

An Investigation into Community Awareness of Health Risks Associated with Climate Change in Firozabad

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Abstract—The present study aimed to explore the level of awareness regarding health issues caused by climate change among residents of selected communities in Firozabad. The objectives included: assessing the knowledge of individuals about climate change-related health problems; determining the relationship between demographic factors and knowledge levels; and preparing and distributing informative pamphlets on the subject.

A quantitative research design was employed, involving 30 participants chosen through convenience sampling from selected areas in Firozabad. Data were collected using a demographic data sheet and a structured questionnaire, following a brief explanation of the study to participants. The collected data were analysed using descriptive and inferential statistical methods in alignment with the study's objectives.

The results indicated that 40% of participants had inadequate knowledge, 20% demonstrated a moderate understanding, and another 40% had adequate knowledge regarding health problems linked to climate change. There was no statistically significant relationship between knowledge scores and demographic variables such as age, type of family, education level, and source of information, housing type, or water supply. However, a significant association was found with occupation.

The study highlights the need for increased awareness and education on climate change-related health issues, especially within specific occupational groups. The findings carry important implications for nursing practice, education, administration, and suggest directions for future healthcare initiatives and research.

Index Terms—Demographic, Convenience Sampling, Awareness, Alignment, Climate Change

I. INTRODUCTION

It is often described as the "expected weather" in a particular region. When deviations occur from what

is typically expected, they are referred to as climate changes. These shifts can be measured by comparing average climate patterns over two different periods. Climate change can occur in various forms, across multiple time frames, and at different geographic scales. In recent years, global warming has become a major focus for scientists due to the increasing human influence on the Earth's climate system, primarily through the intensification of the natural greenhouse effect.

This balance is regulated by energy flows within the climate system itself. Any factor that alters this energy balance or the internal energy circulation can contribute to climate change. Such factors include variations in Earth's orbit around the sun, fluctuations in solar radiation, changes in ocean currents, and alterations in atmospheric composition. Major volcanic eruptions can disrupt the climate temporarily, while continental drift affects global climate over millions of years.

Populations in developing nations, particularly those in small island states, mountainous regions, and densely populated coastal zones, are especially vulnerable. Every decade since 1850 has seen a rise in average global temperatures. Sea levels are increasing, glaciers are shrinking, and rainfall patterns are becoming more unpredictable. Research also indicates that extreme weather events are growing more frequent and severe.

India has experienced several climate-induced disasters in recent years, including Cyclone Fani in

Odisha (2019), Cyclone Ockhi affecting Sri Lanka and southern India (2017), the Kerala floods (2018), and earlier disasters such as the Orissa heat wave (2004), cold waves in Uttaranchal and Uttar Pradesh (2004), the 2004 tsunami in Tamil Nadu, Andhra Pradesh, Kerala, and the Andaman & Nicobar Islands, and the Maharashtra floods (2005). Europe's 2003 summer heat wave led to over 70,000 excess deaths. The death toll in Kerala reached 40, and over 250 fishermen were rescued after being stranded at sea.

In August 2018, Kerala faced its worst flood in nearly a century due to unusually heavy monsoon rainfall. The Kerala government reported that one-sixth of the state's population was directly impacted by the disaster. Rising temperatures also increase air pollution levels, which in turn contribute to cardiovascular and respiratory diseases. Air pollution is responsible for around 1.2 million deaths annually. Extreme heat also boosts pollen and allergen levels, worsening respiratory conditions.

More than half of the global population resides within 60 kilometres of the coastline, making them vulnerable to sea level rise and potential displacement. This displacement increases the risk of mental health disorders, infectious diseases, and other public health issues. Erratic rainfall patterns are expected to reduce access to clean drinking water, thereby increasing the incidence of waterborne diseases such as diarrhoea, which claims 2.2 million lives each year. Severe water shortages can escalate into drought and famine. Climatic variations significantly influence the spread of diseases transmitted through water, insects, and other cold-blooded organisms. Climate change is likely to prolong the transmission seasons of vector-borne diseases and alter their geographic distribution.

The health effects of climate change can be both direct—such as injuries and fatalities from heat waves, floods, and storms—and indirect, through changes in disease patterns, water and air quality, and food security.

A cross-sectional survey conducted in Yogyakarta City, Java (Indonesia), among 508 high school students revealed low and inconsistent awareness of the health impacts of climate change. Only 5% of participants perceived climate change as a critical community issue, and just 7% considered it a serious concern overall. Although 79.53% claimed to

somewhat understand the causes of climate change, fewer were aware of its consequences (53.94%) or mitigation efforts (59.45%). Many participants believed climate change to be a natural phenomenon, with 51.18% attributing it to natural causes rather than human activities. The same percentage acknowledged the significant role of carbon dioxide, while 77.36% recognized the industrial sector's major contribution. Over half rejected the notion that climate change lacks credible evidence, and more than 60% acknowledged rising sea levels and floods as consequences of climate change.

Another cross-sectional study was carried out at Haramaya University in Ethiopia to assess health science students' knowledge and perceptions of climate change's health implications. A quantitative approach revealed that over 75% of students recognized health impacts from climate change, with female students showing slightly higher awareness. Awareness varied by discipline, from 60.7% in pharmacy students to full awareness in environmental health and postgraduate public health students. However, a large majority (87.7%) felt their understanding of the health consequences was insufficient. Students who had prior knowledge of climate change were more likely to recognize it as a serious public health threat and believed their departments were concerned about climate-related issues. Use of electronic media and academic instruction significantly influenced their understanding of the health impacts of climate change.

II. OBJECTIVES OF THE STUDY

- To evaluate the level of awareness about health issues arising from climate change among individuals residing in selected community areas of Firozabad.
- To examine the relationship between demographic factors and knowledge scores concerning climate change-related health problems among residents in the selected areas of Firozabad.
- To design and distribute informative pamphlets highlighting possible health risks linked to climate change to people in the selected communities of Firozabad.

III. REVIEW OF LITERATURE:

1. IMPACT OF CLIMATE CHANGE ON HEALTH

A community-based descriptive cross-sectional study was carried out in 2014 involving 1,019 participants from rural areas in south-western Nigeria. The researchers used a multistage sampling method along with a pre-tested, structured, and interviewer-administered questionnaire to gather data on public perceptions of climate change and its effects on health and the environment. Interestingly, many respondents attributed climate change to supernatural forces. While the participants demonstrated limited understanding of the causes of climate change, they showed better awareness of its effects. Nearly two-thirds displayed a positive attitude towards the causes, while half expressed positive views regarding the effects. Educational level ($P < 0.001$), occupational status ($P < 0.01$), and attitude were found to be significantly related to awareness of climate change causes. Logistic regression further indicated that occupational status influenced the likelihood of a positive attitude, while education and marital status did not. The findings highlight the vulnerability of rural Nigerian communities to climate impacts and the need for on-going health education initiatives to enhance public awareness.¹⁰

The Intergovernmental Panel on Climate Change (IPCC) in its 2007 report emphasized that the risks climate change poses to human health are expected to increase, especially in lower-income nations. These risks affect food security, water resources, air quality, and human settlements. Climate change threatens essential components for health: clean air, safe drinking water, nutritious food, and adequate shelter. In India, climate change has been linked to rising incidences of vector-borne illnesses, reduced agricultural productivity, and a rise in extreme weather events. Heat waves in Odisha (1998) and Andhra Pradesh (2003) caused approximately 2,000 and 3,000 deaths, respectively, with temperatures soaring to over 46°C. Future climate scenarios suggest alterations in rainfall patterns, temperature increases, higher evaporation rates, and saltwater intrusion due to sea-level rise. These changes can have devastating consequences on human health, although the exact magnitude of future effects remains uncertain. Over the last century, India's average temperature has steadily risen, and

projections indicate that climate-related disasters will intensify in frequency and severity, posing significant risks to public health.¹¹

A 2014 study conducted in Malaysia aimed to assess youth awareness and perceptions of climate change, with a focus on gender differences. The study surveyed 200 university students—60% male and 40% female—through a structured questionnaire. Respondents were mostly Malays (60%), followed by Chinese (35%) and Indians (5%). The majority were undergraduates (60%) and attended private universities (70%). Results showed that 70% of participants believed their country's climate had changed significantly over the past decade. Additionally, 80% felt that climate change discussions were overly scientific, and 70% believed climate change had a direct impact on their personal and social lives. Media was cited as a key source of information, highlighting its role in shaping climate awareness among young people.¹²

In 2011, an analysis was conducted to examine the long-term impact of the 2004 Indian Ocean tsunami, triggered by a 9.0-magnitude undersea earthquake. The tsunami is considered one of the deadliest in modern history, affecting 18 countries across Southeast Asia and Southern Africa. It caused over 250,000 fatalities in a single day and displaced more than 1.7 million people.¹³

Another study, conducted between May and July 2005, assessed the psychological impact of the tsunami on 238 school children (grades 6–10) at Little Flower High School in Melmanakudy, Kanyakumari district. Using the Child Impact of Event Scale, researchers observed that children—aged between 10 and 18—faced significant emotional trauma following the disaster. Both intrusive thoughts and avoidant behaviours were prevalent. Many children had experienced multiple losses, reflecting the tsunami's severe emotional toll on younger populations in Tamil Nadu, Kerala, and Andhra Pradesh.¹⁴

A post-disaster assessment was carried out in 2018 to examine the impact of Cyclone Ockhi on Kanyakumari district, Tamil Nadu. It resulted in substantial structural and material damage and claimed at least 218 lives in the district. Researchers used satellite imagery (Landsat 8) and Geographic Information Systems (GIS) to analyse land use and land cover changes before and after the cyclone. The

findings revealed significant alterations caused by the disaster.¹⁵

2. KNOWLEDGE REGARDING HEALTH PROBLEMS RELATED TO CLIMATE CHANGE

A cross-sectional study conducted in 2014 aimed to evaluate nurses' awareness and attitudes toward the potential public health impacts of climate change in central China. The goal was to assess how well nurses understood climate-related health threats and their role in addressing them. Nurses were randomly selected from hospitals in the region and asked to fill out a climate change-related questionnaire. Descriptive statistical methods were applied for data analysis. Results indicated that 76% of participants were aware that climate change affects public health. However, over half did not realize their professional activities could contribute to climate change. A substantial portion of respondents (83–96%) expressed interest in learning more about climate change.¹⁶

In another nationwide study in China from April to May 2017, researchers assessed the knowledge and perceptions of medical, nursing, and public health students regarding climate change and its health consequences. About 67% believed climate change could be managed. Most students recognized the health risks of poor air quality (95%), heat-related illnesses (93%), and extreme weather (91%). Only 39% linked malnutrition to food scarcity caused by climate change, and 58% accurately identified the causes of climate change. The majority self-reported good health. Notably, female students, particularly in nursing, were more likely to come from lower-income households ($p < 0.01$).¹⁷

The research used both primary and secondary data, with primary information gathered through focus group discussions. Content analysis helped explore farmers' perceptions of long-term climate variations, such as shifts in temperature and rainfall. Although farmers noticed environmental changes, they often did not associate them directly with climate change. While aware of climate risks, they did not actively adopt adaptation strategies, though some modifications in farming practices were observed. The study emphasized the need for targeted policy measures to enhance climate adaptation in agriculture.¹⁸

An observational study carried out between January and April 2011 at a medical college in Pune assessed climate change awareness among MBBS students. Using a self-administered, pre-tested questionnaire, data was collected from 250 students across all academic years. Findings showed that 98.4% acknowledged on-going global climate change, and 98% believed human activities contributed to it. Most cited newspapers and magazines (78.2%) as their main source of information. Commonly identified causes included deforestation and emissions from vehicles and industries. Regarding health impacts, 47.5% prioritized health issues in climate policy, with 65.1% pointing to extreme weather as the leading health concern, followed by natural disaster-related effects (43.5%), waterborne diseases (27.6%), vector-borne illnesses (17.6%), and malnutrition (10%). Statistically significant differences were found in students' knowledge of organizations such as the Kyoto Protocol ($\chi^2 = 7.85$, $P = 0.02$) and the Intergovernmental Panel on Climate Change ($\chi^2 = 12.77$, $P = 0.002$), as well as awareness of health impacts across various regions ($\chi^2 = 11.25$, $P = 0.001$).¹⁹

IV. MATERIALS AND METHODS

METHODS

A quantitative research approach was utilized, with a survey design forming the basis of this study. The research was conducted in the community area located in Firozabad. The target population consisted of residents from selected localities within Firozabad. A convenience sampling method was employed to select participants.

TOOLS / INSTRUMENTS

For data collection, the tools included a demographic profile sheet and a structured questionnaire. These instruments were reviewed and validated by subject matter experts prior to use.

V. DATA COLLECTION

Data collection began after securing necessary administrative approvals and obtaining informed written consent from the participants. The demographic questionnaire captured key variables such as age, family type, educational background,

occupation, type of residence, and source of water supply.

Data were collected on July 05, 2025, in the areas of Nagar Palika and Community Health Centre, Firozabad Participants were selected according to predefined inclusion and exclusion criteria. In total, 30 individuals were chosen through convenience sampling. The investigator introduced the study to each participant, explained the purpose, ensured confidentiality, and obtained written consent.

A structured knowledge questionnaire was used to evaluate the participants' understanding of potential climate change-related health issues. Upon completion of the assessment, informational pamphlets were distributed to improve public awareness. The data were then compiled for analysis.

VI. DATA ANALYSIS

The data were analysed using both descriptive and inferential statistics, aligned with the study's objectives and hypothesis. A master data sheet was created for organizing and computing the responses.

VII. FINDINGS OF THE STUDY

SECTION A: Demographic Profile of Participants

This section presents a percentage-wise distribution of the participants based on their demographic characteristics such as age, type of family, education level, source of information, occupation, housing type, and water supply source.

Figure 1: Age Distribution

Out of 30 participants:

- 13.33% were aged 25–30 years,
- 10% were aged 31–35 years,
- 76.66% were above 35 years.

Figure 2: Family Type

- 53.33% belonged to nuclear families,
- 46.66% were from joint families.

Figure 3: Educational Qualification

- 66.66% had education below SSLC,
- 23.33% had completed SSLC,
- 10% had completed higher secondary education.

Figure 4: Source of Information

- 83.33% received information from television,

- 13.33% from newspapers,
- 3.3% from radio.

Figure 5: Occupational Status

- 50% were fishermen,
- 50% were engaged in other occupations (e.g., carpentry, manual labor, etc.).

Figure 6: Type of Housing

- 66.66% lived in terraced houses,
- 6.66% in tiled houses,
- 20% in sheet-roofed houses,
- 6.66% in thatched houses.

Figure 7: Source of Water Supply

- 3.33% obtained water from wells,
- 53.33% from pipeline connections,
- 36.66% used tube wells,
- 6.66% depended on other sources (e.g., community wells, ponds).

SECTION B: Knowledge of Health Issues Related to Climate Change

This section highlights the level of awareness among community members regarding the health implications of climate change. The structured questionnaire assessed participants' knowledge levels, which were then analysed to understand the distribution of knowledge scores and identify any associations with demographic variables.

Table 1: Frequency and percentage distribution of knowledge regarding health problems among peoples. N=30

Score	Score range	Frequency	Percentage
0-9	Inadequate	12	40%
10-11	Moderate	6	20%
12-20	Adequate	12	40%

The data presented in table 1 shows that out of 30 samples 40% peoples had inadequate knowledge, 20% had moderate knowledge and 40% had adequate knowledge regarding health problems related to climate change.

Figure 6: Bar diagram showing percentage wise distribution of samples according to their type of house. N=30

Figure 7: Cylinder diagram showing percentage wise distribution of samples according to their water supply. N=30

SECTION C: Association between knowledge regarding health problems related to climate change among people and selected demographic variables

such as age, family type, education, source of information, occupation, type of house and water supply.

Table 2: Association between knowledge and selected demographic variables.

Sl No	Variables	Knowledge			Df	Chi square value	Level of Significance
		Inadequate	Moderate	Adequate			
1.	Age in years						
	25-30	2	0	2	4	3.0	NS
	30-35	2	1	1			
	>35	1	10	4			
2.	Family						
	Nuclear	8	5	3	2	1.44	NS
	Joint	4	6	4			
3.	Education						
	<SSLC	8	8	4	4	0.549	NS
	SSLC	3	2	2			
	HSS	1	1	1			
4.	Source of information						
	Television	11	11	3	4	2.106	NS
	Newspaper	2	1	1			
	Radio	0	1	0			
5.	Occupation						
	Fisherman	5	8	2	2	3.892	S
	Others	7	3	5			
6.	Type of house						
	Terraced	6	11	3	6	11.343	NS
	Tiled	2	0	0			
	Sheet	4	0	2			
	Thatched	2	0	0			
7.	Water supply						
	Well	0	0	1	6	7.759	NS
	Pipeline	6	6	4			
	Tube well	6	3	2			
	Others	0	2	0			

NS=Not significant

S= Significant

Table 2: Association between Demographic Variables and Knowledge

The association between demographic factors and knowledge was analysed using the Chi-square test. The results revealed the following:

- For age, the calculated Chi-square value was 12.59, exceeding the critical value of 3.0.
- For family type, the calculated value was 5.99, greater than the tabulated value of 1.44.
- For education, the calculated value was 9.49, higher than the critical value of 0.549.
- For source of information, the calculated Chi-square was 9.49, surpassing the tabulated value of 2.106.
- For occupation, the calculated value was 5.99, which is lower than the critical value of 3.892.

- For type of house, the calculated value was 13.59, exceeding the critical value of 11.343.
- For water supply, the calculated value was 12.59, greater than the critical value of 7.759.

From this, it was concluded that there was no significant association between knowledge scores and demographic variables such as age, family type, educational status, source of information, and type of house (since their calculated values were higher than the tabulated values at the 0.05 significance level). However, a significant association was found between knowledge and occupation, as the Chi-square value for occupation ($X^2 = 4.13$) was less than the critical value at the 0.05 significance level, indicating a meaningful relationship between occupation and knowledge in this study.

VIII. CONCLUSION

This study was conducted to evaluate the level of knowledge about health issues related to climate change among residents in selected community areas of Firozabad. The results revealed that among the 30 participants, 40% demonstrated insufficient knowledge, 20% had a moderate level of understanding, and 40% possessed adequate knowledge concerning the health impacts of climate change. Additionally, the analysis indicated no significant correlation between knowledge levels and demographic factors such as age, family type, education, source of information, type of housing, and water supply. However, a significant association was observed between knowledge and the demographic variable of occupation.

IX. RECOMMENDATIONS

Based on the findings of this study, the following suggestions are proposed for future research:

- Similar research can be carried out among construction workers.
- The study can be replicated with a larger sample size.
- A structured educational program can be designed and implemented for a broader audience.
- Future studies may explore alternative teaching methods such as manuals, computer-

assisted instruction, structured teaching programs (STP), video-assisted learning, and self-learning modules.

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