

PUBLIC AWARENESS AND PERCEPTION TOWARD CLIMATE CHANGE AND ITS EFFECTS ON HUMAN HEALTH

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Abstract

The objective of this study was to collect data on individuals' awareness and perception of the influence of climate change on human health. We conducted a survey using a cross-sectional approach to gather information from 150 individuals living in the Kanpur Dehat District. Information was gathered from a well-organized questionnaire. This enabled them to obtain information from the participants. The survey revealed that the majority of the population comes from low socioeconomic origins. Specifically, 2.67% of them had higher socioeconomic status, while the majority worked as day labourers or farmers. The majority of participants (75.33%) had an awareness of climate change, whereas 24.67% of them were uninformed of this issue. Television and radio were the main sources of information about climate change for 55.6% of the participants, with television being the principal source for 43.33% and radio for 41.33%. According to the poll, 83% of participants believed that deforestation was the primary cause of climate change. A significant association existed between awareness of climate change and variables such as gender, educational attainment, monthly income, and occupation. The research group had a moderate level of awareness about climate change, but their perception of the impact of climate change on human health was significantly higher than usual.

Introduction

Climate change is one of the most significant global challenges of our time, with profound impacts on the environment, economies, and human health. Understanding the public's awareness and perception of these issues is critical for developing effective policies and interventions to mitigate the negative effects and adapt to changing conditions.

In many countries, awareness of climate change is high due to extensive media coverage, education, and the visible impacts of climate-related events. While awareness is high, understanding of the specifics and severity of climate change can vary widely. Some people may recognize the term but lack deeper knowledge of the causes and consequences. Television, newspapers, and online news platforms are primary sources of information about climate change. Schools and universities play a critical role in educating the public, particularly the younger generation, about climate change science and impacts. These platforms and groups help disseminate information quickly and mobilize public opinion.

The public's perception of the severity of climate change varies. In regions heavily impacted by climate events, people may perceive it as an urgent threat. Less-affected areas may perceive it as

a distant or future problem. Despite scientific consensus, there is a segment of the population that remains skeptical about climate change, often influenced by misinformation or political beliefs. Heatwaves, extreme weather events, and changes in disease patterns directly affect human health. These impacts are increasingly recognized, particularly in areas with frequent climate-related health issues. Awareness is also increasing regarding the indirect effects of climate change on health, such as food and water security, air quality, and mental health.

Increased awareness and concern often lead to behavioral changes aimed at reducing personal carbon footprints, such as using public transportation, recycling, and conserving energy. People in affected areas may take health precautions during extreme weather events, such as staying hydrated during heatwaves or seeking air-conditioned environments. Financial limitations can hinder the ability of individuals and communities to adapt to climate change or take preventive measures. A lack of detailed and accessible information can prevent people from taking effective action against climate change and its health impacts. The perception that climate change impacts are temporally or geographically distant can reduce the sense of urgency and personal responsibility.

Embedding climate change education in school curricula can enhance understanding from a young age. Government and non-governmental organizations can run campaigns to raise awareness about the health impacts of climate change and promote preventive actions. Community-based programs can address the specific local impacts of climate change and mobilize collective action. Involving the public in decision-making processes can increase awareness and empower individuals to contribute to climate action. Governments can implement policies that promote sustainable practices and support communities in adapting to climate change. Investing in infrastructure that can withstand climate impacts helps protect public health and safety.

Understanding and improving awareness and perception of climate change and its impacts on human health is crucial for fostering a proactive public response. Through education, community engagement, and supportive policies, society can better prepare for and mitigate the effects of climate change on health, ultimately leading to a more resilient and informed population.

Review of literature

Awareness of health risks can prompt protective behaviors. Berry et al. (2010) note that individuals aware of heatwave risks are more likely to take precautions, such as staying hydrated and avoiding outdoor activities during peak heat.

Community-based initiatives and supportive policies can foster a sense of collective efficacy. According to Ostrom (2010), local engagement in climate action can drive significant change, especially when supported by policies that facilitate sustainable practices.

Awareness of the health impacts of climate change is growing, but it remains less widespread than general climate awareness. Maibach et al. (2011) found that while many recognize the environmental impacts of climate change, fewer are aware of its specific health risks, such as heat-related illnesses, vector-borne diseases, and respiratory problems.

Perceiving climate change as a distant issue creates a psychological distance that hinders proactive behavior. Gifford et al. (2011) argue that reducing this distance through localized messaging can enhance engagement and motivate action.

Studies indicate that awareness of climate change is high globally, although the depth of understanding varies. Lee et al. (2015) found that in many countries, over 70% of respondents were aware of climate change, but awareness did not always correlate with understanding its anthropogenic origins.

There is evidence that increased awareness and perceived risk lead to behavioral changes. According to van der Linden (2015), individuals concerned about climate change are more likely to engage in pro-environmental behaviors, such as reducing energy use and supporting climate policies.

Perceptions of the severity and personal relevance of climate change vary. Weber (2016) suggests that individuals are more likely to perceive climate change as severe if they experience direct impacts, such as extreme weather events. However, for many, climate change remains a distant threat.

Enhancing climate literacy through targeted education and clear, relatable communication is crucial. Moser (2016) emphasizes the importance of using accessible language and local examples to make the abstract concept of climate change more tangible.

Information gaps and misinformation remain significant challenges. Cook et al. (2017) highlight that despite the scientific consensus on climate change, misinformation campaigns have sowed doubt, affecting public perception and action.

Barriers to Financial constraints and social norms can impede individual and collective action. Leiserowitz et al. (2019) report that while many people recognize the need for action, economic barriers often limit their ability to make sustainable choices, such as investing in energy-efficient appliances.

Utilizing media and digital technologies to disseminate accurate information can counteract misinformation and raise awareness. Ballew et al. (2019) suggest that social media campaigns and interactive platforms can engage diverse audiences and promote climate-friendly behaviors.

Education and the media play crucial roles in shaping public awareness. Svarstad et al. (2020) highlight that formal education significantly enhances understanding of climate science, while media exposure increases awareness but can also propagate misinformation.

Awareness and concern about climate change can differ significantly by region. For example, Leiserowitz et al. (2021) report higher levels of concern in Europe and Latin America compared to North America and Asia. Factors influencing these differences include exposure to climate impacts, media coverage, and political context.

Sambrook et al. (2021) conducted a review that examined how personal experiences of extreme weather events influence individuals' beliefs and actions regarding climate change. It discovered that while personal experiences can heighten concern about climate change, its effectiveness in promoting action depends on individuals attributing these events to climate change and overcoming pre-existing beliefs.

Pereira and Freire's (2021) study focused on how young people perceive climate change and its impact on their development. This research emphasized the importance of the Positive Youth Development framework to enhance adolescents' and young adults' well-being and engagement in climate action. It highlighted that young people are particularly vulnerable to climate change effects, impacting their mental health, development, and future prospects.

The European Investment Bank (EIB) conducted surveys in 2021–2022 to explore public perceptions of climate change across Europe. The survey found that a significant majority of Danish people (79%) consider climate change the biggest challenge of the 21st century, with notable support for government measures to combat it. However, there were differences in concern levels across age groups and socioeconomic statuses.

These studies collectively demonstrate a growing recognition of climate change as a critical issue and varying perceptions based on personal experiences, age, and socioeconomic factors. Understanding these differences is crucial for designing effective communication and intervention

strategies to enhance public engagement in climate action. The literature highlights the complexity of public awareness and perception of climate change and its health impacts. While awareness is generally high, there is a need for deeper understanding and more effective communication to bridge knowledge gaps and motivate action. Addressing barriers such as economic constraints, psychological distance, and misinformation is essential for fostering a proactive public response to the intertwined challenges of climate change and human health.

The present study has a rationale.

Studying awareness and perceptions about climate change and human health is highly relevant for a number of reasons:

- Understanding public awareness and perceptions is helpful in designing effective public health campaigns. If people recognize the health risks associated with climate change, they are more likely to support and engage in measures to mitigate these effects. For instance, awareness can lead to better preparedness for heatwaves, which are increasingly common due to climate change (Sambrook et al., 2021; Pereira and Freire, 2021).
- Policymakers can use public perception data to develop policies that are more likely to win public support. For example, if surveys show high concern about climate change, governments might feel more justified in implementing stringent environmental regulations or investing in renewable energy sources (EIB, 2021–2022).
- Perception studies can identify gaps between awareness and action, helping to address barriers to behavioral change. Understanding why some individuals remain inactive despite high awareness levels allows for targeted interventions to promote sustainable behaviors and reduce health risks related to climate change (Sambrook et al., 2021; Pereira and Freire, 2021).
- Research can identify demographic groups with lower awareness or different perceptions about climate change. The development of customized communication strategies can help educate and safeguard vulnerable populations, promoting equal health outcomes across diverse social groups (Pereira and Freire, 2021).
- Awareness studies can also highlight the mental health effects of climate change anxiety. Recognizing this allows for the development of mental health resources and support systems to help individuals cope with climate-related stress and anxiety (Pereira and Freire, 2021).
- Studies focusing on young people's perceptions can foster early engagement and education, promoting a generation that is more informed and proactive about climate change and its health impacts. This is crucial for long-term sustainability and health resilience (Pereira and Freire, 2021).

Overall, the relevance of these studies lies in their ability to shape effective communication, inform policy, promote public engagement, and address the specific needs of vulnerable populations, all of which are essential for mitigating the health impacts of climate change.

Objectives of present study

- To explore the participants' awareness and perception about climate change.
- To explore the Participants' awareness and perception towards the influence of climate change on human health and the environment.
- To explore the association between socio-demographic variables and awareness of climate change

Methodology

Design, sample, and context

We conducted a survey using a cross-sectional approach to gather information from 150 individuals living in the Kanpur Dehat District.

Climate change and health awareness-perception questionnaire prepared by Kabir et al. (2016):

A structured questionnaire served as the primary instrument for this investigation. We conducted a comprehensive analysis of existing literature and produced a set of inquiries pertaining to the topics of climate change and health. These questions were specifically designed to assess individuals' level of awareness, perception, attitude, and behaviour towards these issues. The replies to all perception questions about climate change and health were provided using different Likert-type answers, including 'Yes', 'No', 'Did Not notice', or categorical options. Participants who expressed awareness of climate change were queried about their understanding of climate change, followed by inquiries on its underlying factors. The awareness score was derived from this information. In order to evaluate the respondents' perspective of climate change, we posed particular questions relevant to climate change to all participants, regardless of their level of expertise on the subject.

Data collection

The ultimate survey was utilised to gather data on the socio-demographic attributes of the participants, as well as their understanding and perspective of climate change, extreme weather occurrences, and health.

Results

There were 85 male participants in the study, making up 56.67% of the total, and 65 female participants, making up 43.33% of the total. The participants' ages ranged from 40.1 years on average to 10.2 years on average for the SD. With a standard deviation of 9.6, the average number of years that residents lived in the region was 27.3 years. The study was conducted in Kanpur Dehat, where 50.67% of the participants got their drinking water from supplied sources, while 43.33% of the participants lived in both kacha and pakka households. The study's participants were primarily from low-income socioeconomic backgrounds. Of the participants, just 3.33% held a postgraduate degree. The majority of participants were either farmers (23.34%) or day workers (25.33%). Furthermore, Table 1 shows that 52.0% of participants earned less than 10,000/- each month.

Table 1 Characteristics of the participants (N = 150)

Variable	Frequency (%)
Gender	
Male	85 (56.67)
Female	65 (43.33)
Age in years	40.1±10.2
Duration of stay in this locality in years	27.3±9.6
Education	

No formal education	15 (10.0)
Primary	25 (16.67)
Secondary	30 (20.0)
Higher Secondary	65 (43.33)
Graduate	10 (6.67)
Post-graduate and above	5 (3.33)
Occupation	
Farmer	38 (25.33)
Day labourer	35 (23.34)
Service holder	11 (07.33)
Small and medium business	15 (10.0)
House wife	17 (11.33)
Fisherman	10 (06.67)
Unemployed	9 (06.0)
Others	15 (10.0)
Type of House	
Kachca	35 (23.34)
Pakka	45 (30.0)
Both Kacha and Pakka	65 (43.33)
Other	5 (3.33)
Total household monthly income	
< 10 thousand	78 (52.0)
10 to 25 thousand	37 (24.67)
25-50 thousand	25 (16.67)
50-75 thousand	6 (04.0)
75-1 lakh	3 (02.0)

>1 lakh	1 (0.67)
Drinking water source	
Shallow Tube well	5 (03.33)
Deep tube well	2 (01.33)
Supply water	76 (50.67)
Untreated water	33 (22.0)
Treated water	10 (6.67)
Rain water	9 (06.0)
Others	15 (10.0)

The responses of the participants regarding their knowledge of climate change are presented in Table 2. Out of the 150 research participants, 75.33% acquired knowledge on climate change from a specific source, whereas 24.67% obtained it from alternative sources. The majority of participants, specifically 55.6%, indicated that television served as their main source of information regarding climate change. This was followed by radio at 43.33%, newspapers at 22.67%, neighbours at 22.0%, health professionals at 9.33%, teachers at 14.0%, family members or relatives at 7.33%, and non-governmental organisation workers at 5.33%. The poll found that 83.33% of respondents believed that deforestation was the primary catalyst for climate change. The breakdown is as follows: 37.33% of industrial effluents, 34.0% of population increase, 22.67% of vehicle black smoke, 14.67% of excessive carbon emissions from wealthy countries, 12.67% of increasingly urbanising and changing lifestyles, and 8% of other reasons.

Table 2 Participants Awareness and Perception about climate change (n=150)

Variable	Frequency (%)
Have you heard of what ‘Climate Change’ means from any source?	
Yes	113 (75.33)
No	37 (24.67)
What is the main source of your information on climate change?	
Newspaper	34 (22.67)
Radio	62 (41.33)
Television	65 (43.33)

Neighbours	33 (22.0)
Health workers	14 (9.33)
Teachers	21 (14.0)
Family members/Relatives	11 (7.33)
NGO workers	8 (5.33)
Causes or reasons for climate change	
Deforestation	125 (83.33)
Industrial effluents	56 (37.33)
Population Growth	51 (34.0)
Black smoke of vehicles	34 (22.67)
Excessive carbon emission by the developed country	22 (14.67)
Rapid urbanization and changes in lifestyle	19 (12.67)
Others	12 (8.0)

To examine individuals' perspective and consciousness regarding the impact of climate change on human health and the environment (Table 3). The survey found that over the past decade, participants reported a rise in occurrences of severe weather events, including droughts (70.0%), cyclones/floods (59.33%), and tidal waves (46.0%). Approximately 80.67% of them reported a noticeable alteration in the pattern of rainfall throughout the past decade. A portion of the participants observed that the sea water level has risen (55.33%).

Table 3 Participants' awareness and perception towards influence of climate change on human health and the environment (n=150)

Influence of Climate Change	Yes (%)	Unchanged/Not applicable (%)	Did not notice (%)
An increased frequency of floods and cyclones over the past ten years	89 (59.33)	51 (34.0)	10 (6.67)
An increase in tidal wave episodes during the past ten years	69 (46.0)	60 (40.0)	21 (14.0)
An increase in drought episodes during the past ten years	105 (70.0)	29 (19.33)	16 (10.67)

Rainfall patterns have changed during the past ten years.	121 (80.67)	19 (12.66)	10 (6.67)
Sea level change during the previous ten years	83 (55.33)	37 (24.67)	30 (20.0)
Water's increased salinity during the past ten years	61 (40.67)	51 (34.0)	38 (25.33)
Lack of fresh water because of the past ten years' salinity increase	75 (50.0)	48 (32.0)	27(18.0)
Heightened risk to health as a result of rising salinity	117 (78.0)	18 (12.0)	15 (10.0)
Decreased yield of food crops throughout the previous ten years	87 (58.0)	34 (22.67)	29 (19.33)
Drowning death within the previous ten years	80 (53.33)	31 (20.67)	39 (26.0)
Snakebite death in the previous ten years	84 (56.0)	24 (16.0)	42 (28.0)
Spending more on health care following severe weather occurrences	99 (66.0)	31 (20.67)	20(13.33)

Furthermore, the study also examined participants' impression of the health risks associated with climate change, in addition to considering environmental factors. Half of the participants (50%) expressed the belief that there will be a shortage of freshwater caused by an increase in salinity. A significant majority (40.67%) reported having witnessed an increase in water salinity during the past decade. Approximately 78% of individuals were cognizant of the escalating health hazards associated with elevated salt levels, including conditions such as hypertension and adverse pregnancy outcomes. Regarding food security, about 58% of respondents expressed that food crop output would be adversely impacted. The mortality rates for drowning (53.33%) and snake bites (56.0%) have been seen during extreme weather events throughout the past decade. The majority of participants (66.0%) held the belief that health care cost rose following extreme weather occurrences, as indicated in Table 3.

Table 4 Association between socio-demographic variables and awareness of climate change (n = 150)

Variable	Frequency (%)	Knowledge of climate change			Statistics
		No (%)	Yes (%)	Total (%)	
Gender					

Male	85 (56.67)	11 (12.94)	74 (87.05)	85 (56.67)	$\chi^2 = 14.51$ $p < 0.01$
Female	65 (43.33)	26 (40.0)	39 (60.0)	65 (43.33)	

Education

No formal education	15 (10.0)	07 (46.67)	8 (53.33)	15 (10.0)	$\chi^2 = 40.17$ $p < 0.01$
Primary	25 (16.67)	16 (64.0)	9 (36.0)	25 (16.67)	
Secondary	30 (20.0)	09 (30.0)	21 (70.0)	30 (20.0)	
Higher Secondary	65 (43.33)	05 (7.69)	60 (92.30)	65 (43.33)	
Graduate	10 (6.67)	00 (0.0)	10 (100.0)	10 (6.67)	
Post-graduate and above	5 (3.33)	00 (0.0)	5 (100.0)	5 (3.33)	

Occupation

Farmer	38 (25.33)	12 (31.58)	26 (68.42)	38 (25.33)	$\chi^2 = 11.41$ $p < 0.01$
Day labourer	35 (23.34)	10 (28.57)	25 (71.43)	35 (23.34)	
Service holder	11 (07.33)	1 (9.09)	10 (90.91)	11 (07.33)	
Small and medium business	15 (10.0)	5 (33.33)	10 (66.67)	15 (10.0)	
House wife	17 (11.33)	9 (52.94)	8 (47.06)	17 (11.33)	
Fisherman	10 (06.67)	5 (50.0)	5 (50.0)	10 (06.67)	
Unemployed	9 (06.0)	3 (33.33)	6 (66.67)	9 (06.0)	
Others	15 (10.0)	9 (60.0)	6 (40.0)	15 (10.0)	

Type of House

Kachca	35 (23.34)	7 (20.0)	28 (80.0)	35 (23.34)	$\chi^2 = 2.54$ $p > 0.01$
Pakka	45 (30.0)	12 (26.67)	33 (73.33)	45 (30.0)	
Both Kacha and Pakka	65 (43.33)	22 (33.85)	43 (66.15)	65 (43.33)	
Other	5 (3.33)	2 (40.0)	3 (60.0)	5 (3.33)	
Total household monthly income					
< 10 thousand	78 (52.0)	12 (15.38)	66 (84.62)	78 (52.0)	$\chi^2 = 18.65$ $p < 0.01$
11 to 25 thousand	37 (24.67)	17 (45.99)	20 (54.01)	37 (24.67)	
26-50 thousand	25 (16.67)	13 (52.0)	12 (48.0)	25 (16.67)	
51-75 thousand	6 (04.0)	2 (33.33)	4 (66.67)	6 (04.0)	
76-1 lakh	3 (02.0)	1 (33.33)	2 (66.67)	3 (02.0)	
>1 lakh	1 (0.67)	0 (0.0)	1 (100.0)	1 (0.67)	
Drinking water source					
Shallow Tube well	5 (03.33)	0 (0.0)	5 (100.0)	5 (03.33)	$\chi^2 = 4.94$ $p > 0.01$
Deep tube well	2 (01.33)	1 (50.0)	1 (50.0)	2 (01.33)	
Supply water	76 (50.67)	22 (28.95)	54 (71.05)	76 (50.67)	
Untreated water	33 (22.0)	11 (33.33)	22 (66.67)	33 (22.0)	
Treated water	10 (6.67)	5 (50.0)	5 (50.0)	10 (6.67)	
Rain water	9 (06.0)	3 (33.33)	6 (66.67)	9 (06.0)	
Others	15 (10.0)	6 (40.0)	9 (60.0)	15 (10.0)	

An analysis using cross-tabulation was performed to examine the correlation between sociodemographic factors and participants' comprehension of climate change. The survey revealed strong correlations between gender ($\chi^2 = 14.51$, $p < 0.01$), education ($\chi^2 = 40.17$, $p < 0.01$), occupation ($\chi^2 = 11.41$, $p < 0.01$), and monthly family income ($\chi^2 = 18.65$, $p < 0.01$) and the level of knowledge among participants in the surveyed region (Table 4).

Discussion

This study is a quantitative endeavor to evaluate the awareness and views of the populations in Kanpur Dehat regarding climate change and its effects on health. The findings offer significant insights into individuals' thoughts and beliefs derived from their own experiences at the local level. There were 56.67% male and 43.33% female participants in the study. Participants in Kanpur Dehat were primarily from low-income socioeconomic backgrounds, mostly farmers or day workers with a higher secondary degree. This suggests that despite their educational qualifications, limited economic opportunities may confine them to low-income occupations typical of rural areas.

The majority of participants indicated that television and radio served as their main sources of information regarding climate change because these mediums are often the most accessible and widely used in rural areas. They are cost-effective and do not require literacy, making them suitable for audiences with varying education levels. According to the poll, respondents believed deforestation was the primary catalyst for climate change, likely due to its visibility and direct impact in their region. Local experiences and media coverage may have emphasized the connection between tree loss and environmental changes, leading to this perception.

The survey found that over the past decade, participants reported a rise in occurrences of severe weather events, including droughts, cyclones, floods, and tidal waves, due to the increasing impacts of climate change. These changes are consistent with scientific observations that climate change is leading to more extreme and unpredictable weather patterns globally. Participants reported a noticeable alteration in the pattern of rainfall, which is a common consequence of climate change as it disrupts normal weather patterns, leading to irregular and intense precipitation events or prolonged dry spells. The observation that sea water levels have risen aligns with global data showing that melting polar ice caps and thermal expansion of seawater due to global warming are causing sea levels to rise. This rise is especially noticeable in coastal and low-lying areas, which have a direct impact on local communities.

Due to their direct experiences and observations of rising salinity levels over the past decade, half of the participants expressed the belief that an increase in salinity will cause a shortage of freshwater. Several factors likely influence this belief. As sea levels rise, saltwater intrusion into freshwater sources, such as rivers, lakes, and groundwater, becomes more common, increasing salinity. Excessive groundwater extraction for agricultural or domestic use can lead to a decrease in freshwater levels, allowing saltwater to encroach. Changes in precipitation patterns and increased evaporation rates can concentrate salts in remaining water sources. Certain irrigation practices can exacerbate salinity in soil and water sources over time. These factors contribute to participants' observations of increasing water salinity and their concerns about future freshwater shortages.

Individuals were aware of the escalating health hazards associated with elevated salt levels, including hypertension and adverse pregnancy outcomes, likely due to a combination of personal experiences, community knowledge, and public health information disseminated through local media (such as television and radio). Key reasons for this awareness include: high salt levels in drinking water can lead to direct health issues such as hypertension (high blood pressure) and

complications in pregnancy, which may have been observed in the community, public health initiatives and education campaigns, often communicated through accessible media like television and radio, likely informed residents about the risks associated with high salt consumption, shared experiences and anecdotal evidence within the community can spread awareness about the health impacts of increased water salinity, advice and information from local healthcare providers and clinics may have played a role in raising awareness of these health risks. These factors combined to create a well-informed community regarding the health risks posed by elevated salt levels in their water supply.

Climate change adversely affects food security and crop output for several reasons: Increased frequency and intensity of extreme weather events such as droughts, floods, and storms can damage crops, reduce yields, and disrupt planting and harvesting schedules. Changes in precipitation patterns, including unpredictable rainfall and prolonged dry spells, can lead to water stress for crops, affecting growth and reducing productivity. Rising temperatures can affect crop growth cycles, with some crops becoming less viable in hotter climates. Heat stress can also reduce crop yields and quality; warmer temperatures and changing weather patterns can expand the range and life cycle of pests and diseases, leading to increased crop damage and losses. Climate change can exacerbate soil erosion, salinization, and nutrient depletion, reducing soil fertility and the ability to support healthy crop growth. Increased evaporation and reduced water availability can limit irrigation, which is crucial for maintaining crop yields in many regions. In coastal areas, rising sea levels can lead to saltwater intrusion into freshwater sources and agricultural lands, making them less suitable for crop production. These impacts collectively threaten food security by reducing the availability, accessibility, and stability of food supplies, as well as increasing agricultural production.

Mortality rates for drowning and snake bites have increased during extreme weather events throughout the past decade due to several factors associated with the impacts of climate change and the nature of these events: Extreme weather events, such as heavy rains and flooding, create conditions where people are more likely to encounter deep or fast-moving water, leading to a higher risk of drowning. Floodwaters can also obscure hazards and sweep people away; floods and storms can displace people from their homes, forcing them into unfamiliar environments where they may be more exposed to the risks of drowning or encountering snakes; and extreme weather events can disrupt the habitats of snakes, causing them to seek shelter in areas where humans live, increasing the likelihood of encounters and bites. Flooding can drive snakes out of their natural habitats and into residential areas. In many affected regions, there may be a lack of preparedness and resources to manage and respond to extreme weather events, leading to inadequate warning systems, rescue operations, and medical care, which can result in higher mortality rates. People in low-income communities often have limited access to safe housing and infrastructure, making them more vulnerable to the impacts of extreme weather events, including drowning and snake bites. Extreme weather events can disrupt transportation and communication networks, delaying medical attention for snake bites and increasing the fatality rate. These factors contribute to the observed increase in mortality rates from drowning and snake bites during extreme weather events over the past decade.

Participants believed that health care costs rose following extreme weather occurrences due to several interrelated factors: Extreme weather events often lead to a higher incidence of injuries (e.g., from debris during storms or accidents in floods) and illnesses (e.g., waterborne diseases, respiratory issues from mold and damp conditions, and vector-borne diseases like malaria and dengue). Damage from extreme weather can lead to increased costs for repairs and reconstruction

in healthcare facilities, potentially impacting patients. Disruptions in supply chains can lead to shortages of medical supplies and drugs, driving up costs for both healthcare providers and patients. The immediate aftermath of extreme weather events often sees a surge in demand for medical services, which can overwhelm existing healthcare infrastructure and resources, leading to higher costs. The costs associated with evacuation, emergency medical services, and temporary shelters contribute to overall healthcare expenditure during and after extreme weather events. Stress and trauma from extreme weather events can exacerbate chronic health conditions, leading to increased healthcare utilization and costs over the long term. Extreme weather events can cause economic disruption, leading to the loss of income and livelihoods. This, in turn, makes it more difficult for individuals to afford healthcare, leading them to perceive any costs as burdensome. These factors combine to create a perception and reality of rising healthcare costs following extreme weather events, impacting both immediate and long-term healthcare needs and expenditures.

Several factors contribute to the strong correlations between gender, education, occupation, and monthly family income with the level of climate change awareness among participants in the surveyed region: Higher education levels often provide individuals with better access to information and a greater ability to understand complex issues like climate change. Academic settings, the media, and informational campaigns are more likely to expose educated individuals to climate change discussions. Different occupations expose individuals to varying levels of information and concern about climate change. For instance, climate change impacts, such as changing weather patterns and their effects on crop yields, likely directly affect and increase the awareness of farmers and those working in agriculture. Conversely, individuals in occupations less directly affected by climate change might not prioritize this awareness. Higher family income can correlate with greater access to information sources, such as the internet, newspapers, and educational materials, which can increase awareness of climate change. Wealthier families may also have the financial means to invest in educational opportunities that include information about climate change. Gender differences in climate change awareness can result from different roles and responsibilities in the household and community. In some regions, women might be more involved in activities like farming or water collection, making them more directly aware of environmental changes. Conversely, men might have greater access to formal education and external information sources, affecting their level of awareness.

Overall, these correlations suggest that socio-economic factors play a significant role in shaping individuals' awareness of climate change. Those with higher education, better occupations, and higher incomes typically have more resources and opportunities to access information about climate change, leading to greater awareness. Gender roles and responsibilities further influence this dynamic, affecting how different groups perceive and prioritize climate change information.

Conclusion

The study evaluates climate change awareness and perception in Kanpur Dehat,. Participants, mostly farmers or day workers and belong to low-income socioeconomic backgrounds, reported increased awareness of climate change from television and radio. They believed deforestation was the primary cause of climate change. Over the past decade, severe weather events, rainfall changes, and rising seawater levels have affected health. Participants also believed in increased salinity, which could lead to freshwater shortages and health hazards like hypertension and pregnancy outcomes. The study found strong correlations between gender, education, occupation, and monthly family income and climate change awareness.

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Conflicts of interest

There are no conflicts of interest.

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