance, emotional outbursts, mental exhaustion, intrusive thoughts and memories and avoidance behavior



trauma related distress.

Thus, the model highlights that the relationship between climate change and mental health is context- dependent and mediated by individual and psychological factors. Recognizing this interplay is important for developing effective clinical interventions and policies that are sensitive to the needs of ageing population.

Implications for Practice and Policy

The findings of the study points towards the need for solutions both at clinical and policy levels.

Implications for Clinical Practice

Clinician handling older population especially those facing challenges due to environmental stressors should be mindful about how climate change could have significant psychological consequences. Interventions should be planned catering to the specific need of the individual client. A holistic approach

should be prioritised when handling ageing population. The interventions should be simple, easily accessible and sensitive to the everyday needs of the older adult. As many of these climate stressors cannot be easily controlled thus the focus should be on strengthening older adults coping skills and restoring their sense of stability and control.

Intervention should prioritize teaching emotion regulation skills such as distress tolerance, body relaxation exercises, breathing techniques as well as cognitive restructuring techniques to address catastrophizing tendencies and intrusive thought process. Another very important aspect should be to help older adults learn how to flexibly restructure and maintain their activities of daily living that may have been disrupted due to environmental situations.

Psychoeducation for both older adults and caregivers can help normalize emotional responses and improve coping. Therapeutic interventions should be

planned from trauma care approach especially for older adults exposed to acute events like flood, cyclone, etc. Strengthening social support through family and community engagement should also be a priority. This will help to reduce isolation and improve resilience. Based on the integration of findings from review of literature and clinical cases a brief clinical framework is proposed to guide such interventions, as seen in table 2. Table 2 summarizes the key domains and strategies.

Community based outreach programs strengthening support system and early identification of distress among older adults should be developed and implemented. Training modules for front line workers should have proper guidelines and instructions for recognizing and responding to the psychological concerns of older adults exposed to environmental disaster. Access to geriatric mental health services should be improved within primary care settings. Thus, addressing the psychological impact of climate change

Table 2 : Clinical Framework for Supporting Older Adults Experiencing Climate Related Psychological Distress

Domain	Focus	Strategies
Emotion Regulation	Managing distress	Breathing, relaxation, cognitive restructuring
Routine Restoration	Stability	Indoor routines, structured daily schedule
Psychoeducation	Awareness	Educating patients and caregivers
Trauma-Informed Care	Safety and Processing	Validation, gradual exposure
Social Support	Reducing Isolation	Family engagement, peer contact, community support

Note : This framework is derived from the integration of clinical observation, existing literature and theoretical perspective presented in the study. It outlines practical and low intensity strategies. The framework is intended to guide clinicians, caregivers and community base practitioners in supporting older adults exposed to climate related stressors

Implication for Policy

At the policy level there is a clear need to integrate mental health as an important component in climate and ageing frameworks. Existing initiatives such as National Action Plan on Climate change (Government of India, 2008) should expand their focus to include psycho-logical well-being for vulnerable populations such as older adults. Disaster management frameworks such as the National Disaster Management Authority guideline (NDMA, 2019) should prioritize and incorporate psycho-social care as a core component of preparedness and response.

requires a coordinated, multi-level approach that integrates clinical care as well as broader policy and community-based efforts.

Conclusion

The topic of climate change in the pasthas mostly focused on environmental damage, physical health risks and rising temperatures. The impact of climate change goes beyond these visible consequences and has the capacity to impact how people think, feel and cope with everyday life. The article highlighted that among older adults, climate related stressors such as

The psychological impact of climate change is determined not solely by exposure to these environmental events but also to a large extent on how older adults interpret and understand these experiences, the support that is available to them and their ability to adapt

air pollution, extreme heat, floods and environmental uncertainty tend to have significant psychological consequences such as anxiety, low mood, distress and in extreme cases trauma related responses. These effects further intensify when they combine with old age issues such as chronic health problems, reduced mobility, social isolation and increased dependency. Thus, the findings of the current study shows that the psychological impact of climate change is determined not solely by exposure to these environmental events but also to a large extent on how older adults interpret and understand these experiences, the support that is available to them and their ability to adapt. The clinical examples that were presented in the paper further highlighted that even after the passage of immediate environmental threat the emotional distress continued to impact the day-to-day functioning and overall quality of life. Thus, highlighting the intensity and severity of the psychological impact of climate change.

The article emphasizes on the need to recognize older adults as a psychologically vulnerable population within climate and disaster response framework. Addressing climate change only at the level of

infrastructure and physical health overlooks its broader emotional and psychosocial consequences. Thus, integrating mental health support into climate adaptation strategies, geriatric care and community-based services during disasters planning is extremely essential. The study highlights the importance of adopting a more holistic understanding of climate change. Strengthening mental health awareness, supportive care systems and climate-sensitive intervention to cater to the emotional needs of older adults facing climate related adversities is of utmost importance. Paying attention to these experiences is not just about reducing distress but more importantly about preserving dignity, promoting resilience and supporting healthy ageing in a world with uncertain environmental future.

AI Disclosure

The author acknowledges the use of ChatGPT(OpenAI, GPT-5.5). The tool was used to support language refinement and improve clarity of writing during manuscript preparation. The author takes full responsibility for the originality, accuracy and integrity of the content presented in this paper.

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Disaster Risk Reduction and Age Friendly Societies: Building Resilience Through Community in India

- Anoushka Mukherji¹

Abstract

The concept of 'Liveable' communities is gaining traction and popularity in the changing world. Alongside the AARP's published evaluation guide in 2000 describing liveable communities as including elements that would help older people maintain the quality of life and independence. In a resource scarce country like India where ageing population is challenged with rising disaster frequency, the lived realities of these vulnerable population become especially crucial to examine the implications it has on the political, economic and social characteristics of the country.

The aim of this article is to examine why disaster risk reduction (DRR) strategies fail in protecting the elderly, and how redesigning disaster risk reduction strategy incorporating age-friendly and community-focused models would help solve this problem. Anchored in the Disaster Management Act, 2005, the Sendai Framework, the LASI (Longitudinal Aging Study in India) study, and other literature on age-friendly cities, this article highlights a significant structural deficiency in the current laws: Senior citizens have not been recognized as a vulnerable group in law leading to a lack of adequate constitutional protection under Article 21 and disaster data. The proposed solution is twofold: the broad interpretation of Article 21 of the Constitution to create a justiciable right of age-sensitive disaster preparedness and an operational model of GIS-assisted vulnerability assessment along with elder-focused criteria and community resilience groups. This article argues that age-specific disaster resilience in India needs policy makers, judges, and citizens to approach the security of elderly people as a constitutional priority and not as an administrative postscript.

Introduction

The ongoing drastic demographic changes occurring in India calls for an urgent overhaul of its disaster governance structure. Considering the prediction made by UN Population Fund that the number of older people in India will grow to more than 20% of the total population in 2050, which indicates a growth of nearly 41%, per decade, the link

between aging and disaster vulnerability is one of the key, but least considered issues in India's disaster governance system (UNFPA, n.d.).

The idea of 'liveable communities' or environments aimed at sustaining a high quality of life and independent living throughout the life cycle has gained traction in global policy debates, surroun-

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The ongoing drastic demographic changes occurring in India calls for an urgent overhaul of its disaster governance structure

ding urban planning, public health, and climate adaptation. Both the criteria, used in the evaluation of AARP and the way 'liveability' is defined by the Oxford Dictionary, imply that 'liveability' is a necessary prerequisite for well-being and self-sufficiency of people who might be unable to achieve the former due to certain age-related factors. Nonetheless, in India, this issue has not been part of mainstream disaster risk reduction (DRR) policy discussions (Fathi, Abdullah and Kamil, 2014).

The older persons have been identified as structurally vulnerable groups in disaster situations due to multiple reasons: mental stress, decreased physical mobility, impaired sensory functions, social isolation, and limited economic means. Research conducted on the Indian Longitudinal Ageing Study (LASI, 2017-18) data revealed that older people exposed to disasters have higher levels of poor self-reported health (33.4% versus 23.31%), additional ADL problems, and increased risks of communicable diseases than their non-exposed counterparts (Muhammad et. al., 2024).

The shortcomings in India's present legal and institutional mechanisms in handling these weaknesses could be highlighted through concrete instances from everyday life. While an elderly lady was moved from her residence to a cyclone shelter amidst Cyclone Dana in October 2024 in Odisha's Kendrapara District, she unfortunately died of a heart attack – a situation that indicates the inadequacy of evacuation measures and actual protection. Instances like this are a clear indication of the structural weakness of any emergency management plan taking into account the special needs of the elderly (The Times of India, 2024).

In terms of legislation, the Disaster Management Act of India, 2005, has an evident gap in law and technicality since it

fails to provide legally enforceable duties for the protection of older persons, with its relevant policies acting only as aspirations. In the absence of an extensive interpretation of Article 21 of the Constitution of India, which includes living with dignity and appropriate disaster protection as the right to age, it will be impossible for such frameworks to provide legally mandated measures to prepare elderly citizens against disasters.

From international frameworks, we can learn some lessons. The Sendai Framework for Disaster Risk Reduction (2015-2030) provides a more risk-informed approach to disaster reduction with people-centred initiatives. As per the research conducted based on the principles of the framework by Hung et. al (2024), societies that have high adaptive capacities and actively engage in preparation prior to any disaster have significantly reduced impact of disasters on their senior members compared to societies that use post-rescue strategies to mitigate risks. Likewise, a scoping review by Jia et. al (2025), on age-friendly city policies in China identifies 'care services' and 'social participation' as contributing to around 50% of policy outcomes.

In this article, it is proposed that disaster management in India should undergo a two-fold transformation process: one, which involves a reform of the doctrine and law, whereby geriatric obligations are made a part of the disaster preparedness framework through constitutional interpretation and legislation; and, two, which entails an operationally-oriented change, whereby GIS-based mapping and the inclusion of age-specific indicator systems such as shelter occupancy levels, ADL measures after disasters, and sex-specific information are employed to develop a localised disaster preparedness structure.

Using the experiences of Indian elderly

The older persons have been identified as structurally vulnerable groups in disaster situations due to multiple reasons: mental stress, decreased physical mobility, impaired sensory functions, social isolation, and limited economic means

and relying upon the international literature on the subject, the article seeks to develop a conceptual framework for age-friendly disaster resilience building in India. Furthermore, the ensuing analysis is guided by three interrelated questions: one, what specific legal and practical measures make the disaster risk reduction possible for India's ageing population; two, how the concepts of age-friendly societies help to refine and enhance the above measures; and three, what role community structures may have in implementing the above protection in practice.

Methodology

The article adopts a dual pronged approach combining doctrinal research with an analytical policy methodology to trace the scope of introducing age friendly societies in tandem with Disaster Risk Reduction in India.

The normative legal review systematically analyses the Disaster Management Act 2005, the National Disaster Management Plan alongside the Article 21 of the Constitution of India to gauge the breadth of legal provisions extended to geriatric sensitive frameworks. The article underscores the existing legal technical dearth that can be alleviated through a wide interpretation of Article 21 to obligate age-focused risk migration.

The policy mapping aligns India's disaster management architecture with global frameworks like the Sendai Framework alongside United Nation's looming prediction of a burgeoning geriatric population. Thus, this article comparatively maps international scholarships for integrating with provisions for call for decentralised and community mapping-based DRR interventions in order to develop a comprehensive framework on an expanded ambit.

Finally, the article delves into the lived realities of the elderly population as

illustrative evidence supporting the doctrinal lens to highlight the disproportionate effect of disasters on the vulnerable population. Furthermore, the paper recommends harnessing a GIS-informed methodology, identify areas of high risk by finding areas of intersection between disaster risk and ageing demographics. This will also use proposed elder-specific data, such as shelter occupancy, post-disaster ADL recovery, and sex-disaggregated data, to assess community resiliency.

Result and Discussion

The Vulnerability Nexus: Ageing, Disability, and Disaster Exposure in India

Prior to the discussion it is imperative to understand that Disaster Risk Reduction for the elderly population in India is possible using three interlinked levers: the first lever being enforceable obligations to treat senior citizens as a unique vulnerable section; the second, application of age-friendly principles including participation in society, accessible infrastructure and adaptive designs in communities'; and third, resilience mechanisms at the community level which implement both the law and the policy at the household level. However, before moving on to each of these levers, it is first important to understand why age itself presents vulnerability, because without understanding the extent and manner in which older persons are exposed to disaster risks, it will be impossible to calibrate the legal reform measures, design guidelines, and community mechanisms that come after.

Analysis of the LASI 2017–18 wave showed that Indian elderly exposed to disasters were much more likely to report poor health (33.4% against 23.31%), suffer from deteriorated ADL, and contract communicable diseases after the disaster.

This is because of structural reasons: the lower physiological resistance of older adults due to their inability to maintain body temperature, chronic illness, and necessity of taking prescribed medications make regular shelters unsuitable for them. The case study of death during Cyclone Dana evacuation in Kendrapara demonstrates that while physical evacuation was successful, the lack of medical help required to save the life of an elderly person was not (The Times of India, 2024)(Muhammad et. al., 2024).

Furthermore, gender makes elderly adults even more vulnerable as gendered patterns of isolation, poverty, and limited mobility add to the list of factors, which expose people to risks; however, the lack of sex-disaggregated data in DRR undermines efforts to tailor assistance programs to this population group's needs(The Times of India, 2024).

Legal-Institutional Approach: The Anatomy of Indifference

Having identified the reasons why elderly people in India have high vulnerability to disasters, this section now moves on to explore the first lever for mitigating this vulnerability – legislation and institutional design. From this perspective, an analysis of India's legal instruments demonstrates a structural problem with respect to protections for the elderly. First, although the Disaster Management Act, 2005 recognizes certain 'vulnerable groups,' the statute fails to specify older persons and lacks concrete criteria for ensuring minimum housing requirements and geriatric triaging during disasters. Even the provisions regarding 'age-sensitive planning' under the National Disaster Management Plan do not establish enforceable legal obligations but remain dependent on administrative discretion (Help Age India, n.d.).

The second option involves using

constitutional interpretations to fill the legal gap. Through a broad construction of Article 21 of the Indian Constitution, which includes the right to dignity, health, and a clean environment, the judiciary can determine that the state owes the duty of protection to include measures for disaster preparedness based on age. A judicial recognition of such a duty will make it possible to transform existing policy objectives into enforceable obligations (Disaster Management Act, 2005).

International Frameworks and Comparative Insights

Age-friendly society, defined and described by the World Health Organization Global Network for Age-friendly Cities and Communities (WHO, n.d.) and developed in the academic field of study, is an approach that seeks to adapt its social systems, structures, and governance to promote the well-being and safety of older persons throughout their lifetime. However, it is much more than that, because it involves both physical infrastructure that stays accessible during times of crisis, social networks that do not allow people to become isolated before and after the disaster, care services within emergency response, and institutions that involve older people in planning and decision-making. However, what is vital is that the literature, including the study by Hung et al. (2024) on earthquake resilience and Jia et al. (2025) on policy analysis in China, shows that such societies are not only able to cope with disasters better but actually minimize their risk of occurrence by fostering adaptive capacity, which the reactive rescue-based approach lacks. This is the benchmark for comparison of India's existing DRR system.

Where Indian law remains silent, the practical impact of an age-friendly society in decreasing the risks of disasters becomes apparent through comparative experiences. Three lessons from comparative

Gender makes elderly adults even more vulnerable as gendered patterns of isolation, poverty, and limited mobility add to the list of factors, which expose people to risks

HelpAge India and the Sendai Framework recommend the role of local governance in managing disasters, especially those targeting vulnerable populations

literature are applicable almost instantly. According to Hung et al., community-level adaptive capacity and social involvement of older adults are independent factors in minimizing earthquake-disaster health impacts. Similarly, Jia et al. reveal that about half of the age-friendly policies in China relate to 'care services' and 'social participation'. Lastly, applying the Sendai Framework's four priorities on aging risks in India clearly indicates that each priority has at least one gap in India's DRR strategy. For example, Priority 1 involves age disaggregated disaster data; Priority 3 involves age-appropriate housing guidelines while Priority 4 involves geriatric emergency preparedness (Hung et.al., 2024) (Jia et.al., 2025).

Towards an Integrated Framework: GIS, Community Mapping, and Elder-Specific Indicators

If law supplies the doctrinal lever, this section will provide the mechanics on how to make disaster risk reduction practically feasible through geographic targeting, standardized indicators, and above all, community participation. The proposed operational framework for implementing the policy recommendations involves three major pillars. The first pillar calls for vulnerability mapping using GIS, which will involve superimposing information related to disaster risk with demographic areas with high numbers of elderly people, making it possible to identify critical areas that require intervention, such as Odisha, Assam, Bihar, Andhra Pradesh, and West Bengal, and positioning geriatric medical assistance and shelters in such areas.

The second pillar is concerned with incorporating geriatric DRR indicators into three groups: process indicators, such as the rate of occupancy in shelters and training of first responders in geriatric cases; outcome indicators, such

as the recovery of ADLs post-disaster and the number of deaths caused by disasters among individuals aged 60 years and above; and equity indicators, such as sex-disaggregated data on the disaster experiences of elderly women. These indicators would be used to develop a standardised geriatric DRR assessment instrument for state authorities.

The third pillar involves establishing geriatric resilience committees at the community level. Such committees could include elderly members of the community, CHWs, and local government officials. HelpAge India and the Sendai Framework recommend the role of local governance in managing disasters, especially those targeting vulnerable populations (HelpAge India, n.d.). Practically speaking, there are four distinct activities that these committees can engage in: conducting a door-to-door registration of old and bedridden people in the respective wards; matching each person on the list with one young volunteer who will be in charge of evacuating them in case of disaster and post disaster check in; holding regular sessions on basic geriatric first aid and triage training for ASHA workers and Anganwadi workers employed at local shelters; and sending shelter occupancy figures as well as ADL recovery statistics up to the GIS system mentioned above. In this way, the community pillar gets an operational meaning rather than just advisory, and this is how the first two pillars get delivered to elderly residents.

Conclusion

India currently finds itself at a crucial point in its development as a nation in terms of its disaster management regime. The combination of demographic ageing along with increased frequency of disasters brought about by climate change results in a scenario which is beyond the scope of what the existing legal and operational

DRR regime can handle. It has been shown that this issue in India has systemic origins, namely through the omission of provisions within the Disaster Management Act, 2005, lack of geriatric-specific procedures in emergencies, and lack of statistical reporting of the elderly, especially elderly women, during disasters.

Resources both normatively and empirically are available to rectify this predicament. The international literature ranging from the evidence offered by Hung et al (2024). on age-friendly community resilience to that provided by Jia et al. concerning China's care-oriented policy environment reveals that community integration and social participation, alongside appropriate care infrastructure, are not additional but essential elements for disaster risk reduction in an aging context. The four priorities of the Sendai Framework offer a structure against which Indian shortcomings can be measured and addressed.

The two-fold approach for reform that is put forward in this article is both crucial and attainable. Doctrinally, an expansive reading of the Article 21 of the Constitution of India, either through litigation or law-making, can bring about change that will turn age-appropriate disaster preparedness into a justiciable right rather than an optional administrative one. In terms of action, the three-pronged approach of GIS-based vulnerability mapping, elder-specific DRR indicators, and community-level geriatric resilience committees constitutes a feasible way forward.

The above-mentioned combination of the legislation, the working model, and the community-based measures reveals that reducing disasters among older persons in India is possible, that the successfulness of the measure depends upon the age-

appropriate design of such programs, and that sustainability of such measures rests with communities. In totality, therefore, the above arguments come to the same conclusion, which can be stated as follows. Firstly, any strategy for disaster risk reduction among the aged shall become a possibility of structural nature only if it is made mandatory by law, either through the broad interpretation of Article 21 or by amending the Disaster Management Act, 2005. In the second place, the notion of age-friendly societies, which is understood not only as a welfare system but also as an environment that develops adaptability even before disasters occur, provides the rationale for design that is absent in India's DRR policy; it is evidenced by the research conducted by Hung et al. (2024) and Jia et al. (2025). Thirdly, community is the minimal unit in which law and design are realized; the formation of resilience committees for elderly people, volunteer systems for evacuation purposes, and triaging in connection with ASHAs cannot be regarded as additional tools but as the tool itself.

The case of the death of the elderly woman in the cyclone shelter in Kendrapara district is not an isolated case but, rather, an exact example of the consequence of the absence of these three elements in conjunction with one another. For the building of the age-sensitive disaster resilience of India, there must be a change in mindset by the decision makers, judiciary, civil society, and the citizenry of India regarding the constitutionality of elder security.

AI Disclosure

No AI-assisted tools has been applied by the writer. The research and all the analysis conducted along with the structuring, grammar and referencing are the work of the author.

For the building of the age-sensitive disaster resilience of India, there must be a change in mindset by the decision makers, judiciary, civil society, and the citizenry of India regarding the constitutionality of elder security

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Climate Change and Ageing: Health Vulnerabilities and Resilience

- Basabadatta Jena¹ and Dr. Tattwamasi Paltasingh²

Abstract

Climate change has been identified as one of the most serious threats to global health in the twenty-first century. As resilience declines with age, older persons become more vulnerable to hazards of climate-change. The intersection of population ageing and climate change highlights the importance of climate gerontology. Understanding and addressing the health impacts of climate change on older populations is therefore an urgent global priority. In this context, this paper employed the Preferred Reporting Items for Systematic Review and Meta Analysis (PRISMA) framework to examine scholarly articles published between 2010-2026 to address climate change risks and their implications on the health vulnerabilities of the ageing population in India. Additionally, the review highlights existing literature on strategies aimed at strengthening climate resilience among older people.

Using PRISMA, this paper identified 12 studies which reflect the adverse effect of climate change on physical and psychological health of older people. While vulnerability to climate change is further shaped by socio-economic status, gender and environmental factors; resilience depends on familial, community and policy support. To fill the research gap future research should comprehensively examine heterogeneous experience of older people to support equitable climate adaptation and promote healthy ageing.

Keywords: *Older persons, Healthy ageing, Climate change, Vulnerabilities, Environmental Influences*

Climate change has emerged as a major public health concern due to its extensive impact on the physical and mental well-being of human beings

Introduction

Climate change is a global emergency involving long-term alterations in earth's temperature, weather patterns, and environmental conditions (Hafeznia et al., 2026). In addition to its environmental consequences, several studies (Wang et al., 2025; Mukhopadhyay and Weitz, 2022) demonstrate that climate change has

emerged as a major public health concern due to its extensive impact on the physical and mental well-being of human beings. Elevated ambient temperatures increase the incidence of heat stress-related illness. It also intensifies drought conditions and wildfire activity, thereby deteriorating air quality, which in turn exacerbates respiratory diseases such as asthma, cardiovascular diseases, heat stroke, cognitive impairment, post-traumatic stress disease

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Although climate change poses substantial health risks to ageing, resilience is increasingly recognised as dynamic and context dependent process; shaped by accumulated life experience and access to individual, familial, community and institutional resources

[PTSD] (Montoro- Ramírez et al., 2025; Hafeznia et al., 2026). A report by World Health Organisation (WHO, 2023) shows that climate induced hazards are anticipated to cause over 250,000 additional mortalities between 2023 to 2050 due to a combination of nutritional, infectious and mental health impacts. Many studies (Montoro-Ramírez et al., 2025; Jena and Paltasingh, 2024; HelpAge India, 2016) indicate that older persons are more susceptible to climate change than other age cohorts due to age-related physiological changes, multi morbidity and functional limitations that constrain their ability to cope with climate-related health risks. Population projections indicates that by 2050, one in six people worldwide will be over 65 years or above (United Nations Population Fund [UNFPA], 2017).

India is also experiencing demographic shifts, with a rapidly ageing population (Government of India, 2021). Population ageing and its vulnerability to climate change represents a crucial public health concern (Paltasingh and Jena, 2021; 2022). Although climate change poses substantial health risks to ageing, resilience is increasingly recognised as dynamic and context dependent process; shaped by accumulated life experience and access to individual, familial, community and institutional resources (Ugwu et al., 2026). Accordingly, examining both, climate related health vulnerabilities and resilience among older people is crucial for developing effective adaptation strategies and public health policies that support healthy ageing, in the context of climate change.

With this background, the first section of the article focuses on overview of climate change and ageing. It seeks to (i) examine the climate change-related health vulnerabilities experienced by older people in India by synthesizing evidence from existing studies; (ii) explore the resilience mechanisms and adaptation

strategies identified in existing literature for protecting the well-being of older people; (iii) suggests policy measures to promote healthy ageing in the Indian context.

Climate Change and Ageing

Physiological resilience to heat waves, extreme temperatures decline with age (Åström et al., 2011). According to Wang et al. (2025), the effect of climate change on older persons extends beyond physical health and can also negatively affect mental health. Certain medications may further impair thermo regulation, while cognitive conditions, such as dementia risk can limit awareness of environmental risk and reduce protective responses (Seritan, 2023). Social circumstances, including living alone, physical dependency, and residence in long-term facilities, further increases the vulnerability of ageing individuals during periods of severe heat and environmental stress.

Developing countries (countries with lesser revenue and economic development as described by the World Bank) are disproportionately affected by climate hazards (Mukhopadhyay and Weitz, 2022; Sarkar et al., 2023). Many of these nations continue to experience persistent socio-economic challenges, including poverty, inadequate infra-structure, and limited access to essential services. Such conditions reduce their capacity to prepare for and respond to climate-related risks (Islam and Winkel, 2017). Countries such as India and China have achieved significant economic and health care improvements, whereas several nations in Sub-Saharan Africa and Southeast Asia continue to struggle with widespread poverty and insufficient health care infrastructure (Sarkar et al., 2023).

As a result, the vulnerable population in these regions, particularly ageing indivi-

duals, face increased exposure to heat-related illness, and mortality associated with extreme weather events (Hafeznia et al., 2026). The WHO (2026) report states that global heat related mortality among older persons has increased by 85% since the 1990s. In India the corresponding increase of mortality among individuals age 65 years and above was 55% between 2000-2004 and 2017-2021. The highest number of heatwaves related mortality among older persons was reported in Rajasthan and Uttar Pradesh (Sharma, 2025, August 26). These mortality patterns reveal growing significance of climate gerontology in exploring climate vulnerability among ageing population.

Methodology

This article used Systematic literature review (SLR) following Preferred Reporting items for systematic reviews and meta-analysis (PRISMA)(Page et al., 2021). This approach was selected to ensure transparency, and comprehensive synthesis of existing scholarly literature related to climate change and ageing. Both authors conducted the screening procedure, applied the eligibility criteria and selected the studies included in the review.

Study Identification and Search Strategy

A systematic literature search was conducted to identify studies on the effects of climate change on the health of ageing population in India. Relevant studies were retrieved from databases, including Scopus, Web of Science, Science Direct, with additional manual search through google scholar to identify relevant studies not indexed in these databases. The search employed combinations of keywords with Boolean operators (AND/OR), covering “climate change”, “global warming”, “heat waves”, “cold waves”, “climate hazards”, “extreme weathers”, “older adults”, “older

people”, “ageing”, “elderly”, “health”, “vulnerability”, “resilience”, “adaptation”, and “India”. Various combination of these terms was used across databases to ensure a comprehensive search.

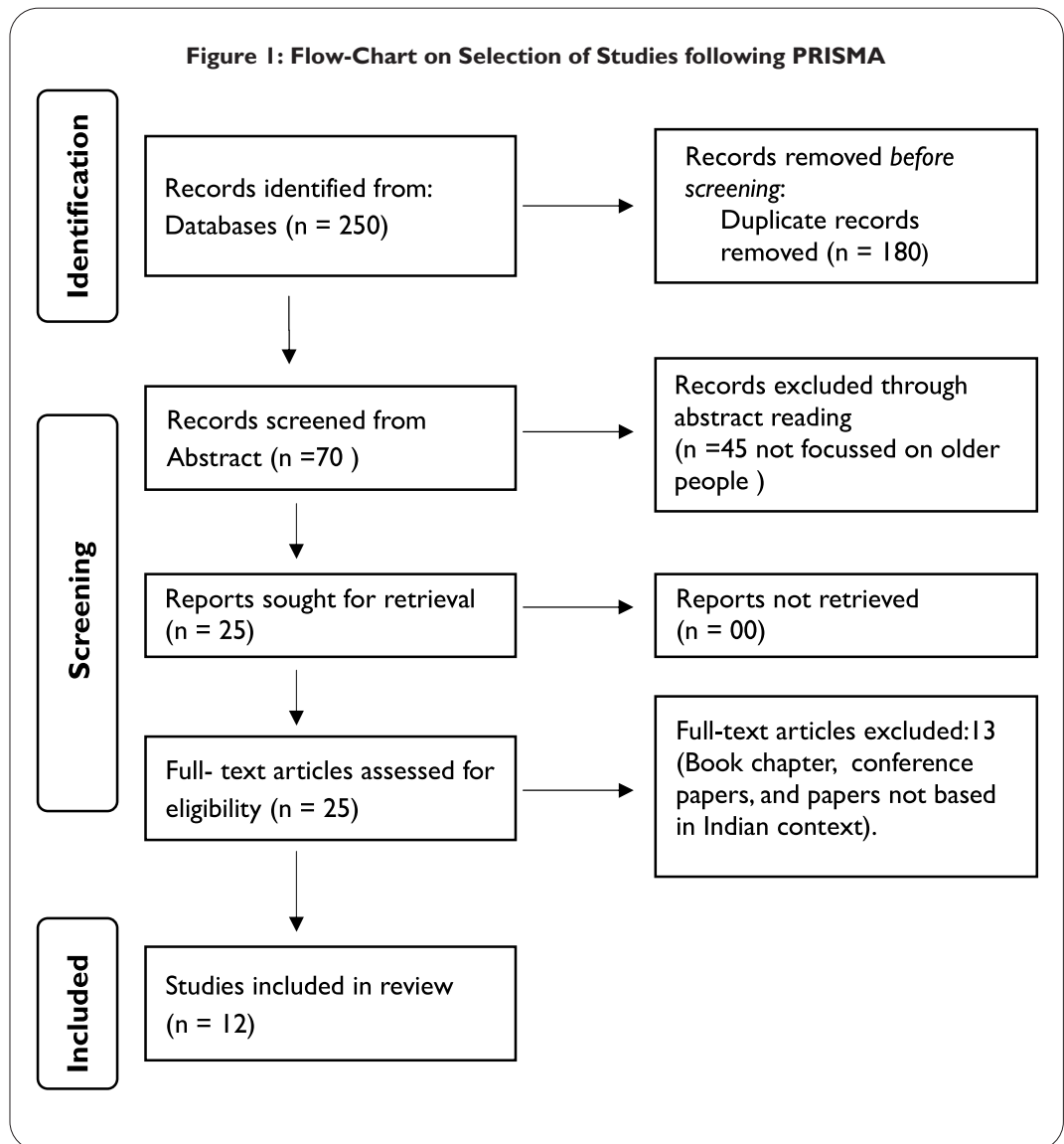
Inclusion and Exclusion Criteria

Title, abstract and full-text were screened based on pre-defined inclusion and exclusion criteria. The inclusion criteria comprised studies: (i) focusing on older persons aged 60 years and above, as the Indian Census classifies individuals aged 60 years and above as older persons; however, some studies including participants both below and above 60 years were also considered as it reported findings specifically relevant to older people. Both, the review and empirical studies published in English Language between 2010-2026 were included. (iii) Both review and empirical studies published in English language between 2010-2026 focusing on the implication of climate change on ageing within Indian context were considered eligible for inclusion (iv) Book chapters, conference proceedings, editorials and non-English language articles, and studies that did not focus on older people or in Indian context were excluded from this review study.

Study Selection

Following PRISMA guidelines (Page et al., 2021) a total of 250 records were identified through manual searches and databases. After removing 180 duplicates, 70 studies were screened based on titles and abstracts. Following screening, 25 full-text articles were assessed for eligibility. Of these, 13 articles were excluded because they were book chapters, editorials or were not focusing on India. Following the screening process, about 12 studies complied with inclusion criteria and were included in this systematic review.

Figure 1 presents the details of the selection of included article for analysis.



Results and Findings

This section analyses the summary of the included study, the implications of climate change on the health of the ageing population in India and resilience strategies adopted included in the existing studies. Table I describes the summary of the included studies. The publication year of the sample studies

ranged from 2020-2026, with a noticeable increase in relevant publications during 2025 and 2026. Majority of the studies (n=10) were empirical and used quantitative methods (n=9), one study used qualitative method, while the remaining two were review papers (see Table I)

Table 1: Summary of the Included Study

Study	Study Type/ Methodology	Sample	Objective	Key Findings
Kalaiyarasi and Rajkumar(2020)	Review	-	Implication of climate change on health of older people	Extreme heat and cold, air pollution, and geographic location increases vulnerability of elderly to climate related health risks.
Weitz et al., (2022)	Empirical /Quantitative	130 urban elderly and 180 rural elderly in Kolkata	Explore the individually experienced heat stress among rural and slum dwellers older people	Older people living in slum areas are more likely to be exposed to heat stress than their rural counterparts.
Mukhopadhyay and Weitz(2022)	Empirical/ Quantitative	130 slum dwelling elderly and 180 rural elderly in West Bengal	Assessed heat stress symptomatology, perception on comfort and coping behaviour among the older population residing in slums and rural areas	The occurrence of most heat-related symptoms was significantly higher among older women, whereas elderly men and rural residents reported using a wide range of heat coping behaviours.
Yadav et al. (2024)	Empirical/ Quantitative (Using LASI Wave-I) data	72, 250 aged >45 years across all states in India	Employed Wave-I (2017-18) of Longitudinal Aging Study in India (LASI) to assess disaster related impacts on human health	Psychological health is the predominant climate- induced disaster related health concerns, with education level and rural residence emerging as key social determinants of vulnerability
Darunkar and Kamble(2025)	Empirical/ Quantitative	200 older people and 300 >40 years old in Central India	Assessed the health impacts of heat waves on older people and outdoor workers	Older people commonly experience heat-related conditions such as heat rash, sleep disturbance, heat stroke, hypertension
Makwana (2025)	Review	-	Assessed the national and international literature on psychological health effects of climate change among older people in the Indian context	Older people are disproportionately affected by heatwaves, with key mental health outcomes including depression, PTSD, anxiety and suicide
Wang et al, (2025)	Empirical/ Quantitative (Using LASI Wave-I) data	67000 individuals aged >45 years and above	Examined the implications of heat exposure and climate change on the health of older people in ten Indian states using the Longitudinal Ageing Study of India [LASI] (Wave-I) data	Heat exposure has a substantial effect on the physical and mental health of older people
Dutta et al., (2025)	Review	-	Implications of climate change and vulnerabilities on ageing women in North-east India	Climate change involves both environmental and socio-economic challenges that affect people's ability to cope with this impact

Rajagopalan and Wang (2026)	Empirical/ Quantitative (Using LASI Wave-I data)	72, 250 aged >45 years across all states in India	Examined the association between heat exposure and health outcomes among older people in India	Heat exposure has a substantial effect on the physical and psychological health of older people
Yadav et al., 2026	Empirical/ Quantitative (Using LASI Wave -I data)	72, 250 older people across India	Effect of water-related disaster(Flood/cyclone on water-related infectious disease among older people	Older people are vulnerable to water-related infectious diseases after water-related disasters
Khanduri et al., (2026)	Empirical/ Quantitative (Using LASI Wave -I data)	14, aged >45 years across all states in India	Explored the association between cumulative extreme heat exposure and stroke among older people using LASI Wave-I (2017-18) data	Prolonged exposure to extreme heat days associated with higher stroke prevalence among women, urban residents, less educated individual.
Wani et al. (2026)	Empirical Qualitative	22 elderly in Kashmir	Explored influence of climate change on health, and lives of older people in Kashmir	Climate change worsens health challenges such as respiratory illness, limit access to basic services

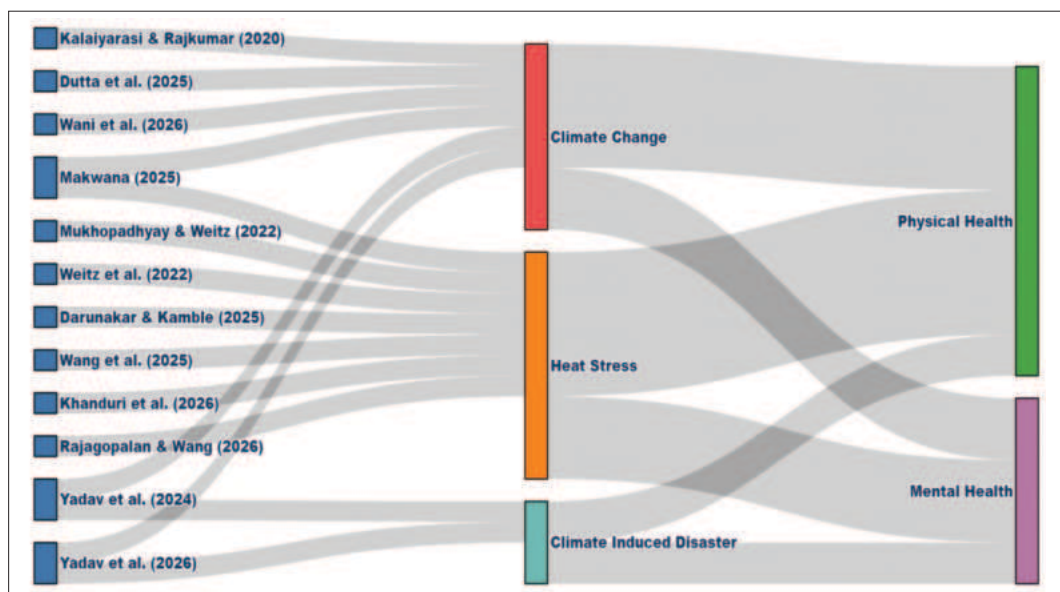
Source: Drawn from included sampled studies

Implications of Changing Climate on the Health of Older People

The existing literature (Kalaiyarasi and Rajkumar, 2020; Dutta et al., 2025; Wani et al., 2026) highlighted the substantial

effect of climate change on health of older persons. The synthesis of existing studies identified three major themes: (i) effects on physical health of older people (ii) climate change and psychological health of older people ; (iii) health inequalities and vulnerabilities.

Figure 2: Studies Reflecting Climate Exposure and Associated Health Effects



Effect of Climate Change on Physical Health of Older People

Heat exposure was the most frequently examined climate hazard across the reviewed studies (Weitz, 2022; Mukhopadhyay and Weitz, 2022; Darunakar and Kamble, 2025) and was consistently associated with adverse physical health outcomes among older people (see Figure 2). Age related physiological changes, included impaired thermo-regulation, reduced sweating capacity, and diminished cardiovascular efficiency; increased susceptibility to heat related illness such as heat stroke, dehydration, cardiovascular complications, kidney injury and mortality (Makwana, 2025; Khanduri et al., 2026). Additionally, acute effects of health exposure exacerbated the pre-existing chronic conditions among older persons (Rajagopalan and Wang 2026). Studies (Yadav et al., 2024; 2026) indicate that climate related health impacts extended beyond extreme heat.

The water related disasters, including floods and cyclones increased the risks of communicable diseases. Seasonal climatic variability further contributed to respiratory illness, asthma, chronic obstructive pulmonary disease among older persons (Makwana, 2025).

Climate Change and Psychological Health of Ageing

Figure 2 further reflects that mental health impacts were also associated with climate change in several studies (Wang et al., 2025; Rajagopalan and Wang, 2026; Makwana, 2025). Prolonged exposure to extreme heat contributed substantially to mental distress, anxiety, depression, fatigue, and reduced life satisfaction (Wang et al). These effects were not solely attributable to thermal discomfort; but, were also linked to declining mobility and uncertainty regarding coping with extreme weather.

Using LASI Wave-I data, 2017-18, Yadav et al.(2026), described that climate induced disasters further intensified psychological vulnerability. Floods and droughts were associated with higher levels of depression, anxiety, post-traumatic stress disorder, and emotional distress among older people. A Qualitative study conducted in Kashmir by Wani et al(2026) reinforcing these findings reported that climate variability resulted in deteriorated health of older people, leading to emotional stress and neglect arising from combined pressure of environmental change and inadequate support system.

Health Inequalities and Vulnerability

Studies (Mukhopadhyay and Weitz, 2022; Weitz, 2022) showed that climate change disproportionately affected older persons. Climate related vulnerability was shaped by the intersection of gender, place of residence, socio-economic status, existing inequalities resulting in substantial disparities in health outcomes. Gender emerged as a major determinant of vulnerability (Wang et al., 2025). Several studies (Yadav et al, 2024; 2026; Dutta et al, 2025) reported that older women experienced greater heat exposure and a higher prevalence of heat-related symptoms than older men. According to a study by Weitz et al (2022) in Kolkata city stated that older women were four times more likely to experience heat stroke than the older men. Similarly, Dutta et al (2025) stated that older women in rural communities experienced disproportionately substantial health risks because existing gender inequalities intersect with climate related vulnerabilities.

Regional disparities were also evident as rural older persons generally experienced substantial exposure to extreme climatic conditions and faced limited access to

Age related physiological changes, included impaired thermo-regulation, reduced sweating capacity, and diminished cardiovascular efficiency; increased susceptibility to heat related illness such as heat stroke, dehydration, cardiovascular complications, kidney injury and mortality

healthcare and adaptive resources than urban populations (Khanduri et al., 2026; Weitz, 2022). Although urban slum residents were also highly exposed; nature of vulnerability differed, reflecting variations in housing conditions, infrastructure and occupational exposure (Weitz et al., 2025). Socio-economic disadvantages such as lower income, financial dependence, limited education further compounded climate related health risks among older persons (Rajagopalan and Wang, 2026).

Resilience Approaches Highlighted in the Existing Studies

The literature evidence reflected three broad and interlinked resilience strategies that emerged for reducing climate vulnerability among the older persons.

Structural and Environmental Resilience Strategies:

The existing studies (Wang et al., Mukhopadhyay and Weitz, 2022) consistently emphasized reducing heat exposure through environmental and housing related adaptations like climate resilient construction materials, passive cooling features. These were highlighted as more important in urban slums where poor building conditions intensified heat stress. Strengthening the built environment and ensuring basic infrastructure access for reduction of climate vulnerability among older persons was one of the effective strategies (Wang et al., 2025)

Institutional and Policy-Level Resilience Strategies

The existing studies (Mukhopadhyay and Weitz, 2022; Darunkar and Kamble, 2025) strongly supported the role of structured public health governance interventions in mitigating heat-related risks in India. Drawing from global examples like Heat

Action Plans, (heat) early warning systems implemented in cities like Hong Kong, Florence, and Ahmedabad were identified as effective tools for reducing morbidity and mortality during extreme heat (Wang et al., 2025; Kalaiyarasi and Rajkumar, 2020). This highlighted the crucial requirement for similar nationwide policies to safeguard the older persons, especially vulnerable populations in high-risk regions. In addition, the expansion of health insurance coverage, social protection schemes were shown to reduce adverse health outcomes, while improved surveillance and targeted interventions strengthened nationwide preparedness for climate gerontology (Yadav et al., 2026; Makwana, 2025).

Social, Behavioural and Community - based Resilience Strategies

The studies (Rajagopalan and Wang, 2026; Yadav et al., 2024) highlighted that resilience among older people also depended heavily on social support systems and behavioural adaptations. Community-based interventions such as inter generational programmes helped reduce isolation and strengthened the social capital. Promoting training programme for frontline workers (ASHA, ANMs and local volunteers in geriatric psycho social care) enabled early identification of distress and improved referral system (Kalaiyarasi and Rajkumar, 2020) Given India's lesser mental health workforce, the studies (Dutta et al., 2025; Yadav et al., 2026) emphasised the role of community embedded approaches, such as digital mental health platforms, tele-counselling services and integration of geriatric psychosocial care into the primary health system. Overall, the resilience depended on accessible, responsive health care for the ageing population.

Policy Recommendations

- (i) Primary health care system should be strengthened with age- friendly climate health services, including routine screening and integration of mental health support.
- (ii) Community-based support networks should be strengthened to enable early identification of vulnerable older people and improve emergency response.
- (iii) Digital literacy programmes should be promoted to enhance accessibility of older people to climate related information, emergency communication platforms and essential services.
- (iv) Resources should be allocated to expand geriatric health services particularly in rural and climate vulnerable regions.

Conclusion

The studies on climate change on psychological health of older people and

other climate related hazards remains underexplored. This systematic review showed that research on climate change related health impact among older people in India remained limited to and largely focussed on heat exposure. Climate change adversely affects the physical and psychological health of older people, with substantial vulnerability among older people in rural residence, those from socio-economically disadvantaged backgrounds and older women. The vulnerability is shaped by interconnected physical, social and environmental factors, while resilience depends on familial, community and policy level actions. Future research should adopt a more comprehensive and nuanced approach to understand differential vulnerabilities and to support equitable climate adaptation and healthy ageing policies in India.

AI Disclosure

No Artificial Intelligence(AI) tool has been used by the authors in the preparation, writing , generation of this article, and the article is not AI generated .

Climate change adversely affects the physical and psychological health of older people, with substantial vulnerability among older people in rural residence, those from socio-economically disadvantaged backgrounds and older women

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Calendar

2025

10th - 14th July 2025

The 5th European Conference on Aging & Gerontology (EGen2025)

London, United Kingdom

Organized by: The International Academic Forum

Contact person: Organising Secretary

Website: <https://egen.iafor.org/>

9th - 12th September 2025

IFA 17th Global Conference on Ageing

Cape Town, South Africa

Organized by: International Federation on Ageing

Contact person: Xavier Rodrigues

Website: <http://www.ifaconf.ngo>

4th - 7th October 2025

5th Interventions in Ageing Conference

St. Julians, Malta

Organized by: Fusion Conferences

Contact person: Rosie Johnson

Website: https://www.fusion-conferences.com/conference/181?utm_source=Fusion&utm_medium=Weblistings&utm_campaign=Aging25

17th - 18th October 2025

9th International Workshop on the Socio-Economics of Ageing (IWSEA)

Lisbon, Portugal

Contact person: Paula Albuquerque

Website: <https://9th.iwsea.pt/>

22nd - 24th October 2025

Ageing and Social Change: Fifteenth Interdisciplinary Conference,

Linköping University,

Norrköping, Sweden

Organized by: Common Ground Research Networks

Contact person: Alba Lopez Fahay

Website: <https://agingandsocialchange.com/2025-conference>

14th - 16th November 2025

3rd Global Conference on Ageing and Gerontology

London, United Kingdom

Contact person: Romina Dellucci

Website: <https://www.agconf.org/>

24rd - 25th November 2025

4th Global Conference on Ageing and Gerontology

Barcelona, Spain

Palliative Care and Pain Management in Older Adults

Website:

<https://aging.conferenceseries.com/>

9th - 11th December 2025

Towards Healthy Brain Ageing: Bridging Biology, Lifestyle, and Therapeutics

Daegu, Korea (South)

Contact person: Laura Frampton

Website: https://natureconferences.steamgo.live/towards-healthy-brain-ageing/register?utm_medium=EventBoard&utm_source=Conal&utm_campaign=MLSR_NATCF_CFUL_GL_PCFU_05R7U_

2026

22nd - 27th March 2026

The 12th Asian Conference on Aging & Gerontology (AGen2026)

Tokyo, Japan

Organized by: The International Academic Forum (IAFOR)

Contact person: Organising Secretary

Website: <https://agen.iafor.org/>

21st - 22nd April 2026

Longevity and Healthy Ageing: New Perspectives from Psychology, Neuroscience, and Medicine

Cairo, Egypt

Contact person: Julia Kovalenko

Website:

<https://www.cognitivesciences-rg.com/>

21st - 22nd May 2026

International Conference on Gerontology and Healthy Aging

Porto, Portugal

Organized By : ISIT

Contact Person : Nathan Vincent

Email ID : info@isit.org.in

28th - 29th May 2026

International Conference on Gerontology and Elder Care Practices (ICGEC-26),

Poznan, Poland

Organized By: ISSER

Contact Person : Thomas

Email ID: info@issersociety.com

29th - 30th May 2026

International Conference on Gerontology and Healthy Aging (ICGHA- 26)

Jakarta Raya, Indonesia

Organized By: ASPHER

Contact Person; Eunice Pinto

Email ID: support@aspher.net

30th - 31st May 2026

International Conference on Gerontology and Elder Care Innovations (ICGECI-26)

Dakar, Senegal

Organized By: ISER

Contact Person: George Mathew (Abroad)

Email ID: info@iser.org.in

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But for many elders, the struggle hasn't paused. They live alone, face poor health, lack financial security and often have no one to turn to. We'd be honoured to have your kindness back in their lives.

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The paper should be only on issues concerning ageing and aged in India. The manuscript should be typed in double space with a wide margin and should not exceed 4000 words. The title page should carry the title of the paper, name and affiliation of the author/s. The official designation and official address should be typed at the bottom of the first page of the script. The paper should be divided into Abstract, Introduction, Material and method, Results and discussion, conclusion, acknowledgements (if any) and references. Tables should be given in Arabic, serial number and each table on a separate page. References should be listed at the end of the paper in alphabetical order and they should include only works referred to in the text. The format for the reference is:

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2. Books: Surname and initials of the author(s).Year of Publication. Title. Edition. Place of Publication. Name of Publisher.

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Published and Printed by:

Policy Research and Advocacy Department
On behalf of HelpAge India,
C-14 Qutab Institutional Area
New Delhi-110016

Published at:

HelpAge India
C-14 Qutab Institutional Area
New Delhi

ISSN: 0972-0227

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of all research is not
objectivity, but truth.”*

- Helene Deutsch



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