



Research Article

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Perception of Climate Change among College Students in Lahore

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ABSTRACT

The climate is changing with time. There are various activities through which our climate changes. Human activities mainly contribute to the change of climate. If we see the impacts of climate change, they are extensive. Almost all the developing countries in the world are seriously threatened by the impacts of change in climate. Understanding the phenomenon of climate change is not that easy, it requires a lot of thinking and discussion. If we talk about Pakistan, it is most exposed to climate change and its impacts. This study basically examined the awareness of climate change among college students in Lahore. Additionally, the study also surveyed how human activities contribute to climate change and how the impacts can be mitigated. A total of 403 students were asked to fill in the responses in Lahore belonging to different ages, gender, education level, and economic status. The study found that individuals who had a higher level of education were more likely to be aware of the climate and the impact of their actions on the environment. This highlights the importance of education in promoting sustainable behavior and improving environmental quality. Overall, this study provides valuable insights into students' attitudes toward climate change and environmental responsibility, which can inform policy decisions aimed at promoting sustainable practices and protecting our planet for future generations.

INTRODUCTION

Climate change impacts are extensive. Physiological, geographical, social, political, and economic effects can be seen with changing climate. Global climate change is changing our relationship with the environment, altering stable climate factors, and making them dangerous, unpredictable, and threatening. Many developing countries in the world are seriously threatened by climate change. Climate change has not only put pressure on water resources but also changed land use and impacted the ability of ecosystems to sustain food production, ensure an uninterrupted supply of freshwater resources, provision of ecosystem services, and promotion of local multifunctional (Abbasi Z et al. 2020).

Each and everything in the world grows and changes. So, the climate of the world also changes with time. Various studies show that climate change is happening much faster than before. Humanity is currently facing dramatic changes in climate. Temperatures, sea level rise, ocean warming, winter shortening and warming, increased occurrence of severe cyclones, melting of glaciers, and many other most common extreme climate events. These changes will have many negative effects on humans and natural ecosystems. For developing mitigation strategies, regional and broad knowledge of climate change is required. A lot of research has been done on climate change awareness among students, educators, farmers, and others. These studies indicate that we need to focus on a fundamental understanding of communities/

people to increase their susceptibility to climate change (Mohsin et al. 2022).

There are studies one from the United States and the other from the United Kingdom that have been done to further explain the risk of severe rain. They have cautioned that these hazards are brought on by extreme climate change, thus we must gradually address the problem of global warming. The two floods of 500 years each in Just 15 Years occurred and one of them occurred in the United States the Great Flood of 1993, which wreaked havoc on cities along the Mississippi River and its tributaries in nine Midwestern states. Hundreds of levees burst, forcing thousands of Americans to leave their homes and lives behind, and the total cost of the destruction ranged from \$12 to 16 billion in only 15 years (Singh et al. 2012).

A lot of people still question whether the climate is warming or not. A common challenge in understanding the problem of climate change is that science is complex, lengthy, and it requires thinking. Certain misguided judgments make the question wrong, in addition to conceptual flaws of global climate change like the difference between weather and climate (Singh et al. 2016).

The study was conducted on Karnataka's agriculture has been devastated by climate change, creating a shortage of food, and increasing poverty. Due to unpredictable rainfall patterns, crop yields are dropping, which has an impact on both farmers' and consumers' access to food. Food scarcity has a negative impact on livelihood growth and resilience, which is counterproductive. Researchers have claimed that climate change poses major concerns to farming households' ability to ensure food protection (Schweizer et al. 2005).

In the Palghar district of Maharashtra, more than 30% of women have a BMI underweight of 18.5 kg/m², and more than 50% of infants aged 6 to 59 months have anemia in 2015. The Indian non-profit organization The Energy Research Institute launched a series of interventions in 2018 to reduce chronic malnutrition and anemia connected to food insecurity by exploiting the area's abundance of natural resources and biodiversity. The major objective of the program is to encourage tribal tribes to resume including nutrient-rich, locally cultivated wild foods in their daily diet. The facilitation of community focus groups by knowledgeable local health professionals and the

introduction of nutrition initiatives in surrounding schools have increased social acceptance of these food sources (Wheeler et al. 2013).

A quarter of all carbon dioxide that is released onto land is absorbed by tropical forests, which are powerhouses in the carbon storage department. There is evidence that the 2005 and 2010 droughts may have reached a growth limit for tropical forests. Brazil has decreased deforestation in the Amazon by 60–70% since 2004, although additional decreases might not have a significant impact on the global carbon budget. With vast amounts of carbon being released by fires, Indonesia has the highest rate of deforestation and the largest area of forest cleared worldwide (Gairola et al. 2010).

Due to short-term crop output fluctuations and food insecurity in sensitive places, climate change has the potential to obstruct efforts to end world hunger. A "climate-smart food system" needs to be built through investments in adaptation and mitigation (Chang S et al., 2018). Healthcare systems in the Himalayan region that rely on medicinal plants are significantly affected by climate change. This study examined how Vaidyas perceived medicinal herbs and their impact on conventional medical practices. The locals employ 15 highly valuable medicinal herbs to treat illnesses, but due to changes in phenoplasts, and have shifted the collection season. To adapt to the changes, traditional healers have discovered various plant species as alternatives (Sanjay et al. 2010).

Global health initiatives have increased as a result of the terrible effects that climate change has on the world's poorest citizens. In order to address this, a collaborative learning initiative is proposed to raise awareness of climate change, strengthen the evidence base, incorporate climate change mitigation and adaptation concerns into program design, and align existing global health program targets and methods with more comprehensive frameworks for climate change and sustainable development (Nelson et al. 2009).

Pakistan is a country that is quite deprived in terms of resources with a population that is quite large and is increasing day by day very quickly. It has an exceptionally low natural resource base and socio-cultural conditions in particularly disadvantaged areas conditions. The population of Pakistan is estimated at about 190 million people and the growth rate of the annual population is 2.2%. Agriculture and power

generation in Pakistan rely severely on the irrigation water flowing from Himalayan glaciers. Being a dry land, Pakistan is always short of water for agriculture and urban/industrial use. In addition, Pakistani people, especially those living in slums and squatter settlements, suffer from heat stress and various diseases such as gastroenteritis, dengue fever, and malaria. Changing of climate is an extra load for this country as it is already facing a lot of issues and burdens. On the ranking list of the countries most affected by the change of climate, Pakistan is the 12th number (Shahid et al. 2016).

It is noticeably clear that Pakistan is one of those countries which are most exposed to climate change. Pakistan has experienced many severe floods, droughts, and storms during the past few years. However, there are very few studies present that have focused on studying why Pakistan is the most susceptible to the risk caused by climate change. Floods and droughts, along with multiple natural threats that people face, are major sources of economic and social risk to individuals and contribute to rising deaths. Especially in developing countries, rural populations are often vulnerable to floods due to their low levels of adaptability and wealth. The intensity and severity of floods in developing countries are primarily ecological and climate change related. The lack of professional and efficient identification of the impacts of changing climatic conditions on agricultural systems can have exceptional and negative impacts on food productivity and its security and contribute to poverty alleviation and sustainable development. Development efforts can also become an obstacle (Fahad et al. 2020).

Due to climate change, Lahore has experienced many major events recently. Winter is very short, and summer is longer than usual. Summer temperatures in Lahore in 2019 were extremely hot, with some days exceeding 45 degrees Celsius. As an agricultural city, Lahore also faces climate challenges, with hailstorms distorting crops. This suggests that the ice cap has melted. Pakistan has also suffered from flood problems in recent years (Ranal et al. 2018).

Climate change is an environmental crisis that requires widespread attention not only from policymakers but also from the general public. School, College, and University students were selected as the target group to determine public knowledge about climate change in Pakistan. There are many conceptual difficulties students face in such subjects

due to limited knowledge and many misunderstandings. Due to limited local media coverage on the issue, students may believe anything and everything that can turn a simple scientific phenomenon into a debate in their minds (Gulraiz et al. 2021)

Lahore is the capital of Punjab and is the second most populous city in the country. The city has a long history and has undergone remarkable expansion, growth, and development activities since the 1970s, including buildings, road construction, and loss of prime agricultural land, among many other human activities (Shirazi et al. 2012).

Therefore, the main objective of this study was to know the perception of climate change among college students in Lahore. The main purpose of this study is to raise awareness and educate young people about climate change.

METHODOLOGY

The research was carried out at Kinnaird College for Women and nearby institutes including, Lahore College for women university, university of Central Punjab, Punjab University, and KIPS School in Lahore, region of Punjab Pakistan. A survey was conducted in the adult population among students who examined climate change awareness in their region and filled out the questionnaire. The poll included a total of 403 students. A Google-formed-based questionnaire was developed and conducted online. The questionnaire was reviewed multiple times and kept simple. The responses were analyzed. The purposes of the survey and all the terms used in the survey were explained to the respondents and maintained confidentially. The survey was conducted on a limited sample of the city's population. As a result, the research sample was biased. The research shows the estimation of awareness regarding climate change in certain age groups of people. Secondary data was collected by using the internet and library to gain access to publish articles, journals, and reports. Primary data was collected through a questionnaire survey. The questionnaire included closed-ending questions that were filled by 800 students of urban communities. The survey shows different responses from students regarding climate change awareness. The questionnaire survey responses were statistically analyzed and compiled by using the IBM SPSS

software. Positive and Negative responses of defendants were calculated.

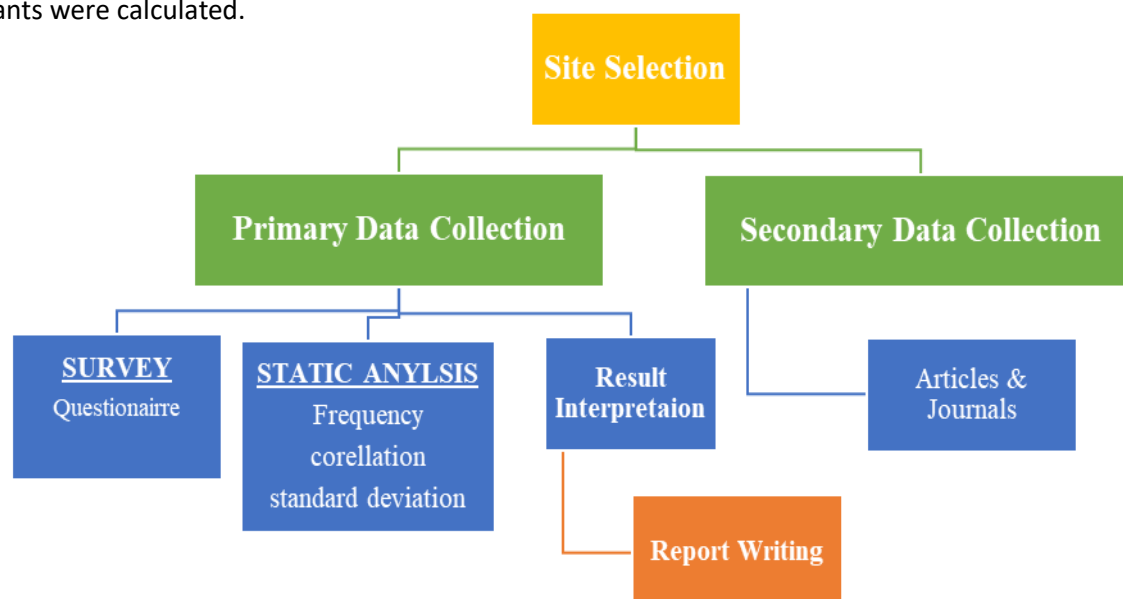


Figure 1. Research Methodology

RESULTS AND DISCUSSION

Firstly, frequencies between the variables were obtained using numeric values. In frequencies, cumulative percentages were also found. Frequencies were in two categories, Yes or No. Standard deviation and descriptive statistics were obtained. In Standard deviation minimum, maximum, and mean were also obtained. At last, Correlations were obtained between different variables. Correlations were obtained by correlating age, gender, socioeconomic status, and education level with different variables. Then Frequency, Standard deviation, and correlation results were discussed. The result of the questionnaire Survey has a different frequency. The respondents (81.1%) think that global climate is changing thus the results of that question show that the students at different educational institutes already have some knowledge about climate change because of its increasing effects on weather. The respondents (73.7%) think that human activities are really responsible for climate change which can be due to the increasing use of fossil fuels for vehicles and for energy etc. More than half of respondents (67%) think that deforestation is one of the causes of climate change as forests are the larger sinks of carbon. The forest is cleared for agriculture or woods which increases the release of carbon dioxide in the atmosphere that can cause climate change. In the questionnaire, respondents were asked about the UNFCC which showed that more than half of

respondents (61.3%) know about the UNFCC which was signed in 1993 for addressing the problems that are increasing the greenhouse gas in the atmosphere due to anthropogenic activities that cause climate change. The respondents (67.5%) know about the international panel on Climate Change which is the policy maker on climate change to control the climate change activities. The respondents (71%) are aware that vehicular emissions are one of the causes of climate change, so they know that fossil fuel burning releases greenhouse gases like carbon dioxide and methane in the atmosphere which is enough to cause climate change. The respondents (66.5%) really knew that industrial emission is one of the causes of climate change that releases every kind of chemical in the atmosphere that can change the climate. Human health issues are due to climate change, so respondents (80%) think that yes, it is due to climate change that introduces the dangerous greenhouse gases in the atmosphere that cause asthma or skin allergies on exposure to climate change. In the Questionnaire respondents (78.2%) think that water-related issues are mainly due to climate change so they must know that climate changes increase the temperature which increases the chances of flooding that can disturb the water flow in dams. The respondents (81.9%) think that agricultural production is affected by climate change as they know

that temperature is changing that are affecting the growth of crops that grows in summer and in springs or winter and majority respondents (78%) agreed that climate change is responsible for the natural disasters like floods that occurred in SINDH due to change of temperature. According to respondents (84.6%), climate change can cause threats to nutritional security and malnutrition by increasing the chances of diseases in crops and by destroying the crop's nutritional value which led to malnutrition. The respondents (65.5%) agree that climate change has impacted food security in Pakistan by increasing the chances of drought and floods mainly in Sindh province. The majority of respondents (80.8%) agreed that higher temperatures and emissions of carbon dioxide in the atmosphere and drought and floods affect the staple food in the world. Most of the countries including Latin America and most parts of Africa have rice as their staple food so the areas that are facing drought due to increased temperature can have problems in cultivating the rice. More than half of respondents (75.4%) agreed that vector-borne diseases are due to climate change then they must know that the most viral disease carried by a vector in the world is dengue and over one-third of the world's population resides in warm, humid tropical areas, where the temperature is excellent for the mosquitoes that transmit dengue and the other lethal and extensively researched climate-sensitive vector-borne disease is malaria, which is brought on by plasmodium species and spreads between people by infected female *Anopheles* mosquitoes. In Questionnaire, the respondents (74.2%) agreed that physical hazards due to climate change can be health-related such as climate change causing floods that destroy people's personal property including their agricultural lands from where they eat, and these people can face malnutrition so climate change can cause physical hazards related health. The respondents (75.4%) agreed that lifestyle changes can help to cope with climate change that can be done by using public transport more than personal transport and by using more renewable energy sources that can decrease the release of carbon dioxide in the atmosphere and it can be done by planting the more trees. In Questionnaire, the respondents (66.3%) agreed that awareness about climate change is important to reduce the changes in climate and it can be done by spreading awareness in areas where people are less educated including villages where people still burn their lands to clear their land which is the old and destructive methods to clear the land that can cause climate change by increasing the

temperature and by introducing the smoke in the air. The respondent (74.7%) International partnership and cooperation are important to cope up with the climate change because all countries are responsible for the causes of greenhouse gases especially developed countries all countries are suffering due to climate change so international partnership and cooperation are important regarding climate change. As shown in the table below, in Questionnaire the respondents (74.8%) agree that awareness and campaigns about climate change can help to control climate change and that campaigns about climate change can be done by individuals on social media where the person can engage a large amount of audience. The respondents (65%) agreed that helping the community on addressing climate change and food security by educating them about the activities that can cause threats to food security and the respondents (71.7%) also agreed that more scientific research is still needed various aspects and climate change because scientific new research can further help to understand why global temperatures continue to rising and how global warming is going to affect the world and different scientific studies will helps to address this issue before it gets worse.

The respondents (71%) are aware that vehicular emissions are one of the causes of climate change, so they know that fossils fuels burning release greenhouse gases like carbon dioxide and methane in the atmosphere that is enough to cause climate change. The respondents (66.5%) really knew that industrial emission is one of the causes of climate change that releases every kind of chemical in the atmosphere that can change the climate. Human health issues are due to climate change, so respondents (80%) think that yes, it is due to climate change that it introduces the dangerous greenhouse gases in the atmosphere that cause asthma or skin allergies on exposure to the climate change. In the Questionnaire respondents (78.2%) think that water related issues are mainly due to climate change so they must know that climate changes increase temperature that increases the chances of flooding that can disturb the water flow in dams. The respondents (81.9%) thinks that agricultural production is affecting by the climate change as they know that temperature is changing that are affecting the growth of crops that grows in summer and in springs or winter and majority respondents (78%) agreed that climate change is responsible for the natural disasters like floods that occurred in SINDH due to change of temperature. According to

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The table below shows descriptive statistics. Mean (M) and Standard deviation (Std. Deviation) are shown in the above table. As shown in the table, information of 403 responses is included. The difference between maximum and minimum age of respondents is 18-22 years. Respondents are mostly females and males are very few. For Socio-Economic status maximum respondents' response is middle Class and minimum response is upper class. The maximum responses for Education Level are Undergraduate and Minimum Response is Postgraduate. Standard deviation measures the dispersion among data sets. Do you think that the global climate is changing? are (Mean:.8114 and St. Deviation: .39617), For do you think that human activities are contributing to climate change? are (Mean: 7.370 and St. Deviation: .44082), For do you think that deforestation contributes most significantly towards climate change? are (Mean: .6700 and St. Deviation: .47081). For Have you ever heard about UNFCC (United Nations Framework Convention on Climate Change)? are (Mean: 6.129 and St. Deviation: .48769), For have you ever heard about IPCC (International Panel on Climate Change)? are (Mean: .6749 and St. Deviation: .46898). For do you think that vehicular pollution is contributing to climate change? are (Mean:.7196 and St. Deviation: .44975), For do you think that industrial pollution is also major reason behind climate change? are (Mean: .6650 and St. Deviation: .47257), For do you think that health-related issues have connection to changing climate? are (Mean:.7940 and St. Deviation: .40490). For do you think that water-related issues (quantity as

well as quality of water) are mainly pertaining to changing climate change? are (Mean: .7618 and St. Deviation: .42652), For do you think that reduction in agricultural production is related to climate change? are (Mean:.8089 and St. Deviation: .39363), For do you think that climate change can lead to frequent natural disasters? are (Mean:.6799 and St. Deviation: .46709). For do you think that the impact of climate change threatens nutrition security and causes undernutrition? are (Mean: .8561 and St. Deviation: .35145), For do you think Pakistan is currently facing impacts of climate change on food security are for (Mean: .6551 and St. Deviation: .47593), For do you agree higher temperatures, water scarcity, droughts, floods and greater CO2 concentrations in the atmosphere affect staple crop around the world? are (Mean: .7940 and St. Deviation: .40490). For do you think that vector borne diseases are also health related impact of climate change? are (Mean: .7444 and St. Deviation: .43673), For do you think that direct physical hazards of extreme climatic events are health-related impact of climate change? are (Mean: .7320 and St. Deviation: .44346), For do you think that various issues due to climate change are same at different places? are (Mean: .7841 and St. Deviation: .41194). For do you think that lifestyle changes would

be effective in tackling climate change. (Mean: .7444 and St. Deviation: .43673), For do you think that awareness and education regarding climate change is important to prevent further climate change? are (Mean: .6526 and St. Deviation: .47673), For do you think that international partnership and cooperation is also essential in order to tackle climate change? are (Mean:.6873 and St. Deviation: .46415). For have you ever promoted awareness on climate change or participated in climate change awareness campaigns? (Mean:.7370 and St. Deviation: .44082), For if no, will you ever help community on addressing climate change and food security? are (Mean:.6501 and St. Deviation: .47752) and For do you think that more scientific research is still needed on various aspects and climate change? are (Mean: .7072 and St. Deviation: .45561). Total number of responses includes N: 403. All the values the M are laying within the range of (0 to +1) which confirms the normality of the data similarly the values of standard deviation are laying within in the range of (0.3 to 0.6) also shows the normality of data and the descriptive statistics of each item were also measured to get the data which is presented in the appendix. These values confirm the normality of each response.

Table 1: Frequencies and Cumulative Percentages between Different Variables

	Categories	Frequencies	Cumulative Percentage %
Global Climate is Changing	Yes	327	100
	No	76	18.9
Human Activities Are Contributing to Climate Change	Yes	297	100
	No	107	26.3
Deforestation Contributes Most Significantly Towards Climate Change	Yes	270	100
	No	133	33
Ever Heard About IPCC (International Panel on Climate Change)	Yes	272	100
	No	131	32.5
Ever Heard About UNFCC (United Nations Framework Convention on Climate Change)	Yes	247	100
	No	156	38.7
Vehicular Pollution Is Contributing to Climate Change	Yes	290	100
	No	113	28
Industrial Pollution is Also a Major Reason Behind Climate Change	Yes	268	100
	No	135	33.5
Health Related Issue in Human Have Connection to Climate Change	Yes	320	100
	No	83	20.6
Water Related Issues Are Mainly Pertaining to Changing Climate Change	Yes	307	100
	No	96	23.8
Reduction in Agricultural Production Is Related to Climate Change	Yes	326	100
	No	77	19.1
Climate Change Can Lead to Frequent Natural Disasters	Yes	274	100
	No	179	32

Impact of Climate Change Threats Nutrition Security and Causes Undernutrition	Yes No	345 58	100 14.4
Pakistan Is Currently Facing Impacts of Climate Change on Food Security	Yes No	264 139	100 34.5
Higher Temperatures, Water Scarcity, Droughts, Floods, And Greater CO ₂ Concentrations in The Atmosphere Affect Staple Crops Around the World	Yes No	320 83	100 20.6
Vector Borne Diseases Are Also Has Health Related Impact of Climate Change	Yes No	300 103	100 25.6
Direct Physical Hazards of Extreme Climatic Events Are Health Related Impact of Climate Change	Yes No	295 108	100 26.8
Various Issues Due to Climate Change Are Same at Different Places	Yes No	316 87	100 21.6
Lifestyle Changes Would Be Effective in Tackling Climate Change	Yes No	300 103	100 25.6
Awareness and Education Regarding Climate Change Its Important to Prevent Further Climate Change	Yes No	263 140	100 34.7
International Partnership and Cooperation is Also Essential to Manage Climate Change	Yes No	277 126	100 31.3
Promoted Awareness on Climate Change or Participated in Climate Change Awareness Campaigns	Yes No	297 106	100 26.3
Helped Community on Addressing Climate Change and Food Security	Yes No	262 141	100 35
More Scientific Research is Still Needed on Various Aspects and Climate Change	Yes No	285 118	100 29.3

Table 2: Mean and Standard Deviation between Different Variables

	Mean	Std. Deviation
Gender	.5459	.49851
Age range	1.1836	.57392
Socio Economic	1.2581	.58836
Educational level	1.2084	.69556
Global Climate is Changing	.8114	.39167
Human Activities Are Contributing to Climate Change	.7370	.44082
Deforestation Contributes Most Significantly Towards Climate Change	.6700	.47081
Ever Heard About IPCC (International Panel on Climate Change)	.6129	.48769
Ever Heard About UNFCC (United Nations Framework Convention on Climate Change)	.7196	.44975
Vehicular Pollution Is Contributing to Climate Change	.6749	.46898

Industrial Pollution is Also a Major Reason Behind Climate Change	.6650	.47257
Health Related Issue in Human Have Connection to Climate Change	.7940	.40490
Water Related Issues Are Mainly Pertaining to Changing Climate Change	.7618	.42652
Reduction in Agricultural Production Is Related to Climate Change	.8089	.39363
Climate Change Can Lead to Frequent Natural Disasters	.6799	.46709
Impact of Climate Change Threats Nutrition Security and Causes Undernutrition	.8561	.35145
Pakistan Is Currently Facing Impacts of Climate Change on Food Security	.6551	.47593
Higher Temperatures, Water Scarcity, Droughts, Floods, And Greater CO ₂ Concentrations in The Atmosphere Affect Staple Crops Around the World	.7940	.40490
Vector Borne Diseases Are Also Has Health Related Impact of Climate Change	.7444	.43673
Direct Physical Hazards of Extreme Climatic Events Are Health Related Impact of Climate Change	.7320	.44346
Various Issues Due to Climate Change Are Same at Different Places	.7841	.41194
Lifestyle Changes Would Be Effective in Tackling Climate Change	.7444	.43673
Awareness and Education Regarding Climate Change Its Important to Prevent Further Climate Change	.6526	.47673
International Partnership and Cooperation is Also Essential to Manage Climate Change	.6873	.46415
Promoted Awareness on Climate Change or Participated in Climate Change Awareness Campaigns	.7370	.44082
Helped Community on Addressing Climate Change and Food Security	.6501	.47752
More Scientific Research is Still Needed on Various Aspects and Climate Change	.7072	.45561

Pearson correlation was studied between multiple variables to determine the level of awareness regarding climate change between respondents of students of Lahore. The results of correlating variables with each other were as follows. Firstly, the Pearson correlation was performed between multiple variables like gender of respondents, awareness about global climate change, contribution of human activities to climate change and contribution of deforestation towards climate change. As a result, positive correlation was observed between respondent's gender and perception about climate change, human activities contribution to climate change and deforestation contribution towards climate change at 1% level of significance. Pearson's correlation was also performed between different

variables like age of respondents, heard about UNFCC, contribution of vehicular pollution to climate change and heard about IPCC. Positive correlation was determined between age, UNFCC, vehicular pollution and IPCC at the 1% level of significance. Pearson's correlation was also performed between different variables like socioeconomic status of respondents, industrial population major reason behind climate change, water related issues pertaining to climate change and human health related issues connection to climate change. Positive correlation was determined between socioeconomic, industrial pollution, water related issues and human health related issues at the 1% level of significance. Pearson's correlation was also performed between different variables like education level of respondents, agricultural production related

to climate change, climate change may lead to frequent natural disasters and climate change impact threatens nutrition security causes undernutrition. Positive correlation was determined between education level, frequent natural disasters, agricultural production and threatens nutrition security at the 1% level of significance. Pearson's correlation was also performed between different variables like gender of respondents, Pakistan facing impacts of climate change on food security, higher temperatures, water scarcity, droughts, floods, and greater CO₂ concentrations in the atmosphere affect staple crop around the world and vector borne diseases health related impacts of climate change. Positive correlation was determined between gender, Pakistan, and food security, affect staple crop and vector borne diseases at the 1% level of significance. Pearson's correlation was also performed between different variables like age of respondents, direct physical hazards of extreme climatic events health related impacts of climate change, issues due to

climate change same at different places and changes in lifestyle for tackling climate change. Positive correlation was determined between age, direct physical hazards, issues same and changes in lifestyle at the 1% level of significance. Pearson's correlation was also performed between different variables like socioeconomic status of respondents, awareness, and campaign to prevent climate change, international partnership, and cooperation to manage climate change and promoted or participated in climate change awareness campaign. Positive correlation was determined between socioeconomic, awareness and campaign, international partnership and cooperation and promotion and participation at the 1% level of significance. Pearson's correlation was also performed between different variables like the education level of respondents, help in addressing the community, scientific research needed on various aspects and climate change. Positive correlation was determined between education level, addressing the community, and scientific research at the 1% level of significance.

Table No 3: Correlation Between Level of Education, Helping the Community and Scientific Research

		Gender	Do you think global climate is changing	Do you think that human activities are contributing to climate change	Do you think that deforestation contributes most significantly towards climate change
Gender	Pearson Correlation	1	.197**	.168**	-.025
Do you think global climate is changing	Pearson Correlation	.197**	1	.130**	-.109*
Do you think that human activities are contributing to climate change	Pearson Correlation	.168**	.130**	1	-.012
Do you think that deforestation contributes most significantly towards climate change	Pearson Correlation	-.025	-.109*	-.012	1
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					
		Age range	Have you ever heard about UNFCC (United Nations Framework Convention on Climate Change)	Do you think that vehicular pollution is contributing to climate change?	Have you ever heard about IPCC (International panel on Climate Change)?
Age range	Pearson Correlation	1	-.261**	-.166**	.074
Have you ever heard about UNFCC (United Nations Framework	Pearson Correlation	-.261**	1	-.167**	-.051

Convention on Climate Change)					
Do you think that vehicular pollution is contributing to climate change?	Pearson Correlation	-.166**	-.167**	1	.133**
Have you ever heard about IPCC (International panel on Climate Change)?	Pearson Correlation	.074	-.051	.133**	1
**. Correlation is significant at the 0.01 level (2-tailed).					
		Socio Economic	Do you think industrial pollution is also a major reason behind climate change?	Do you think health related issue in human have connection to climate change?	Do you think that water related issues are mainly pertaining to changing climate change?
Socio Economic	Pearson Correlation	1	.124*	-.058	.057
Do you think industrial pollution is also a major reason behind climate change?	Pearson Correlation	.124*	1	-.127*	-.175**
Do you think health related issue in human have connection to climate change?	Pearson Correlation	-.058	-.127*	1	-.155**
Do you think that water related issues are mainly pertaining to changing climate change?	Pearson Correlation	.057	-.175**	-.155**	1
*. Correlation is significant at the 0.05 level (2-tailed).					
**. Correlation is significant at the 0.01 level (2-tailed).					
		Educational level	Do you think that reduction in agricultural production is related to climate change?	Do you think that climate change can lead to frequent natural disasters?	Do you think that the impact of climate change threatens nutrition security and causes undernutrition?
Educational level	Pearson Correlation	1	-.254**	-.039	.113*
Do you think that reduction in agricultural production is related to climate change?	Pearson Correlation	-.254**	1	.045	.052
Do you think that climate change can lead to frequent natural disasters?	Pearson Correlation	-.039	.045	1	.325**
Do you think that the impact of climate change threatens nutrition security and causes undernutrition?	Pearson Correlation	.113*	.052	.325**	1
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

		Gender	Do you think Pakistan is currently facing impacts of climate change on food security?	Do you agree higher temperatures, water scarcity, droughts, floods, and greater CO2 concentrations in the atmosphere affect staple crops around the world?	Do you think that vector borne diseases are also has health related impact of climate change?
Gender	Pearson Correlation	1	.041	-.033	.037
Do you think Pakistan is currently facing impacts of climate change on food security?	Pearson Correlation	.041	1	-.060	-.030
Do you agree higher temperatures, water scarcity, droughts, floods, and greater CO2 concentrations in the atmosphere affect staple crops around the world?	Pearson Correlation	-.033	-.060	1	.025
Do you think that vector borne diseases are also has health related impact of climate change?	Pearson Correlation	.037	-.030	.025	1
		Age range	Do you think that direct physical hazards of extreme climatic events are health related impact of climate change?	Do you think that various issues due to climate change are same at different places?	Do you think that lifestyle changes would be effective in tackling climate change?
Age range	Pearson Correlation	1	-.031	-.053	-.120*
Do you think that direct physical hazards of extreme climatic events are health related impact of climate change?	Pearson Correlation	-.031	1	-.045	-.098
Do you think that various issues due to climate change are same at different places?	Pearson Correlation	-.053	-.045	1	-.003
Do you think that lifestyle changes would	Pearson Correlation	-.120*	-.098	-.003	1

be effective in tackling climate change?					
*. Correlation is significant at the 0.05 level (2-tailed).					
		Socio Economic	Do you think that awareness and education regarding climate change its important to prevent further climate change?	Do you think that international partnership and cooperation is also essential to manage climate change?	Have you ever promoted awareness on climate change or participated in climate change awareness campaigns?
Socio Economic	Pearson Correlation	1	.072	.041	.099*
Do you think that awareness and education regarding climate change its important to prevent further climate change?	Pearson Correlation	.072	1	.036	-.022
Do you think that international partnership and cooperation is also essential to manage climate change?	Pearson Correlation	.041	.036	1	-.123*
Have you ever promoted awareness on climate change or participated in climate change awareness campaigns?	Pearson Correlation	.099*	-.022	-.123*	1
	Sig. (2-tailed)	.046	.666	.013	
	N	403	403	403	403
*. Correlation is significant at the 0.05 level (2-tailed).					

		Educational level	If no, will you ever help community on addressing climate change and food security?	Do you think that more scientific research is still needed on various aspects and climate change?
Educational level	Pearson Correlation	1	.130**	.036
If no, will you ever help community on addressing climate change and food security?	Pearson Correlation	.130**	1	.077
Do you think that more scientific research is still	Pearson Correlation	.036	.077	1

needed on various aspects and climate change?				
**. Correlation is significant at the 0.01 level (2-tailed).				

CONCLUSION

Climate change is changing our relationship with the environment. As time passes, the climate is changing rapidly. This is mainly due to activities performed by humans. Climate change affects our environment and the well-being of living organisms. For developing mitigations and strategies for climate change, a lot of research is required. The phenomenon of climate change is very difficult to understand, and it requires a lot of effort. Pakistan is on 12th rank out of all the countries most exposed to climate change. We know that Pakistan is already facing a lot of social and economic issues, climate change is an additional stress and load for this country. People of Pakistan are greatly affected by climate change. If we talk about Lahore, its population is exposed to climate change and its impacts. The world needs to study climate change in detail, so the impacts and future are predicted. The main aim of conducting this survey was to analyze climate change awareness among the students of Lahore. The survey was filled by 403 students in Lahore. Out of 403, 220 were female whereas 183 were male. Out of 403 responses, 257 Students age ranged from 19-22 years, 110 students age ranged above 22 years and only 36 students age ranged from 16-18 years. Social economic status of 237 students were middle class where 135 students belonged to upper class and only 31 students were from lower class. The education level of 191 students was Undergraduate while 148 students' education level was Postgraduate and only 64 students were from Intermediate.

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REFERENCES

- Abbasi, Z.A.K.; Nawaz, A. Impact of climate change awareness on climate change adaptations and climate change adaptation issues. *Pakistan Journal of Agricultural Research*, 2020, 33(3), 619.
- Mohsin, A.; Shehzad, A.; Bilal, F.; Imran, F.; Akhtar, S.; Fatima, S.A. Assessment of Awareness on Climate Change among Public and Private Universities of Lahore. *Indonesian Journal of Innovation and Applied Sciences*, 2022, 2(1), 80-87.
- Singh, B.R.; Singh, O. Study of impacts of global warming on climate change: rise in sea level and disaster frequency. Global warming—impacts and future perspective. 2012.
- Singh, G. Climate change and food security in India: challenges and opportunities. *Irrigation and drainage*, 2016, 65, 5-10.
- Schweizer, D. M.; Kelly, G.J. An investigation of student engagement in a global warming debate. *Journal of Geoscience Education*, 2005, 53(1), 75.
- Wheeler, T.; Von Braun, J. Climate change impacts global food security. *Science*, 2013, 341(6145), 508-513.
- Chang, S.H.; Lee, S. Air Pollution Assessment via Statistical Reasoning, and its Implications: A Case Study of Baekryeong Island in Republic of Korea, 2018.
- Gairola, S.; Shariff, N.M.; Bhatt, A.; Kala, C.P. Influence of climate change on production of secondary chemicals in high altitude medicinal plants: Issues needs immediate attention. *Journal of Medicinal Plants Research*, 2010, 4(18), 1825-1829.
- Sanjay, G.; Noresah, M.S.; Arvind, B.; Kala, C.P. Influence of climate change on production of secondary chemicals in high altitude medicinal plants: issues needs immediate attention. *Journal of Medicinal Plants Research*, 2010, 4(18), 1825-1829.
- Nelson, G.C.; Rosegrant, M.W.; Koo, J.; Robertson, R.; Sulser, T.; Zhu, T.; Ringler, C.; Msangi, S.; Palazzo, A.; Batka, M.; Magalhaes, M. Climate change: Impact on agriculture and costs of adaptation. *Intl Food Policy Res Inst*; 2009
- Shahid, Z.; Piracha, A. Awareness of climate change impacts and adaptation at local level in Punjab, Pakistan. *Balanced Urban Development: Options and Strategies for Liveable Cities*, 2016, 409-428.
- Fahad, S.; Wang, J. Climate change, vulnerability, and its impacts in rural Pakistan: a review.

Environmental Science and Pollution Research, 2020, 27, 1334-1338.

Rana, I.A.; Bhatti, S.S. Lahore, Pakistan—Urbanization challenges and opportunities. *Cities*, 2018, 72, 348-355.

Gulraiz, K.; Ali, A. Expressed Willingness and Awareness of Students towards Climate Change in Lahore, Pakistan. *Indonesian Journal of Innovation and Applied Sciences*, 2021, 1(3), 219-228.

Shirazi, S.A. Temporal analysis of land use and land cover changes in Lahore-Pakistan. *Pakistan Vision*, 2012, 13(1), 187.