

Investigating the Relationship Between Climate Change and Health: An Exploratory Cross-Sectional Survey

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ABSTRACT

Climate change (CC) stands out as a significant menace to human health in the 21st century. The escalation of global surface temperatures and the anticipated surge in the frequency and intensity of extreme weather events pose imminent threats. Despite the global gravity of this issue, research specific to the Pakistani context is scarce. Therefore, the current study endeavors to examine the relationship between climate change and its impact on human health in the context of Pakistan. A cross-sectional study was conducted on 167 graduate and postgraduate students at University of Engineering Technology (UET) Lahore, Pakistan from 10 November to 10 December 2023. A probability- simple random technique was used to collect study participants. Data was gathered using questionnaire-based approach from the respondents. The data were analyzed using the statistical package for social sciences (SPSS) version 26. In this study, a total of 167 participants were enrolled. Of them, 52.7% were male and 47.3% were female. Among the respondents, (48.5%) strongly agreed that CC is occurring in Pakistan and has a notable impact on human health (47.3%), and 81.4% strongly supported the idea that human activities are the primary cause of CC. Moreover, 49.1% stating that CC leads to air pollution, resulting in severe health consequences such as asthma, COPD, pneumonia, and cardiovascular disease. Climate change is noticeably widespread in Pakistan, impacting human health and giving rise to serious diseases. Despite the severity of its consequences on human health, there is a notable lack of attention to this issue in Pakistan. It is crucial to address this gap by raising awareness among students.

Keywords: Climate change, Health impact, Relationship, University students

INTRODUCTION

The evaluation of the adverse and extensive consequences of climate change on human health, along with predictions of these impacts persisting in the future, has led the World Health Organization to designate climate change as the "most significant threat to global health in the twenty-first century" (Atwoli et al., 2021). These ramifications encompass heatwaves, cold spells, malnutrition, and the aggravation of cardiovascular and respiratory issues (Frumkin et al., 2008). Additionally, climate change is amplifying the prevalence of vector-borne diseases like dengue, Zika, Chikungunya, and malaria. The direct harm caused by severe climate events, coupled with an elevated risk of compromised water and food safety in affected regions, constitutes substantial health implications. Students possess the potential to positively influence the adoption of healthier behaviors aimed at mitigating climate change-related health risks (Xie et al., 2018). Systematic education of students has been demonstrated to heighten awareness of climate change among the populace, thereby reducing its health impacts (Gill, 2008). Revising student curricula and fostering more positive attitudes during their education are deemed necessary to enhance society's and the healthcare system's health literacy regarding the health impacts of climate change (Bugaj et al., 2021). Despite some studies assessing students' understanding of the health effects of climate change, limited research has explored students' perspectives on these health effects and their

potential contributions to mitigation. Recognizing this gap, the primary goal of this study is to examine the prevalence of climate change, causes and its impact on human health in the context of Pakistan.

MATERIALS AND METHODS

Study setting and Design

A cross-sectional study was carried out on graduate and postgraduate students at University of Engineering Technology (UET) Lahore, Pakistan, from 10 November to 10 December 2023. The selection criteria were: 1) Students presently enrolled at UET Lahore, Pakistan. 2) Both males and females aged 18 and above. 3) Students who are willing to participate in the study. 1) Individuals not affiliated with UET Lahore, Pakistan. 2) Students below 18-year age were excluded from the study.

Sample Size and Sampling Technique

The data collection process utilized a probability sampling technique, specifically adopting the simple random sampling method to ensure an equal likelihood of selection for each participant. Employing the Raosoft sample size calculator (http://www.raosoft.com/sample_size.html) with a 95% confidence level, a 5% alpha level (margin of error), and an expected prevalence of 50%, the sample size of 167 was determined. Data collection took place after obtaining oral consent from participants, assuring them of the confidentiality and exclusive use of their provided information for this study's purposes. As all respondents were above 18 years old, they were deemed eligible for participation in the study.

Study Instruments

A structured, self-administered questionnaire was employed for present study. The questionnaire comprised of six sections. The first section was related to demographic details of participants including gender, age, education and marital status. The second section covered was classified as yes/no based question regarding cause of climate change for the past 150 years. Similarly, in third section questions regarding effect of climate change on human health were asked from respondents. Next section four surveyed about the disease that would be prominent in the next 10 – 20 years. Section five was about to assess the level of knowledge or information that is crucial to provide among students regarding climate change. The final section dealt with the age group that is more likely to affect by climate change.

Statistical Analysis

Initial data were entered into an Excel spreadsheet and then exported to the statistical package for social sciences (SPSS) version 26.0. The quantitative data were reported as means and standard deviations. The categorical data were summarized as frequencies and percentages and correlation test was carried out to examine the association between climate change and human health. The level of significance was set at $p < 0.05$.

RESULTS

Sociodemographic characteristics of study subjects. A total of 167 students completed the questionnaire. Of them, 52.7% were male and 47.3% were female. Regarding age distribution, participants ranged from 19 to 30 and above, with the majority (56.3%) falling in the 23-26 age group. In terms of educational background, the majority were master's degree students (46.1%), followed by graduates (44.9%) and those with education beyond master's (9.0%). In the context of marital status, 70.7% of participants were single, while 29.3% were married.

Variables	Frequency	Percentage	Frequency	Percentage
Gender			Education	
Male	88	52.7	Graduate	75
Female	79	47.3	Master	77
			Above Master	15
Age			Marital Status	
19-22	54	32.3	Single	118
23-26	94	56.3	Married	49
27-30	16	9.6		
>30	3	1.8		

Knowledge of students about Causes, illnesses, and awareness of climate change

After conducting the demographics test, descriptive analysis were carried out in order to address the research objectives. Figure 1 (a) depicts about the results regarding climate change cause for over the past 150 years. Majority of the participants (81.4%) strongly agreed that climate change is mostly caused by human activities. Whereas, 76.6% respondents were in the favor of natural change in environment. Similarly, 31.1% stated that climate change is not happening. Figure 1 (b) illustrates the results of the items asked from respondents regarding climate change effect on health. Majority of the respondents (49.1%) strongly agreed that increase in air pollution is leading the severe illness (asthma, COPD and others). Similarly, (39.5%) respondents agreed that it cause heat related issues (heatstroke, cardiorespiratory illness and others). Figure 1 (c) illustrates about the question asked from respondents regarding the health issues among people due to climate change in the next 10-20 years. A significant proportion of participants (44.3%) expressed concern that in the coming years, the issue is likely to lead to severe illnesses such as asthma and COPD. This suggests a potential escalation of the problem, emphasizing the urgency for early intervention and addressing the issue proactively. Figure 1 (d) depicts the results about the step that should be taken for awareness. Majority of the respondents (41.3%) strongly stated that awareness regarding the climate change and human health should be spreader among students. Figure 1 (e) is about the results collected to see which age group is more affected by climate change. Results showed that majority of respondents (45.50%) agreed that people of age group from 60 and above are more likely to be affected by climate change. There could be reason of the age factors.

Reliability Test for Scale

Reliability test was also conducted in order to check how much reliable the adapted scale is. Results showed that Cronbach alpha value is .951 which shows the scale is reliable and can also be generalized for future study as shown in Table 2.

Reliability Statistics	
Cronbach's Alpha	N of Items
.951	32

Correlation Analysis

The research conducted a correlation test to examine the relationship between climate change and human health. The outcomes revealed a positive association, with a correlation value of 0.449** (p=0.003), indicating that as climate change increases, there is a higher likelihood of it impacting human health as shown in Table 3.

		Climate Change	Human Health
Climate Change	Pearson Correlation	1	.449**
	Sig. (2-tailed)		.003
	N	167	167
Human Health	Pearson Correlation	.449**	1
	Sig. (2-tailed)	.003	
	N	167	167

DISCUSSION AND` CONCLUSION

The cross-sectional study revealed that climate change poses a significant threat to human health, a concerning issue prevalent in Pakistan, resulting in widespread diseases. Results indicated a positive correlation between climate change and human health, with a majority of students strongly acknowledging that climate change contributes to serious health issues such as asthma and COPD. The findings underscored the insufficient attention given to this issue among students in educational institutions. Thus, more awareness among students is imperative to mitigate the impact of this problem.

The current study aligns with previous research findings. It indicates a positive correlation between climate change and human health, echoing the conclusions of Ray & Ming (2020) in the United States. Their study argued that climate change has the potential to negatively impact fundamental health factors. Similarly, the present study's results suggest that climate change is a precursor to disease. These findings are consistent

with Katelaris & Beggs' (2018) research conducted among patients in Australia, which demonstrated that climate change significantly contributes to the occurrence of severe diseases. The severity of climate change corresponds to an increased likelihood of people experiencing severe health issues. Despite earnest efforts to conduct this study meticulously, akin to other research endeavors, it is not exempt from limitations. Several factors served as constraints for the current study, underscoring the need for further investigations to address these limitations. The data collection exclusively pertained to UET Lahore; future research could involve a comparative study encompassing both the main and sub-campuses to discern nuanced results. Additionally, augmenting the sample size could significantly enhance the robustness of findings; therefore, a larger sample is recommended for subsequent studies. Furthermore, incorporating interviews in the next study could provide respondents with an opportunity to express their opinions, thereby yielding more comprehensive insights into the issue.

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