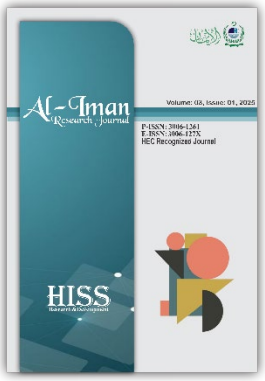
Volume 03, Issue 01,
January-March 2025
PP: 104-121
Open Access on:
www.alimanjournal.com

AL-IMAN Research Journal
P-ISSN: 3006-1261 E-ISSN: 3006-127X



Gender Differences in Attitude of University Students about Climate Change

*Taliha Ali[1], Madiha Nadeem[2]**

Article History

Received
06-02-2025

Accepted
21-02-2025

Published
23-02-2025

Abstract & Indexing

Abstract

Climate change is a major global environmental challenge that affects food, water supply, energy production, human health and well-being, and ultimately threatens the scope of United Nations Sustainable Development Goals (2030). One of the countries most impacted by climate change is Pakistan. The mitigation and adaptation of climate change may be significantly impacted by people's knowledge and behavior. In this regard, youth have the potential to bring change in society through awareness and behavioral change. This study used the cross-sectional survey design to collect information from students enrolled in public and private universities in Lahore to assess their attitude towards climate change. For data collection, a self-constructed tool to measure students' behavior and the standardized tool of climate change awareness scale developed by Gonen et al. (2022) were used. Data was analyzed by using descriptive and inferential statistics. The analysis found the gender differences among students in their reckless behavior and awareness about climate change. Additionally, the influence of discipline and father's education is found critical in shaping students' attitude towards climate change. It is hoped that the findings would help educators and policy makers to sensitize the youth about taking responsible initiatives that effectively foster environmentally friendly behavior.

Keywords:

Climate, University, Students, Attitude, Education.

[1]*Student of Gender and Development Studies, Lahore College for Women University Jail Road, Lahore, Pakistan. ataliha900@gmail.com*
[2]*Lecturer, Gender and Development Studies, Lahore College for Women University Jail Road, Lahore, Pakistan. *Corresponding Author madiha.nadeem@lcwu.edu.pk*

Introduction

Climate change is a global development concern and climate change adaptation measures are not widely used in developing nations. It has an unfavourable impact on developing nations (IFAD, 2010) such as human health, ecosystem health and biodiversity, food production, economic growth, tourism, and water resources (Kovats et al., 2005; Ebi et al., 2006; and Arnell, 2004) and is now considered a global threat (Ahchong & Dodds, 2012). It has a wide-ranging impact, including rising sea levels, droughts, and melting glaciers worldwide. Moreover, it may pose a significant threat to water availability in Asia (Whaley, 2008). Several studies have now demonstrated that climate change is occurring at a significantly faster rate than previously (Indrani et al., 2010). These alterations have various harmful consequences for both humans and the natural environment (Nisha et al., 2014).

Pakistan is one of the top 10 nations in the world that is most impacted by natural catastrophes and climate change (World Bank Group, 2022). Sea level along the Karachi coast has risen by around 1.1 mm annually over the previous century, with a yearly mean temperature increase of about 0.63°C recorded throughout the nation (Ministry of Climate Change Government of Pakistan, 2022; Chaudhry, 2017). Moreover, Pakistan has been widely acknowledged for its high susceptibility to climate change. According to the Ministry of Climate Change, Government of Pakistan (2022), it has already seen an increase in the frequency and intensity of extreme climate events, such as floods, droughts, cyclones, heavy rain spells, extremely high temperatures, etc. These events have an impact on the ecosystems, people, settlements, and infrastructure of the country (Main Report Ministry of Planning Development & Special Initiatives, 2022). The World Bank Group estimates that between 1992 and 2021, weather- and climate related disasters in Pakistan caused economic losses totaling US$29.3 billion (adjusted for inflation to US dollars for 2021) due to damage to property, crops, and livestock; this amount represents 11.1% of the country's GDP for the year2020.

Significant historical occurrences in Pakistan include the protracted drought that struck the southern region of the nation from 1998 to 2002 and again in 2014 and 2015; the severe heat wave that struck the country in 2015, resulting in over 65,000 hospital admissions for heat stroke; and the devastating flood that struck the country in 2010 and destroyed over 2,000 lives, affecting one-fifth of the country and 20 million people (Ministry of Climate Change Government of Pakistan, 2022;Climate Risk Country Profile Pakistan,2021). The number of people in Pakistan who will be impacted by flooding because of climate change is expected to rise. By 2035–2044, an additional 5 million people are expected to be exposed to extreme river floods, and by 2070–2100, an additional 1 million people could be exposed to coastal flooding annually (Climate Risk Country Profile Pakistan, 2021). Pakistan’s extreme climate change susceptibility has been demonstrated by the floods of 2022. A mix of riverine, urban, and flash floods, together with heavy rainfall, caused an unparalleled tragedy in the nation between June and August of 2022. Nearly 8 million people have been displaced because of the floods, making up one in seven individuals, according to the National Disaster Management Authority (NDMA). More than 1,700 people have perished in the floods, with children making up a third of the casualties. The post-disaster needs assessment for the flood of 2022 estimates that the overall projected damages would be more than USD 14.9 billion, the total anticipated economic losses will be around USD 15.2 billion, and the total estimated requirements for resilient reconstruction

and rehabilitation will be at least USD 16.3 billion. It is estimated that the floods would directly result in a 2.2% reduction in GDP for Fiscal Year 2022. The greatest expected contraction of 0.9% of GDP will occur in the agriculture sector (The World Bank Group, 2022).

Climate change is expected to have a significant influence on Pakistan's agriculture industry (World Bank Group, 2022). The Economic Survey of Pakistan, 2020–21 highlighted Approximately 68% of Pakistan's population lives in rural regions and depends on agriculture for their survival; it also employs 45% of the country's labor force and contributes 19.2% of the country's GDP (Government of Pakistan, 2021).The agriculture sector would be impacted by climate change primarily through decreased crop output, negative effects on animal health, and a rise in agricultural production losses due to extreme weather events (Pakistan's Ministry of Climate Change, 2022). The country's risk of extreme poverty, food insecurity, and malnutrition will rise as a result of these agricultural consequences, making it harder to reduce poverty and advance human development than it is now (World Bank Group, 2022).Furthermore, because of the intense heat, climate change in Pakistan is predicted to worsen the health effects of air and water pollution, reduce worker productivity, affect water availability, which will have an impact on riverine ecology, water security, and hydropower production, and have an impact on Pakistan's biodiversity (World Bank Group, 2022).

Pakistan is dealing with the problem of population growth and urbanization too. Misuse of natural resources has a negative impact on the ecosystem. To safeguard the natural environment and promote sustainable development, natural resources must be protected and used effectively (Nadeem, 2008). As though public education and awareness-building on climate change have also been actively pursued by the Pakistani government and several non-governmental organizations (NGOs). The nation's commitment to tackling climate change is reflected in national policies like the Pakistan Climate Change Act and the National Climate Change Policy, which have shaped public opinion by portraying the issue as a major policy concern (Government of Pakistan, 2012; Government of Pakistan, 2017). Furthermore, it has regulations in place to combat climate change, but there are several systemic obstacles in the way. These problems include poor execution, a lack of funds, and poor cooperation amongst different parties, political will deficits and bureaucratic inefficiencies (Khan et al., 2021). Many efforts are still just proposals that are on paper and never become operational (Government of Pakistan, 2012; Government of Pakistan, 2017).

Many studies have been conducted to raise climate change awareness among students, educators, farmers, and other stakeholders. This research has revealed that an emphasis should be placed on educating the local community/people about climate change (Aymeric et al., 2016; Alfonso, 2021). As Pakistan is among the most vulnerable countries who bears the consequences of climate change globally. According to recent study, by the end of this century, climate change may cause summer heat waves in South Asia, an area of extreme poverty where one-fifth of the world's population lives. These heat and humidity levels would be higher than what humans can withstand without protection. If actions are taken right now to lessen the worst effects of global warming, it may still be possible to prevent such catastrophic warming (Chandler, 2017). In the last decade there are many unexpected events in Pakistan like, floods, droughts, heat waves etc. Over the past 20 years, these climate events have included winter fog, flash floods, landslides, displaced populations, summer wildfires, extreme heat waves and melting

glaciers affected most of the population (Shahid, 2012). In recent times, floods have also been a problem for Pakistan (Khadija et al., 2021).

Therefore, it has been emphasized that youth who represent 64% of the Pakistan's population need to be educated about this phenomenon so they can contribute to raising awareness, taking and promoting environment friendly measures. Therefore, to effectively comprehend and adapt to the issue of climate change, the sensitization and engagement of youth about the causes, effects, and potential solutions of climate changes is needed. This can guide efforts to manage the effects of climate change in the nation through policymaking (Oruonye et al., 2011). Various previous studies around the world reported lack of knowledge and awareness about climate change and its effects among students. Moreover, they placed a strong emphasis on educating young people about the effects of global warming (Bello, 2014; Yang et al., 2018; Rahman et al., 2018; Carr et al., 2015).

To encourage responsible consciousness and self-awareness, climate change awareness is essential. Sustainability programs and courses should be part of university curricula since students who take them have a better understanding of climate change and sustainable development. It's also critical to acknowledge the importance of peer networks and student-led projects. Students' understanding of and engagement with sustainable practices can be enhanced by participating in student groups that prioritize sustainability (Lee & Wang 2020; Gautamet al., 2021; Johnson et al., 2019& Rahman et al., 2014).

The knowledge that university students have about climate change and sustainability has a big impact on their actions and behavior. Students who actively participate in sustainability activities have a stronger commitment to promoting sustainable practices in their communities (Smith &Johnson, 2018& Jones et al., 2017). Awareness drives behavior change towards sustainable living. Nevertheless, execution is hampered by issues like limited resources, time, and money (Lee and Wang, 2020). Universities need to offer tools and support networks to encourage environmentally friendly conduct. It is necessary to address the gender differences in Pakistani university students' perspectives on climate change, as women frequently express greater levels of worry and awareness (Khan et al., 2019). Therefore, it is important to recognize these differences to develop targeted interventions and educational programs that promote climate change awareness and activism among Pakistani university students.

Statement of the Problem

To contribute to a more resilient and sustainable world, encouraging environmental preservation and social well-being, the study sought to investigate university students' behavior and awareness about climate change.

Objectives of the Study

- To understand the knowledge and attitude of university students about climate change
- To investigate the possible variables which might influence their attitude towards adopting climate-friendly practices

LITERATURE REVIEW

Climate change is one of the most concerning issues for developing economies (Guo et al., 2021). The term refers to long-term changes in temperature, precipitation patterns, and other aspects of the earth's climate system. These changes can be natural or driven by human activities, primarily through the emission of greenhouse gases. The operational definition of climate change is "climate change refers to a significant and lasting change in the statistical distribution of weather patterns over periods ranging from decades to millions of years"

(National Research Council, 2010, p. 3). It is also defined as “any systematic change in the long term statistics of climate elements (such as temperature, pressure, or winds) sustained over several decades or longer" (IPCC, 2007, p. 78). Pakistan is the most susceptible country to climate change (Cruz et al. 2007). The consequences of climate change are especially visible in Pakistan, where heatwaves, glacier melt, and unpredictable monsoon patterns have increased significantly (Ahmad et al., 2019).

Pakistan is one of the 10 most vulnerable countries in the world to climate-related disasters over the past 20 years (Eckstein, Künzel, & Schäfer, 2021). The National Disaster Management Authority (NDMA, 2020) of Pakistan has projected that each year, over 8 million people are affected by climate-related disasters such heatwaves, droughts, and floods. These disasters make relocation, health concerns, and the lack of access to food and water worse, especially for vulnerable groups including women, children, and the elderly. Moreover, agriculture is the main driver of Pakistan's economy and changing precipitation patterns, and rising temperatures are contributing to reduced agricultural output and food insecurity (Hussain & Mudasser, 2007). In addition, climate change increases the frequency and intensity of natural catastrophes such droughts and floods, which results in financial losses and relocation (Eckstein, Künzel, & Schäfer, 2021). The stress that these environmental problems put on limited resources makes it difficult to promote sustainable development and combat poverty. Furthermore, the health impacts of climate change disproportionately harm poorer populations, exacerbating inequality. According to Watts et al. (2018), these effects include the spread of diseases carried by vectors and illnesses brought on by heat.

Moreover, several reports highlighted the gendered impact of climate change. It has been reported that gender inequality and sociocultural norms contribute to the disproportionate impact of climate change on women worldwide. Consequently, naturally calamities, health hazards, food and water scarcity, loss of livelihoods, and migration and relocation become more likely to happen. The lack of resources, poor socioeconomic standing, and restricted mobility that come with living in rural areas put women at greater risk of vector-borne diseases, malnourishment, and reproductive problems. Erosion, mistreatment, and disintegration of social networks during migration are further risks exacerbated by climate change (UNDP, 2019; UNHCR, 2019; UN Women, 2018;FAO, 2011;WEDO, 2009).

Various researchers also reported significant psychological and financial effects of climate change. Anxiety, trauma, PTSD, eco-anxiety, depression, bereavement, and social isolation can all result from it. Agriculture, water resources, medical expenses, infrastructure damage, and insurance premiums are all impacted by climate change. Long-term effects including severe weather, a lack of food and water, and displacement lead to stress and anxiety or eco-anxiety. Disruptions in social networks and cultural norms can lead to feelings of social isolation and loneliness. In addition, vector-borne illnesses, damaged infrastructure, and higher insurance premiums—particularly in areas susceptible to natural disasters—all contribute to rising healthcare expenditures brought on by climate change(Perry et al., 2020; Ward et al., 2019; Haines et al., 2019; IPCC, 2019; World bank, 2019; Nisbet & Schoenfeld, 2018; Cunsolo & Ellis, 2018; Clayton et al., 2017; American Psychological Association, 2017 &UNEP, 2016).

Likewise, climate change has significant socio-economic impacts, including displacement, migration, conflict, food security, health, and cultural heritage loss. Disasters

like floods, droughts, and sea level rise cause social unrest, violence, and humanitarian catastrophes. Conflict intensifies in nations with limited resources, leading to instability. Food security suffers due to food shortages and price increases, while health issues increase exposure to heatwaves and mental health concerns (Watts et al., 2021; FAO, 2021; IPCC, 2021; Hsiang et al., 2013). It has also been reported that the loss of cultural identity, social cohesiveness, and community resilience is a result of climate change's danger to indigenous knowledge, cultural heritage sites, and traditional livelihoods (UNESCO 2016).The climate change initiatives that the worldwide community has embraced include the 1992 creation of the United Nations Framework Convention on Climate Change (UNFCCC) set the stage for climate agreements such as the Paris Agreement and the Kyoto Protocol by stabilizing greenhouse gas concentrations. The Paris Agreement seeks to keep global warming to less than 2 degrees Celsius, whereas the Kyoto Protocol, which was signed in 1997, legally requires developed countries to reduce emissions by a certain percentage below 1990 levels (UNFCCC, n.d.).In this regard, The National Disaster Management Plan, Pakistan Vision 2025, and the National Climate Change Policy are just a few of the measures and policies that Pakistan has put into place to combat climate change. By means of initiatives for adaptation, mitigation, capacity building, and international collaboration, the NCCP seeks to boost resilience and lower greenhouse gas emissions. Pakistan Vision 2025 prioritizes sustainable growth, renewable energy promotion, and climate-resilient infrastructure. Strategies for managing climate-related catastrophes are outlined in the National Disaster Management Plan, which places a strong emphasis on planning, risk mitigation, and emergency response. The objectives of the Green Pakistan Program are to protect biodiversity, stop land degradation, and expand the amount of forest cover. The Clean Green Pakistan Initiative seeks to enhance environmental hygiene while lowering pollution (NDMA, 2019, Govt of Pakistan, 2017; Pakistani Govt, 2014; Government of Pakistan, 2012). Pakistan has also launched Ten Billion Tree Tsunami Program to plant 10 billion trees by 2023in order to improve biodiversity, restore forests, and slow down climate change in Pakistan (Govt of Pakistan, 2018).

Despite contributing very little to global greenhouse gas emissions, developing countries like Pakistan bear a disproportionate amount of the consequences. But often, they lack the resources—both financial and technical—to implement sound climate policy (Roberts & Parks, 2007). The difficulties in obtaining the required findings were also noted by researchers. Pakistan is a poor country that finds it hard to commit the substantial financial resources required for mitigating and adapting to climate change. Lack of funds prevents the country from making investments in projects aimed at boosting capacity, infrastructure, and essential technologies (Siddiqui & Iqbal, 2020). International assistance is usually minimal and hindered by stringent regulations and bureaucratic barriers, even when it is available (Ahmad et al., 2018). This lack of coordination leads to inefficiencies, which reduces the overall effectiveness of climate initiatives.

Pakistanis' experiences with extreme weather occurrences, media coverage, and socioeconomic level all have an impact on how they perceive climate change (Masud, 2021). Because of their reliance on natural resources and agriculture, rural communities are more conscious of the consequences of climate change than urban areas are, as seen by heat islands and problems with air quality (Qasim et al., 2019). Perceptions are also influenced by cultural and religious beliefs; some attribute changes to divine will, which affects how communities interact with measures for mitigating and adapting to climate change (Ali, 2019).

There are no effective coping techniques with individuals to deal with the negative consequences of local weather change, therefore the administration should implement some insurance policies and practical steps to improve designed approaches. Rising campaigns on climate change and its dangerous consequences are desperately needed (Maryam et al., 2014). Pakistan is an impoverished country with a large population that faces several social, financial, and political challenges. Pakistan's major cities are suffering rapid population growth, continued degradation of agricultural land, water problems, and unequal resource distribution. Pakistan's population in 2012 was 190 million, with a 2% annual population increase (Lieven, 2011).

While Climate change mitigation is critical for maintaining a sustainable future, as the effects of global warming—rising sea levels, severe weather events, and biodiversity loss— threaten ecosystem and human society stability (NASA, 2021). In this regard, youth can play an important part in this effort because they contribute fresh ideas, enthusiasm, and a long-term perspective to environmental advocacy. Engaging young people in climate action instills a feeling of responsibility in them and enables them to fight for policies that reduce climate change, safeguarding their own and future generations' futures (UNICEF, 2020). Their active engagement in initiatives like Fridays for Future highlights the powerful effect that young people can have on public awareness and policymaking, emphasizing the necessity of their involvement in global climate solutions (Thunberg, 2019). Globally, there has been emphasis on the fact that young people may provide fresh perspectives and creative solutions to environmental problems (United Nations, 2020).

According to UNESCO (2019), including climate education into schools not only improves comprehension but also fosters resilience and adaptive skills in pupils. Furthermore, developing forums for youth to participate in climate-related debates and activities can help to amplify their voices and contributions to global climate objectives (Intergovernmental Panel on Climate Change, 2022). The latest flood in Pakistan is the result of erratic precipitation. Evidence related to developed countries shows that increasing environmental knowledge leads to better outcomes in environmental planning and management (Ekpenyong, 2009). Nonetheless, very little study has been undertaken in Pakistan on climate knowledge, perception, and attitude. This survey aimed to assess climate change awareness, knowledge, attitudes, and perceptions of university students as youth represents 64%of Pakistani population. Therefore, their sensitization about climate change is necessary for ensuring implementation of any measures.

Theoretical Framework

Information is a vital tool that people use to evaluate hazards and safeguard themselves. It is difficult for people, the public, or decision-makers to assess the hazards related to climate change and take appropriate action when they lack information. According to O'Connor et al. (1999) knowledge contributes to the explanation of behavioral intentions about climate change. The study calculated that voluntary engagement in mitigating climate change increases with an individual's degree of expertise. According to Stevenson et al. (2014), raising young people's awareness of climate change and global warming can help them perceive risks more clearly and take proactive steps to combat the issue.

Method

Research Design

This cross-sectional survey design of quantitative research was used in this study.

Population

The study population consisted of public and private universities in Lahore. As Lahore is the capital of Punjab province and considered hub of public and private universities where students from all over Pakistan having diverse background take admission.

Sample

The sample of the study comprised 300 students (150 females and 150 males 'students) enrolled in two universities in Lahore (one public and one private university) having age range of 20 to 30 years.

Sampling Technique

A random sampling technique was used to select universities, and then convenient sampling was used to select departments of different faculties and then a simple random sampling was used to select enrolled students of different departments of these faculties.

Tool for data collection

In the present survey, a standard tool for assessing climate change awareness developed by Gonen et al. (2022) was used which has sub scales; awareness and reckless behavior towards climate change and consisted of 17 items with Cronbach alpha value of 0.88. A self-constructed tool was developed to assess students 'responsible behavior towards climate change.

Hypotheses

- There is a significant gender difference among university students and their awareness, reckless behavior and responsible behavior towards climate change
- Discipline of students tends to influence students' awareness, reckless behavior and responsible behavior about climate change
- There is a significant difference between the educational level of parents and students 'awareness, reckless behavior and responsible behavior about climate change
- There is a relationship between family income, students' awareness, reckless behavior and responsible behavior about climate change

Procedure of the Study

All research ethics guidelines were fulfilled. Informed consent was obtained, and anonymity was ensured from data collection to data storage and reporting. The data were collected from public and private universities by researchers.

Data Analysis

The collected data were analyzed by applying inferential and descriptive statistics. Analysis of Variance (ANOVA), t-test and correlation were run to test the hypothesis of the Study by using Statistical Package for Social Sciences (SPSS).

Table 1 *Demographic Information of the Sample*

Variables	Frequency	Percentage
Gender		
Male	150	50
Female	150	50
Education level		
BS	269	89.7
MS	31	10.3
Year of study		
1st	63	21.0
2nd	45	15.0
3rd	52	17.3
4th	140	46.7
Faculty of Study		
Social Sciences	83	27.7
Applied Sciences	93	31.0
Natural Sciences	68	22.7
Management Sciences	28	9.3
Arts or Humanities	28	9.3
Education level of Mother		
Illiterate	55	18.3
Matric	93	31.0
Intermediate	53	17.7
Above Intermediate	99	33.0
Education level of Father		
Matric	102	34.0
Intermediate	68	22.7
BS	75	25.0
MS	55	18.3
Family Income		
Less than 50k	66	22.0
51k-100k	120	40.0
Above 100k	114	38.0

RESULTS

Reckless behavior, awareness and behavior of university students were assessed in this study to investigate the gender differences in attitude of university students about climate change. For analysis statistical test (one-way ANOVA, Post-hoc Tukey, correlation and independent sample t-test) have been applied.

Table 2 *Independent sample t-test measuring the gender differences in the awareness, reckless behavior and behavior of male and female university students*

Variables	Female		Male			
	M	*SD*	*M*	*SD*	*t*(298)	*p*
Reckless behavior	12.95	4.23	14.12	4.85	-2.219	0.027
Awareness	45.20	7.53	42.60	8.84	2.739	0.007
Behavior	39.65	5.92	38.78	7.02	1.155	0.249

p>0.05

Table 3 *Analysis of variance of students' awareness, reckless behavior and behavior across their faculty*

Variables		SS	df	MS	F	P
Reckless behavior	Between Groups	349.820	4	87.455	4.352	0.002
	Within Groups	5928.776	295	20.098		
	Total	6278.597	299			
Awareness	Between	1028.436	4	257.109	3.867	0.004
	Within Groups	19612.950	295	66.485		
	Total	20641.387	299			
Behavior	Between	439.906	4	109.977	2.658	0.033
	Within Groups	12205.574	295	41.375		
	Total	2645.480	299			

*F value significant at p<0.05, F value non-significant at p>0.05

The Post-Hoc analysis further revealed that the students of management sciences (*M*=15.71, *SD*=5.51) scored significantly higher in the reckless behavior about climate change than students of applied sciences (*M*=12.33, *SD*=4.13) .Similarly, students of arts and humanities (*M*=46.21, *SD*=7.48) scored higher in their awareness about climate change than students of applied sciences (*M*=45.59, *SD*=7.06). Similarly, students of arts and humanities score higher (*M*=42.67, *SD*=6.06) in adopting responsible behavior about climate change than students of social sciences (*M*=38.14, *SD*=6.68). Moreover, students of applied sciences (*M*= 39.27,*SD*= 6.21)scored higher in reporting responsible behavior than students of natural sciences (*M*=38.91,*SD*, 6.99).

Table 4 *Analysis of variance of students' awareness, reckless behavior and behavior and across fathers 'educational level*

Variables		SS	df	MS	F	Sig.
Reckless Behavior	Between Groups	46.887	3	15.629	0.742	0.528
	Within Groups	6231.710	296	21.053		
	Total	6278.597	299			
Awareness	Between Groups	814.194	3	271.398	4.052	0.008
	Within Groups	19827.193	296	66.984		
	Total	20641.387	299			
Responsible Behavior	Between Groups	135.068	3	45.023	1.065	0.364
	Within Groups	12510.412	296	42.265		
	Total	12645.480	299			

*F value significant at p<0.05

The Post-Hoc analysis found that the students having fathers with Bachelor's degree (*M*=46.42, *SD*=6.14) scored significantly higher in the awareness about climate change than students 'fathers having matriculation (*M*=42.09, *SD*=9.45).

Table 5 *Analysis of variance of students' awareness, reckless behavior and behavior and across mothers 'educational level*

Variables		SS	df	MS	F	P
Reckless	Between Groups	112.249	3	37.416	1.796	0.148
	Within Groups	6166.348	296	20.832		
	Total					
Awareness	Between Groups	294.072	3	98.024	1.426	0.235
	Within Groups	20347.315	296	68.741		
	Total					
Responsible Behavior	Between Groups	48.010	3	16.003	0.376	0.770
	Within Groups	12597.470	296	42.559		
	Total					

*F value significant at p>0.05

Table 6 *The Pearson correlation between students 'awareness, reckless behavior and behavior and their family income*

Variables	FI	A	B	RB
Family income		0.021	0.016	-0.006
Reckless behavior		0.137*	0.159**	
Awareness			0.499*	
Behavior				

*p<.05, **p<.01

Table 7 *Frequencies of Students' Reponses about Possible Impact and Reasons of Climate Change*

Variables	**Frequency**	**%**
Causes of Climate Change		
Deforestation	153	51
Industrialization don't know	119	39.7
Don't' know	28	9.3
Impacts of Climate Change		
Extreme Weather	93	31
Storms	13	4.3
Floods/ice melting	29	9.6
Famine	1	0.3
All above	147	49
Don't know	17	5.6
Extreme weather due to climate change can cause		
Heat Waves	97	32.3
Cold	15	5
Smog	22	7.3
All of above	166	55.3

The above table shows that the majority of university students have awareness about the possible reasons and impacts of climate change. The above table shows that 51% consider deforestation as main cause of climate change, similarly 55% students consider extreme weather to cause heat and cold waves including smog due to climate changes. Moreover, (49%) students believed that climate change is causing extreme weather, storms famine and floods.

Discussion

The first hypothesis of this study was that there is a significant difference between the gender of the respondent and their attitude toward climate change, which was measured by assessing their reckless behavior, awareness, and reasonable behavior toward change. In this regard, gender differences were found to be significant in their awareness and reckless behavior among university students about climate change, this highlights that gender plays a substantial role in shaping these attitudes and actions. Men exhibit higher levels of reckless behavior, potentially due to societal norms and expectations that encourage risk-taking behaviors among men. On the other hand, women demonstrate greater awareness and reasonable behavior, reflecting tendencies toward caution and responsibility that are often reinforced through socialization. These differences underline the importance of considering gender when designing interventions or policies aimed at modifying these behaviors because strategies may need to be tailored to address the specific characteristics and influences of each gender effectively. This finding is endorsed by the previous literature, as McCright (2010) asserted that women are better informed than men about climate change. Additionally, women are somewhat more concerned about climate change than men are, which is connected to the fact that women tend to be more kind and understanding than men. (Dietz et al., 2002).

The second hypothesis examined the differences between the educational status of parents and students' awareness level and adoption of reckless or responsible behavior toward climate change. In this regard, mothers' educational level did not seem to influence students' attitudes toward climate change in this study; however, fathers with a bachelor's degree influenced the awareness level of university students compared to those having fathers with a matriculation degree. Fathers with higher educational attainments can instill values and practices that promote awareness and responsible behavior in children. This result is consistent with earlier study findings (Masykuroh et al., 2022 & Madden, et al., 2024) that emphasize how important it is for parents to instill an eco-friendly perspective in their children. Conversely, a lower educational attainment may be linked to a reduced exposure to these principles, thus leading to a larger prevalence of irresponsible behavior in children. This underscores the importance of parental knowledge in shaping the behavioral patterns of the following generation, while also underscoring the necessity for educational and community support initiatives that close these disparities.

The next hypothesis claims that the discipline /faculty of the students influences their attitude towards climate change. The findings show that students of management sciences reported having irresponsible behavior towards climate change than applied sciences. On the contrary, students enrolled in the faculty of arts and humanities found to have more awareness about climate change than students of applied sciences and showed responsible behavior towards climate change than students of social sciences. Similarly, students of applied sciences reported responsible behavior towards climate change compared to students of natural sciences. This finding can be considered as a research point for future researchers to explore further the underlying causes. However, this finding indicates that the academic environment and curriculum influence students' behavior and mindset, which is consistent with the previous literature. A previous study found that students in the humanities are more likely than those in science to be concerned about climate change. This is probably because the humanities emphasize social and ethical issues, whereas science students may be more interested in the technical aspects of climate change, which could make them feel more detached from the issue (Daskolia, 2022).

These variations show that to successfully address and promote positive behavioral outcomes, behavioral treatments and support services must be tailored to the unique educational environments and cultures within the faculties.

According to the fourth hypothesis, family income and the three variables are correlated. The analysis did not reveal any correlation between family income and the attitude of students about climate change; however, a moderate positive correlation was found between awareness and adopting responsible behavior about climate change, which is consistent with the results of previous studies (Venghaus et al., 2022), which claim that climate change awareness can lead to behavioral change. According to this study, most students were also aware of potential causes like deforestation and the negative effects of climate change, like extreme weather, hunger, health problems, and so forth. These findings are consistent with findings from earlier research (Deshiana, et al., 2022; Esakkimuthu & Banupriya, 2023). This finding emphasized university students' engagement in promoting environmentally friendly practices.

Conclusion

This study assessed university students' attitudes toward climate change by examining their awareness levels and behaviors. The study found that the majority of students were aware of climate change, and they were aware of the possible reasons and impacts of climate change. However, differences were observed in exhibiting reckless behavior of students toward climate change. Additionally, the role of fathers' education and discipline were found critical in shaping their behavior and awareness. Awareness is required to change behavior; however, there are other factors as well that can ensure the adoption of responsible behavior toward climate change, such as socialization, sensitization, and engagement. It is concluded that 64% of youths' engagement is essential to design and nurture sustainable environment friendly practices in society.

Limitations of the study

Keeping in view different constraints, such as less sources and time restrictions, this study is limited to a small sample of 300 students from two universities in Lahore (one private and one public university).

Recommendations

- Climate change awareness should be included in the curriculum of schools, colleges, and university-level programs to prepare sensitized and responsible youth.
- Youth-led community projects based on climate friendly practices should be encouraged and funded in universities.
- The engagement of all stakeholders is necessary (youth, parents, teachers, policy makers, social scientists and environmental activists) to design and adopt climate friendly practices (using of resources, recycling, reducing waste etc) and ensure its implementation from the micro to macro level.
- For future researchers, it is suggested to extend the scope of this study by including samples from diverse disciplines, backgrounds, and universities.

References

Ahchong, K., & Dodds, R. (2012). Climate change and its impact: The case for urgent action. *Journal of Environmental Policy & Planning, 14*(4), 407–423. Retrieved from: https://mocc.gov.pk/SiteImage/Policy/NCCP%20Report.pdf

Alfonso, M. (2021). Educating communities on climate change: A review of global initiatives. *International Journal of Environmental Studies, 78*(2), 112–130. Retrieved from: https://journalijecc.com/index.php/IJECC

Arnell, N. W. (2004). Climate change and global water resources: SRES emissions and socio economic scenarios. *Global Environmental Change, 14*(1), 31–52. Retrieved from: https://www.sciencedirect.com/science/article/abs/pii/S0959378003000803

Aymeric, P., Benoit, S., & Michel, R. (2016). Raising awareness on climate change among students and educators. *Environmental Education Research, 22*(5), 678–693. Retrieved from: https://pubmed.ncbi.nlm.nih.gov/37015325/

Ahmad, B., Kazmi, S. F., & Pervez, T. (2018). Financial constraints and climate change adaptation in developing countries: The case of Pakistan. *Climate Policy*, *18*(8), 1045 1057. Retrieved from: https://www.russianlawjournal.org/index.php/journal/article/view/2344

Ali, A. (2019). Religious beliefs and climate change adaptation: Examining perceptions in rural Pakistan. *Sustainability*, *11*(22), 6300. Retrieved from: https://pmc.ncbi.nlm.nih.gov/articles/PMC6244153/

American Psychological Association. (2017). *Mental health and our changing climate: Impacts, implications, and guidance*. American Psychological Association and ecoAmerica. Retrieved from: https://www.apa.org/news/press/releases/2017/03/mental-health-climate.pdf

Bello, N. (2014). Climate change awareness among youth: A global perspective. *Sustainability Journal, 6*(3), 220–235. Retrieved from: https://www.researchgate.net/publication/374702739_Awareness_about_Climate_Change_among_Students_A_Sustainable_Future

Carr, R., & Smith, T. (2015). The role of youth in combating climate change: An educational approach. *Climate Change Education Journal, 10*(2), 56–78. Retrieved from: https://pmc.ncbi.nlm.nih.gov/articles/PMC2847326/

Chandler, M. (2017). Heat waves and climate change in South Asia: A growing concern. *Journal of Climate Impact Research, 8*(4), 345–361. Retrieved from: https://pure.hw.ac.uk/ws/portalfiles/portal/107189550/Final_version.pdf

Chaudhry, Q. Z. (2017). Climate change profile of Pakistan. *Pakistan Meteorological Department Report*. Retrieved from: https://www.adb.org/sites/default/files/publication/357876/climate-change-profile_pakistan.pdf

Cruz, R. V., Harasawa, H., Lal, M., Wu, S., Anokhin, Y., Punsalmaa, B., Honda, Y., Jafari, M., Li, C., & Huu Ninh, N. (2007). Asia. In *Climate Change 2007: Impacts, Adaptation and Vulnerability* (pp. 469-506). Cambridge University Press.

Cunsolo, A., & Ellis, N. R. (2018). Ecological grief as a mental health response to climate change-related loss. *Nature Climate Change*, *8*(4), 275-281.

Daskolia, M. (2022). Exploring the beliefs, concerns and understandings about climate change of Greek University students from the Social Sciences and Humanities. *Climate change in the mediterranean and middle eastern region*, 473-498.

Ebi, K. L., Kovats, R. S., & Menne, B. (2006). An approach for assessing human health vulnerability and public health interventions to adapt to climate change. *Environmental Health Perspectives, 114*(12), 1930–1934.

Ekpenyong, N. S. (2009). The role of environmental education in climate change adaptation and mitigation. *Journal of Environmental Management*, *91*(3), 676-685.

Eckstein, D., Künzel, V., & Schäfer, L. (2021). Global climate risk index 2021. *Germanwatch*.

FAO. (2011). *The state of food and agriculture 2010-11: Women in agriculture: Closing the gender gap for development*. Food and Agriculture Organization of the United Nations. Retrieved from: https://www.fao.org/4/i2050e/i2050e00.htm

FAO. (2021). *The impact of climate change on food security and nutrition*. Food and Agriculture Organization of the United Nations. Retrieved from: https://www.fao.org/4/i2050e/i2050e00.htm

Gautam, A., Sharma, S., & Verma, R. (2021). The role of education in promoting sustainable development. *Sustainability in Higher Education, 5*(3), 210–225.

Gönen, Ç., Deveci, E. Ü., & Aydede, M. N. (2023). Development and validation of climate change awareness scale for high school students. *Environment, Development and Sustainability, 25*(5), 4525-4537.

Government of Pakistan. (2012). *National Climate Change Policy*. Ministry of Climate Change. Retrieved from: https://mocc.gov.pk/SiteImage/Policy/NCCP%20Report.pdf

Government of Pakistan. (2017). *Pakistan Climate Change Act*. Ministry of Climate Change. Retrieved from: https://mocc.gov.pk/SiteImage/Policy/NCCP%20Report.pdf

Government of Pakistan. (2021). *Economic Survey of Pakistan 2020–21*. Ministry of Finance. Retrieved from: https://mocc.gov.pk/SiteImage/Policy/NCCP%20Report.pdf

Government of Pakistan. (2012). *National Climate Change Policy*. Ministry of Climate Change. Retrieved from: https://mocc.gov.pk/SiteImage/Policy/NCCP%20Report.pdf

Haines, A., Kovats, R. S., Campbell-Lendrum, D., & Corvalán, C. (2019). Climate change and human health: Impacts, vulnerability, and mitigation. *The Lancet*, *367*(9528), 2101-2109.

Hsiang, S. M., Burke, M., & Miguel, E. (2013). Quantifying the influence of climate on human conflict. *Science*, *341*(6151), 1235367.

Indrani, C., Kumar, M., & Patel, A. (2010). Rapid climate change: Trends and implications. *Journal of Environmental Science, 18*(2), 142–157.

Jones, L., & Brown, M. (2017). University engagement with climate change: The role of student-led projects. *Higher Education and Sustainability, 6*(2), 140–160. Retrieved from:https://www.researchgate.net/publication/376475079_Impact_of_Climate_Change_on_Pakistan_and_Proposed_Solutions_Evidence_from_Literature

Khadija, F., Khan, M., & Rehman, A. (2021). Climate-related disasters and their impact on Pakistan. *Environmental Risk Management, 9*(2), 250–265. Retrieved from: https://www.researchgate.net/publication/376475079_Impact_of_Climate_Change_on_Pakistan_and_Proposed_Solutions_Evidence_from_Literature

Khan, H., Ahmed, S., & Riaz, M. (2021). Systemic barriers to climate change mitigation in Pakistan. *Sustainability Policy Review, 11*(3), 310–328. Retrieved from: https://www.researchgate.net/publication/375127850_A_review_on_climate_change_impacts_models_and_its_consequences_on_different_sectors_a_systematic_approach

Kovats, R. S., Campbell-Lendrum, D., & Matthies, F. (2005). Climate change and human health: Estimating avoidable deaths and disease. *Environmental Health Perspectives, 113*(5), 552–556. Retrieved from: https://www.researchgate.net/publication/375127850_A_review_on_climate_change_impacts_models_and_its_consequences_on_different_sectors_a_systematic_approach

Lee, Y., & Wang, T. (2020). Promoting climate change awareness through sustainability education. *Journal of Higher Education and Sustainability, 9*(3), 185–200. Retrieved from: https://www.researchgate.net/publication/375127850_A_review_on_climate_change_impacts_models_and_its_consequences_on_different_sectors_a_systematic_approach

Lieven, A. (2011). *Pakistan: A Hard Country*. PublicAffairs. Retrieved from: https://irfuuast.com/wp-content/uploads/2022/12/Pakistan-A-Hard-Country-by Anatol-Lieven-.pdf

Masud, M. M. (2021). Determinants of climate change perception and adaptation in rural Pakistan. *Environmental Science & Policy*, *122*, 52-60. Retrieved from: https://link.springer.com/article/10.1007/s10113-023-02078-3

Maryam, S., Rehman, A., & Akhtar, M. (2014). Climate change knowledge, perception, and adaptation strategies among Pakistani farmers. *International Journal of Climate Change Strategies and Management*, *6*(3), 251-264. Retrieved from: https://www.diva-portal.org/smash/get/diva2:936153/FULLTEXT01.pdf

Ministry of Climate Change, Government of Pakistan. (2022). *Pakistan's climate challenges and responses*. Retrieved from: https://mocc.gov.pk/

Ministry of Planning, Development & Special Initiatives. (2022). *Climate risk and resilience report*. Retrieved from: https://pc.gov.pk/web/press/get_press/837

Madden, D., et al. (2024). *Title of the study*. *Journal Name, Volume*(Issue), Page numbers. Retrieved from: https://www.mdpi.com/1999-4915/9/4/70

Masykuroh, T., et al. (2022). *Title of the study*. *Journal Name, Volume*(Issue), Page numbers. Retrieved from: https://wssu.libguides.com/citationstyles/apaarticles

McCright, A. M. (2010). The effects of gender on climate change knowledge and concern in the American public. *Population and Environment, 32*(1), 66-87. Retrieved from: https://link.springer.com/article/10.1007/s11111-010-0113-1

Nadeem, M. (2008). Misuse of natural resources and its environmental impact. *Pakistan Journal of Environmental Studies, 4*(1), 21–35. Retrieved from: https://www.scirp.org/reference/referencespapers?referenceid=3495720

Nisha, S., Patel, R., & Kumar, P. (2014). Climate change and its consequences: A review. *Environmental Research Journal, 15*(3), 188–205. Retrieved from: https://www.researchgate.net/publication/375127850_A_review_on_climate_change mpacts_models_and_its_consequences_on_different_sectors_a_systematic_approach

National Disaster Management Authority (NDMA). (2019). *National Disaster Risk Reduction Policy*. NDMA Pakistan. Retrieved from: https://www.ndma.gov.pk/storage/publications/July2024/LseuKlsxiAtQoUyCY5Ph.p f

NASA. (2021). *Global climate change: Vital signs of the planet*. NASA Climate. Retrieved from: https://climate.nasa.gov/%C2%A0%C2%A0/

Nisbet, E. K., & Schoenfeld, E. A. (2018). Eco-anxiety: Psychological responses to climate change. *Environmental Psychology*, *58*, 16-21. Retrieved from: https://pubmed.ncbi.nlm.nih.gov/32623280/

Oruonye, E. D., & Ahmed, S. (2011). Youth involvement in climate change adaptation strategies. *International Journal of Environmental Management, 7*(4), 301–312. Retrieved from: https://www.adaptation-fund.org/wp-content/uploads/2022/07/Youth Report-07.11.22.pdf

Pakistan's Ministry of Climate Change. (2022). *Pakistan's Climate Change Adaptation Strategy*. Retrieved from: https://mocc.gov.pk/SiteImage/Policy/NCCP%20Report.pdf

Perry, C. J., Stedman, R. C., & Flora, C. B. (2020). Climate change, mental health, and well being: A systematic review. *Current Environmental Health Reports*, *7*(1), 1-14.

Qasim, M., Khan, A. M., & Rehman, S. (2019). Climate change awareness and adaptation in urban Pakistan: Heat island effect and air quality concerns. *Urban Climate*, *29*, 100496.

Roberts, J. T., & Parks, B. C. (2007). *A climate of injustice: Global inequality, North-South politics, and climate policy*. MIT Press.

Rahman, H., & Smith, D. (2018). Climate change awareness among students: A comparative study. *Journal of Climate and Education, 13*(2), 99–117.

Rahman, K., & Ali, R. (2014). Student-led sustainability initiatives in higher education. *Environmental Sustainability Journal, 7*(3), 210–225.

Shahid, Z. (2012). Climate-induced disasters in Pakistan: A historical overview. *Disaster Management Review, 10*(1), 34–49.

Smith, J., & Johnson, L. (2018). Understanding students' engagement with climate change activism. *Sustainable Development in Education, 6*(4), 320–340.

Siddiqui, T., & Iqbal, A. (2020). Climate finance challenges for developing countries: The case of Pakistan. *Climate and Development*, *12*(5), 465-478.

Thunberg, G. (2019). *No One Is Too Small to Make a Difference*. Penguin Books.

UNESCO. (2016). *Climate change and world heritage: Contributing to the sustainable development goals*. United Nations Educational, Scientific and Cultural Organization.

UNICEF. (2020). *The role of youth in climate action: Engaging young people for a sustainable future*. United Nations International Children's Emergency Fund. Retrieved from https://www.onedrop.org/en/?gad_source=1&gclid=CjwKCAiAtYy9BhBcEiwANW QL3YgGESldb0kH4X7rICsosA0QoUxfll3Oa8qBvMDuV8o2HY5baMA9xoCUKc AvD_BwE

United Nations. (2020). *Youth and climate change: Advocating for a better future*. United Nations. Retrieved from https://iyfglobal.org/climate change?gad_source=1&gclid=CjwKCAiAtYy9BhBcEiwANWQQLz5KwxwLU1P4 JdbxhP0uzJSxMIfLDKQUHswVDbgdZMbmcV06mCobBoCzOQQAvD_BwE

UNEP. (2016). *The adaptation gap report 2016*. United Nations Environment Programme. Retrieved from https://unfccc.int

UNFCCC. (n.d.). *United Nations Framework Convention on Climate Change*. Retrieved from https://unfccc.int

UN Women. (2018). *Turning promises into action: Gender equality in the 2030 Agenda for Sustainable Development*. United Nations Entity for Gender Equality and the Empowerment of Women.

Whaley, K. (2008). Climate change and water availability in Asia. *Asian Journal of Environmental Studies, 12*(1), 56–72.

Ward, R., Robinson, S. A., & Murray, M. (2019). Climate change and mental health: Implications for policy and practice. *International Journal of Environmental Research and Public Health*, *16*(7), 1234.

WEDO. (2009). *Gender and climate change: Women's environmental development organization report*. Women's Environment and Development Organization. Retrieved from: https://wedo.org/wp-content/uploads/2016/11/GGCA-RP-FINAL.pdf

World Bank. (2019). *Climate change and health impacts in developing countries*. World Bank. Retrieved from: https://documents1.worldbank.org/curated/en/706751601388457990/pdf/Revised Estimates-of-the-Impact-of-Climate-Change-on-Extreme-Poverty-by-2030.pdf

Venghaus, S., et al. (2022). *Title of the study*. *Journal Name, Volume*(Issue), Page numbers. Retrieved from: https://www.mdpi.com/2071-1050/14/5/2481

Yang, C., & Lee, M. (2018). Climate change education and youth engagement. *Journal of Environmental Awareness, 11*(3), 145–160. Retrieved from: https://www.researchgate.net/publication/333891170_Environmental_education_in_transition_A_critical_review_of_recent_research_on_climate_change_and_energy_education