Assessing Climate Change Sensitivity among Medical Youth of Peshawar: A Social Media-Based Cross-Sectional Study

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Abstract: This study aimed to explore the understanding of climate change and willingness of youth in medical institutions of the Peshawar city to contribute for climate conservation in the context of the growing impact of social media platforms. Employing a quantitative research approach, data were gathered using physical and online questionnaires, reaching medical students through convenience sample method. The collected data analyzed by employing SPSS version 26. The findings displayed a moderate-to-high average climate awareness level of 3.8 out of 5, comparing with international score that confirm a sound level of climate sensitivity prevailing in medical youth. Only 6% respondents exhibited comparatively low level of awareness, indicating prevailing g knowledge gaps. No significant correlation was detected in the frequency in the exposure to social and risk regarding climate-related health issues ($p = 0.82$), detecting the quality of content as compared to amount of social media exposure and its influences. Analysis indicates that consumption of content on climatic issues, spread through social media platforms is linked with higher degree of awareness ($\beta = 0.30$, $p < 0.001$) and more willingness to work for climate issues ($\beta \approx 0.37$, $p < 0.001$). The finding shows that active engagement brings positive impact and build one's climate perceptions. More than 61% of youth showed willingness for involvement in climate campaigns, indicating an increasing trend of digital and climate activism in medical youth. However, no notable gender differences were detected in the context of climatic related awareness among medical youth ($p = 0.81$).

Introduction

In the current era Climate change has been increasingly recognized as a threatening public health issue with far reaching adverse effect on human health, ranging from respiratory problems and vector-borne illnesses to mental health issue and food security (Haines & Ebi, 2019; Romanello et al., 2021). The health professionals, especially upcoming breed of medical experts, has to play a critical contribution in addressing to these threats through efficient healthcare contribution and by actively participating in climate advocacy and public awareness (Maxwell & Blashki, 2016; Krasna et al., 2020).

In spite of increasing climate awareness, the degree of sensitivity and level of preparedness of medical students to coupe with climate-related health concerns still not exposed properly, especially in underdeveloped regions of the globe (Sorensen et al., 2024). The climatic understanding of medical community can positivity impacts on community public health status. That is by integrating of climatic health topics into medical education is still slacking (Krasna et al., 2020; Sorensen et al., 2024).

Social media can provide an effective, easy and accessible platform to overcome climatic gap in educations. Digital platforms like Facebook, Instagram, and Twitter/X have emerged as effective links of information and activities for youth globally (Moorhead et al., 2013; Kostkova, 2015). Such platforms also contribute as tools for health advocacy and can shape perceptions and mold masses behaviors through specially designed campaigns, supported by textual and visual contents (Dada et al., 2022).

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Though Pakistan is contributing less than 1% to global emissions but still it is ranked as top ten most climate-vulnerable countries of the world (Asian Development Bank, 2021) That is why youth engagement is essential to answer this future threat well and in time. previous research studies conducted in university students show variable levels of climate awareness, mostly influenced by media contribution (Younis & Ahmed, 2024). Notably there are very less information about medical youth climatic engagements. Their activities about climate change advocacy on social media and their action-oriented   awareness and preparedness for climate-conservation is not fully explored.

This study focusses to assess climate change awareness and perceptions among medical youth employing a social media–based survey. The research endeavor aims at diging out the degree of influence of digital platforms on the awareness, concerns, preparedness of medical youth to engage effectively in the efforts of mitigation and advocacy of climate changes (UNICEF, 2022).

World health authorities' terms climate change as the worst pressing threats to community health (Romanello et al., 2021; Watts et al., 2021). In order to meet this challenge effectively, health experts need to know the wide-ranging adverse effects of climate-related health problems including respiratory diseases, mosquito -borne infections and mental health disorders (Haines & Ebi, 2019).

Medical youth stand for the future generation of healthcare professionals. Gauging their level of climate change understanding and attitudes lead to critical insight into how well they are prepared to integrate climate concerns into future medical planning and community health practices (Krasna et al., 2020; Sorensen et al., 2024).

It was a cross-sectional research endeavor undertaken through physical and an online self-administered questionnaire shared via social media platforms (e.g. Google form, WhatsApp). A non-probability convenience sampling approach was selected to investigate medical youth presently studying in different medical institutions of in Peshawar city due resources and time constraints (Creswell & Creswell, 2017). Survey instrument was formed to effectively gauge demographic information, level of climate knowhow, impacts of social media use on human health, and degree of preparedness of youth for climate restricting the adverse effect of climate change. The data collected from the medical youth through physical and online interaction   was processed by utilizing descriptive and inferential statistics techniques to trace correlation among variables such as exposure to social media, knowledge about climate changes and readiness to to physically involve in climate preservation.

Problem Statement
This study was conducted to fill the gap regarding the role of social media in influencing climate-health concerns among medical youth in Peshawar. As Khyber Pakhtunkhwa is a climate sensitive region, therefor, there is a dire l need to evaluate how the upcoming breed of medical professionals perceives climate change, what is their preparedness for climate change advocacy and to explore social media paly role in shaping climatic related perceptions.

Significance of the Study
This study is significant for exploring social media association with awareness and shaping climate related perceptions and behavior of medical students and their willingness to climate advocacy, heralding an increasing trend of digital platforms and climate activism in medical youth in Pakistani youth.

Research Objectives
The study was aimed to assess:
1. The level of awareness, consciousness, preparedness for climate change in medical students in Peshawar.
2. To examine influence of social media usage in medical students in the context of o climate change information.
3. To gauge the association climate-related of   social media and level of awareness of medical students for involvement in climate change advocacy.
4. To put forth suggestions to tailor climate change literacy into medical curricula and utilize social media as a supportive educational source.

Gaps and Future Directions

Though plenty of literature is available in this arena, but still several gaps are detected including limited evaluation of digital climate-health education, lack of clear demarcation in active and inactive   climate change advocacy and lack of comparisons to account for specific nature of climate vulnerability at regional level. Upcoming research should focus on mixed-method and longitudinal studies to explore how social media contents create climate sensitivity and mold behavior with passage of time. Moreover, tailoring   climate change approaches to medical education and continuous assessments can lead to actionable experiences for curriculum improvement. There is dire need of evidence studies, especially less developed countries Pakistan, to explore the extent of social media impacts on climate sensitivity and professional preparedness in medical youth.

Research Questions

RQ1: What is the level of awareness of the medical students of impacts of climate change on health?
RQ2: Does social media influence of the consciousness of the medical students regarding climate-related health complications?
RQ3: To what extent the medical students are ready to contribute in action for climate conservation?

Literature Review

The threat of climate change has been emerged as one of the most significant global concerns to public health in the in the contemporary era. Its negative effects range from respiratory and heart diseases due to environmental degradation, global warming, to the emergence of   vector-borne illnesses, devastating floods, food problems, mental health issues and largescale population migrations (Haines & Ebi, 2019; Romanello et al., 2021). Health experts must be ready to understand and solve these big challenges. Unfortunately, the integration of the issues of climate change with health sector and medical education is not organized worldwide (Krasna et al., 2020).

The usage of social media platforms is growing among medical students for seeking information and climate change awareness in in Pakistan. Number of studies conducted in this regard detected positive relationship among climate awareness in medical student and health care professional in the context of social media use.

Khan et al. (2024), in a national cross-sectional study, assessed environmental health consciousness among medical students in Pakistan. Though majority admitted the relevance of impacts of climate change to human health, but still a significant gap in curriculum and actionable readiness was clear. The study detected that Youth primarily relied on social media and non-academic channels for climate change awareness, cautioning the urgent need to integrate environmental health into formal medical curriculum.

A cross-sectional survey study conducted by Shariff et al. (2024) found that medical youth in Pakistan have high climate change's perception of negative impacts on humans' health while high degree of environmental health consciousness prevailing in medical student with sound attitude and knowledge of climate change. Similarly, a study detected the increasingly dynamic contribution of social media platforms in promoting the professional and leadership development of women folk in the health sector Zulfiqar et al. (2025).

The findings of Munir et al. (2025) study recorded lower level of awareness and relationship between climate change in medial youth. Shah et al. (2019) found the increasing role of of social media use for educational and   gauged that overwhelming majority of students used social media for learning and seeking and knowledge and skills. A study carried out by Jandu and Carey (2025) confirmed use of social media application by the medical students for their academic engagements.

Heydari et al. (2023) carried out a qualitative study among Iranian medical youth, recording their level of awareness of climate-health issues but pinpointing their non preparedness to act professionally was low. Lack of climate-health content in undergraduate training was noted as an obstacle in informed advocacy and action for climate change.

A UK-wide survey found medical students' concern over climate change and its impacts on health, but also it underscored their dissatisfaction with existing educational curriculum (Oungpasuk et al., 2022). A report appeared in

The Guardian informed that the European Network on Climate and Health Education (Enche), led by the University of Glasgow, had begun integrating climate-health education across medical schools (Lay, 2024).

Similarly in the United States, the Association of American Medical Colleges (AAMC) has admitted the need for integrating climate change education into the medical training contents. A number of institutions are increasingly incorporating sustainability and climate-health education, but large -scale integration remains yet a challenge (AAMC, 2023).

Moreover, Australian educators have begun integrating climate change education at graduate s to planetary health. Despite accreditation frameworks still lack planned requirements for climate-health education, which slower formal implementation.

A study in South Africa, found that students of health sciences were aware of the health threats posed by climate change but lacked formal training on the subject. Internet-based content was their primary sources of information, with a notable influence of social media (Nigatu et al., 2014). All these studies highlight similar global pattern of informal learning replacing institutional education of climate change in health profession.

Different platforms of social media serve as important sources of health-related awareness and advocacy among youth. Platforms like Twitter/X, Instagram, and Facebook provide widespread engagement with climate- related content in various form through peer campaigns (Moorhead et al., 2013). Schäfer (2025) term such platforms as participatory points for dissemination of knowledge, formation of behavior and identity creation around climate change.

Despite all these facts, reliance on social media for health knowledge is not a positive sign. Such platforms may present unscientific Information which can case misconceptions about climate issues. Enabling such sources to effectively in raise awareness, it must complement and not substitute formal curriculum-based education (Dada et al., 2022).

Theoretical Framework

In order to analyze social media influences on climate sensitivity among medical youth, this study is based in Bandura's Social Cognitive Theory (SCT) and the Health Belief Model (HBM).

Social Cognitive Theory (SCT) SCT explains that people learn behaviors through observation, imitation and modeling in certain social contexts (Bandura, 1986). Medical youth engaging with climate content online witness the actions and attitudes of peers, influencers or professional role models, molding their own attitudes and behaviors. Self-efficacy, a basic component of SCT, is particularly relevant, as students may feel empowered to participate in advocacy through the positive reinforcement vacillated through social media channels.

HBM highlights health behaviors based on influence and its severity, benefits, obstacles, lead toc to action, and self-identity (Rosenstock, 1974). Medical youth may perceive climate change as an unnecessary issue unless exposed to relatable content through social platform. Social media can act as a cue to action by framing climate change as an immediate health threat requiring both personal and professional engagement.

Synthesis and Gap Identification

While medical students globally are aware of climate change's relevance to public health, their preparedness to respond professionally is hindered by insufficient curricular integration. This gap is partially filled by social media, which serves as both a source of knowledge and an advocacy platform. However, this reliance creates disparities in the depth and accuracy of understanding. There is a clear need for empirical studies—particularly in LMICs like Pakistan—to explore how social media impacts climate sensitivity and professional readiness among medical students.

Methodology

This was a cross-sectional study that employed a quantitative research approach. We gathered data through physically and online administered questionnaires. . A quantitative research approach was selected to allow for objective measurement, statistical analysis, and the potential for generalizability of findings, consistent with established social science methodologies (Creswell & Creswell, 2017).

Study Population and Sampling

Our study focused on medical students currently enrolled in private medical institutions in Peshawar. We used a non-probability convenience sampling method. This meant we recruited participants by sharing physical questionnaires and our online survey link through popular medical student groups on WhatsApp, as these platforms were easily accessible and widely used by this demographic (Creswell & Creswell, 2017).

Sample Size

We targeted a sample size of at least 300-400 medical students. This number provided sufficient statistical power for our analyses and allowed for meaningful insights across various demographic and independent variable (Creswell & Creswell, 2017). Underlines pragmatic considerations for sample size, acknowledging resource constraints and the nature of the research question.

We used a structured, self-administered questionnaire, available physically and online, to gather data. It explored demographics, social media engagement with climate content, and climate change sensitivity and action. The questionnaire was pre-tested for clarity.

Data Collection Procedure

The physical and online survey was created using a secure platform like Google Forms. We disseminated the survey link through:

Student-run social media groups (e.g., WhatsApp groups, google forms and classrooms.

Our personal networks within the medical student community, asking for further sharing.

A brief introductory message accompanied the survey link, explaining the study's purpose, ensuring anonymity and confidentiality, and obtaining informed consent. Participation was voluntary, and students could withdraw at any time. We collected data over a period of 4-6 weeks to gather sufficient responses.

Data Analysis

We used SPSS version 26 for our statistical analysis.

Descriptive Statistics

We used frequencies, percentages, means, and standard deviations to describe participant demographics, social media usage, and responses related to awareness, perceptions, and readiness for action.

Inferential Statistics

RQ1: Awareness level of health effects. Primarily descriptive statistics were applied for its measurement.

RQ2: Social media's effect on consciousness. Chi-square tests were employed for exploring associations between categorical variables (e.g., use of social media for climate related content and level of concern). For ordinal variables (e.g., social media frequency and perceived health risks), we used Spearman's rank correlation.

RQ3: Readiness to contribute climate advocacy. Like RQ2, chi-square tests and Spearman's rank correlation to test associations with social media activities.

Ethical Considerations

Anonymity and Confidentiality: We strictly avoid collection of any personal information, while all data kept highly confidential and utilized only for research.

Voluntary Participation: Participation was completely voluntary, and students could withdraw anytime without penalty.

Data Security: Collected data were stored on password-protected computers, with access limited to the research team.

Limitations

Use of convenience Sampling: The sampling method limited how broadly our findings could be generalized to all medical students in region or Pakistan.

The nature of Self-Reported Data: Soley relying on self-reported data could cause to recall bias or social desirability bias.

Use of Cross-Sectional Design: This design is capable of only showing associations, rather cause-and-effect relationships, in social media usage and climate change consciousness.

The issue of Digital Divide: Issues of access to internet and social media among respondents could potentially lead to exclusion of certain participants.

Analysis

The data was collected from 346 participants, the Descriptive analysis is given below.

Table 1
Age

Age	Count	Percent
21-30	224	64.7
Above 30	66	19.1
Below 20	53	15.3
Blanks	3	0.9

Table 1 showing that out of 346 participants, roughly two-thirds of respondents are in the 21-30 bracket, very few are under 20. Gender while females out-number males about 2: 1.

Table 2
Gender

Gender	Count	Percent
Female	223	64.5
Male	107	30.9
Blanks	16	4.6

Table 2 indicating distribution of participants which is   223 (64 %) female and 107 (30.9 %) males while 16 (4.6%) did not show their gender status.

Table 3
Academic Year

Academic Year	Count	Percent
1st Year	113	32.7
4th Year	78	22.5
3rd Year	70	20.2
2nd Year	63	18.2
Final Year	18	5.2
Blanks	4	1.2

Table 3 showing ear wise academic distribution of the participants.

Table 4
Institution

Institution	Count	Percent
Private	325	93.9
Government	17	4.9
	4	1.2

Table 4 representing institution-wise distribution. An overwhelming majority (≈94 %) attending private institutions and only 4.9 % studying in public institutions.

Table 5

Location

Location	Count	Percent
Urban	221	63.9
Rural	119	34.4
	6	1.7

Table 5 indicating geographical location of the respondents, showing that about 64 % live in urban areas while 34% belong to rural areas.

Table 6

Social Media Use

Social Media Usage	Count	Percent
Daily	252	72.8
Weekly	34	9.8
Occasionally	30	8.7
Rarely	28	8.1
Blank	2	0.6

Table 6 represent that nearly three-quarters of the participants use social media daily while "rarely" is <10 %.

Table 7

Platform

Platform	Count	Percent of respondents
Instagram	324	93.6
YouTube	243	70.2
TikTok/Twitter	226	65.3
Facebook	130	37.6

Table 7 showing that Instagram is the most common (94 %), followed by YouTube and TikTok/Twitter while Facebook lags behind.

Table 8

Source of Information

Source of information	Count	Percent of respondents
Social media	265	76.6
Friends/Family	133	38.4
TV	117	33.8
Academic Journals	53	15.3

Table 8 indicating that Social media is the dominant climate-information source (77 %), with friends/family and TV at one-third eachwhile academic journals are consulted by only 15 %.
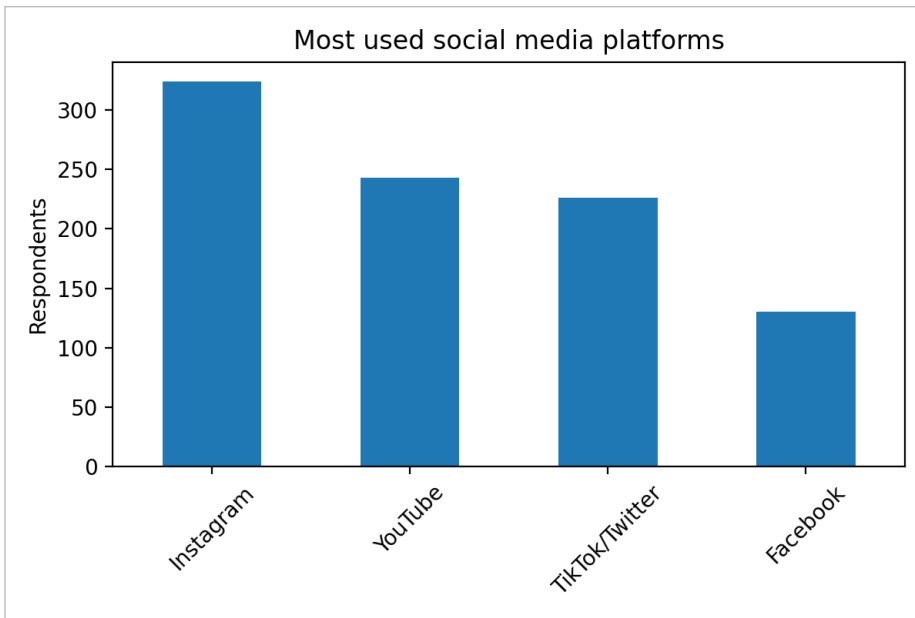
Figure 1

Platforms

Figure 1 visualizing the average awareness score which sits at $\mu \approx 3.8$ on a 1–5 scale, with the median at 4.

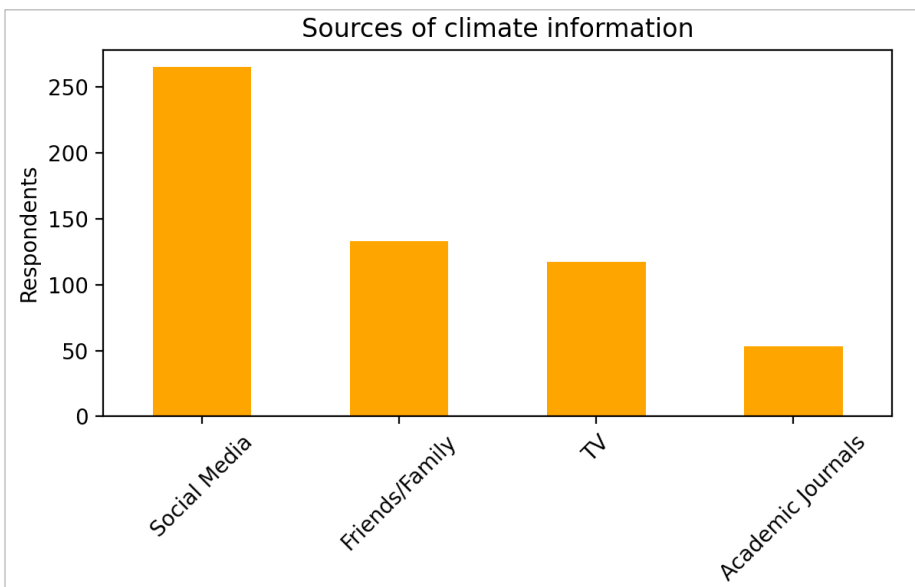## Figure 2

Sources of Climate Information

Figure 2 indicating that three-quarters of the students score is above 3.3, meaning that majority are at least "moderately" aware of the health impacts of climate change.

Key Observations

▶ **Age:** Roughly two-thirds of participants are in the 21-30 bracket, and very few are under 20.
▶ **Gender:** Females are more than the number of males and the ratio is 2 : 1.
▶ **Academic year:** 1st-year students constitute the largest portion (~33 %), but all cohorts are represented.
▶ **Institution:** An overwhelming majority ($\approx$94 %) attend private colleges.
▶ **Location:** About 64 % live in urban areas.
▶ **Social-media use:** Nearly three-quarters use social media daily while "rarely" is <10 %.

▶ **Platforms (SME6):** Instagram is most common (94 %), followed by YouTube and TikTok/Twitter; Facebook lags behind.

▶ **Information sources (SME7):** Social media is the dominant climate-information source (77 %), with friends/family and TV at one-third each, academic journals are consulted by only 15 %

RQ1: How aware are medical students of the health effects of climate change?

Figure 3
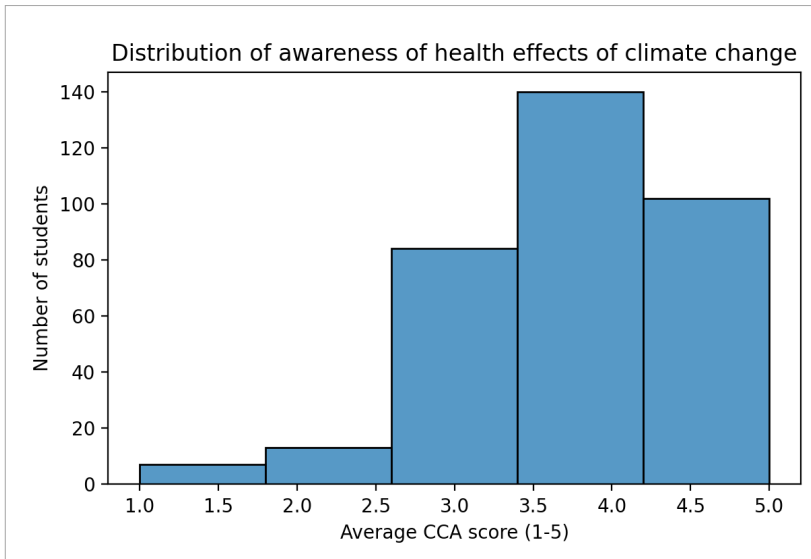*Distribution of Awareness of Health Effects of Climate Change*

Figure 3 showing the average awareness score sits at μ≈3.8 on a 1–5 scale, with the median at 4.

▶ The average awareness score sits at μ≈3.8 on a 1–5 scale, with the median at 4.
▶ Three-quarters of students score above 3.3, so most are at least "moderately" aware of the health impacts of climate change.
▶ Still, a non-trivial minority (≈6 %) land at the lower end (scores 1–2), suggesting room for targeted education.

RQ2: Does social media affect how concerned medical students are about climate-related health issues?

Table 9
Climate-Health Concern of Medical Students

Count	Mean	Std
252	3.6	1.481556493679478
34	3.6	1.0016820869752057
30	3.9	0.5004467990934309
28	3.7	0.8526853525220447
2	3.3	0.0

Table 9 explaining that the length of students' exposure to media is not linked to their climate-health concern issues. The table shows the average climate-health concern (mean of the three ISM items) for each reported frequency of social-media use. A one-way ANOVA compares those group means.
▶ Mean concern scores cluster tightly between 3.3 – 3.9 on the 1-to-5 scale, regardless of use frequency.
▶ The ANOVA returns $F=0.38, p=0.82$ $F=0.38$, $p=0.82$, far above the conventional 0.05 threshold, indicating no statistically significant difference across the usage groups.

In short, in this sample the amount of time medical students spend on social media is not linked to how concerned they feel about climate-related health issues.

RQ3: Are medical students willing to take part in climate advocacy or action?

Table 10
Medical Students Willing to take part in Climate Advocacy

	RCA mean
Count	343
Mean	3.5952380952
Std	0.8751682285

Table 10 showing the mean of respondents 3.5with Standard devition0.8

Table 11
Medical Students Willing to take part in Climate Advocacy

Score	Count	Percentage
Low	45	13.1
Neutral	88	25.7
Willing	210	61.2

Table 11 depicting readiness with highaverage level of 61%.

Figure 4
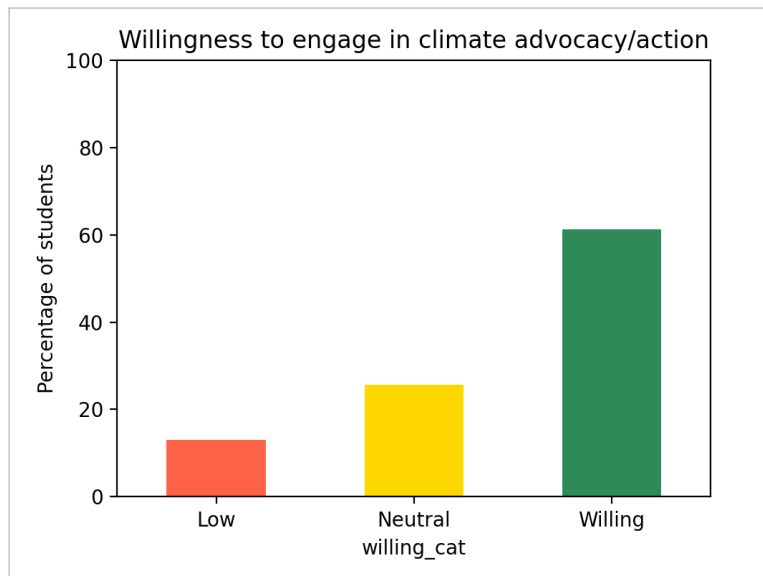*Willingness to Engage in Climate Advocacy*

Figure 4 visualizing mean, standard deviation and level of readiness.

Most students fall on the "willing" side of the scale: roughly 61% say they would actively take part in climate-related advocacy or action, another quarter sit on the fence, and only about one in eight express low willingness. In other words, the majority of medical students report that they are ready to get involved, although a sizeable neutral group could still be nudged with the right opportunities or incentives.

Inferential Statistics

Secondary Research Questions: how social media engagement (SME) impact climate change awareness (CCA) and readiness for climate action (RCA)?

Table 12

Predictor	B (Unstandardized Coefficient)	Std. Error	t-value	p-value	95% CI (Lower, Upper)
Constant	2.8949	0.144	20.117	<0.001	2.612 – 3.178
Social Media Engagement (SME mean)	0.2952	0.046	6.395	<0.001	0.204 – 0.386

Model Summary

- $R^2 = 0.107$
- Adjusted $R^2 = 0.104$
- $F(1, 341) = 40.90$, $p < 0.001$

OLS regression indicated that social media engagement significantly predicted climate change awareness, B = 0.30, SE = 0.05, t (341) = 6.40, p < .001, 95% CI [0.20, 0.39]. The model explained 10.7% of the variance in climate change awareness, $R^2 = 0.107$, F (1,341) = 40.90, p < .001. Standard Errors assume that the covariance matrix of the errors is correctly specified.
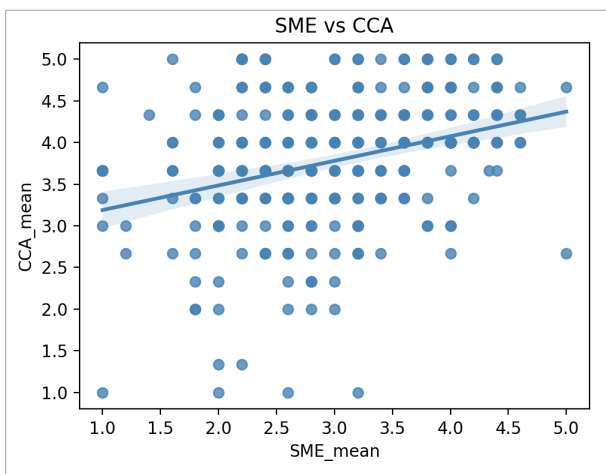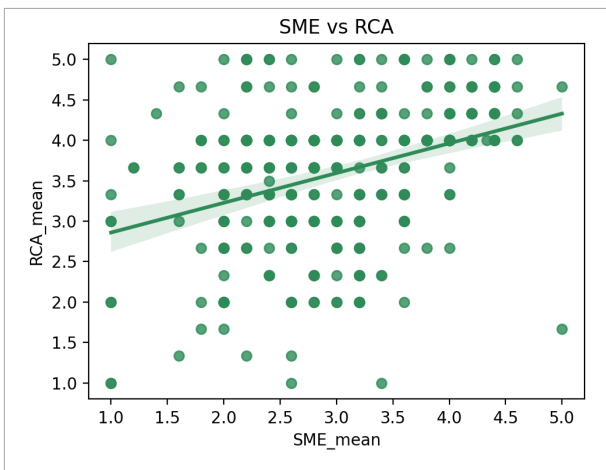
Figure 5

SME vs CCA

Figure 6

SME vs CCA

- Both regression lines slope upward: the more climate-related content students *engage with* (higher SME_meanSME_mean), the higher their average
  - awareness score (CCA) and
  - readiness-for-action score (RCA).

- ▶ Statistical strength
  - Coefficients ≈ 0.30 – 0.37 mean that each one-point rise in SME (on the 1–5 scale) lifts CCA by about 0.30 points and RCA by about 0.37 points.
  - The p-values are essentially zero, so the effect is very unlikely to be due to chance.
- ▶ Practical strength
  - R-squareds of 0.11 (CCA) and 0.13 (RCA) tell us SME explains roughly one-eighth of the variation—useful, but far from the whole story. Other factors clearly matter.

Gender differences in climate awareness
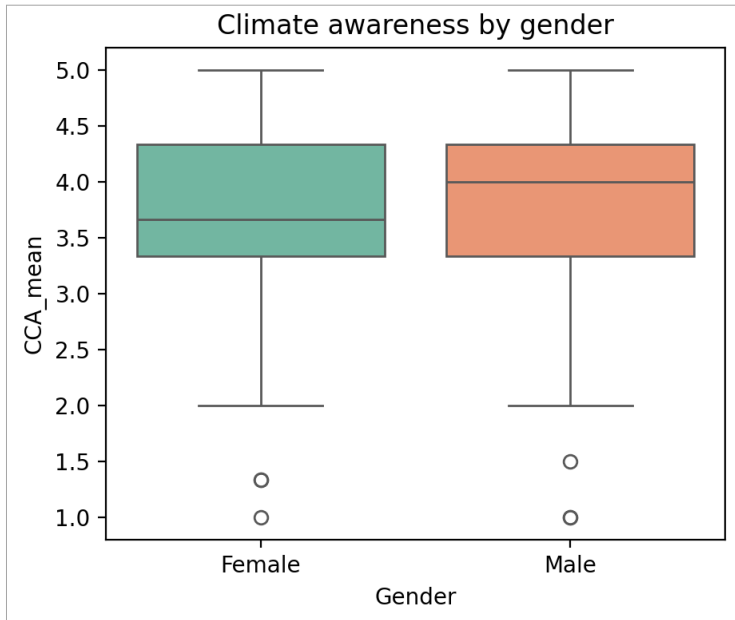### Table 7
Climate Awareness by Gender

Figure 12 showing that gender doesn't paly significant role in influencing climate change awareness.
- ▶ Average climate-awareness scores are almost identical for women (≈ 3.75) and men (≈ 3.77).
- ▶ The independent-samples t-test ($t=0.24, p=0.81$ $t=0.24$, $p=0.81$) confirms no statistically significant difference.

Bottom line: In this sample, gender does not meaningfully influence students' climate-change awareness.

Discussion

The current study conducted to explore climate change awareness, consciousness, advocacy and readiness among medical students in Peshawar city, with a focus on the role of social media in influencing climate change awareness. The analysis detected several significant findings, many of which align with the available literature in the domain, while some indicate novel insights specific to the regional and educational ambiance of Pakistan.

The research found that the average awareness score among participants was approximately 3.8 out of 5, with the over whelming majority scoring above 3.3, representing a "moderate to high" awareness and influencing of the climate change on health. These findings are confirming previous studies conducted in both regional and international scenarios. For example, Khan et al. (2024) recorded that Pakistani medical students mostly recognize climate change as a public health problem, despite their education on the subject remains informal and fragmented.

Likewise, Heydari et al. (2023) in Iran and Nigatu et al. (2014) in South Africa observed that students exhibited awareness but lacked formal curricular learning. These results underline a common global pattern of climate awareness prevailing among medical students but is usually not nurtured through structured educational channels (Krasna et al., 2020).

Although, it is notable that 6% of students in the current research attempt still scored low on awareness. This reflects a continuous gap in formal medical educational outreach, which confirms findings from Oungpasuk et al. (2022), who recorded dissatisfaction among UK students in the context of climate-health education. Consequently, while awareness is comparatively high, the lack of institutional reinforcement remains an issue of concern across different regions of the world.

In contrast to what might be expected based on prevailing literature, the current study found no statistically significant relationship between the frequency of exposure to social media and the level of concern regarding climate-related health issues (ANOVA, $p = 0.82$). This contradicts with claims from Dada et al. (2022) and Schäfer (2025), who observe social media's role in forming perceptions and concerns through targeted content and peer influence.

A possible explanation is that frequency alone may not build concern, but it is the pattern and quality of content utilized for the cause. This issue is explained at in the study by Moorhead et al. (2013), who suggest the mixed quality of social media health content. The findings from this study, therefore, propose that exposure needs to be content-rich designed to impact concern meaningfully.

An interesting finding is that over 61% of participants expressed a readiness to engage in climate advocacy, with only 13% exhibiting low willingness. This level of reediness aligns with earlier findings from UNICEF (2022) and Younis and Ahmed (2024), which observed Pakistani youth as highly motivated to involve in environmental activism regarding climate issues.

The data confirms Bandura's Social Cognitive Theory (1986), observing peers advocate online may boost medical youth' self-efficacy and readiness to action. Comparatively high readiness to participate in climate action despite the absence of structured education also confirms the Health Belief Model (Rosenstock, 1974), proposing that perceived severity and cues to action is likely shaped by social narratives which can influence engagement.

Regression analyses depicted that higher engagement with climate-related content on social media is significantly associated with both high level of awareness ($\beta = 0.30$, $p < 0.001$) and greater degree of readiness for advocacy ($\beta \approx 0.37$, $p < 0.001$). These findings reinforce the previous literature's stance that social media is not just a communication tool but also a source of behavior formation (Schäfer, 2025).

The findings of the current study validate the importance of well targeted and quality content and specific engagement as opposed to generalized use. They also pinpoint that sole social media engagement doesn't cover all variance in awareness or advocacy ($R^2 \approx 11-13\%$), it plays a less important role as expressed by Dada et al. (2022) in their study of informal education as both an advantage and a challenge as well.

Notably, no statistically significant gender variations were found in climate awareness scores ($p = 0.81$), which confirms with the findings from Nigatu et al. (2014) and Heydari et al. (2023), who observed comparable awareness levels indifferent genders among health science students. This indicates that the digital and social media ambiance may facilitate a level playing field, minimizing traditional disparities in acquisition of information.

The current study records encouraging evidence that private medical students in Peshawar are comparatively more aware of climate-health connections and are willing to involve in action for climate change. Social media observed to be a meaningful but partial, agent of both awareness and advocacy for climate change. Nonetheless, the data also reveals the limitations of informal education, particularly when it comes to concern levels and depth of learning and suggesting that formal curricular integration remains as indispensable.

The findings of the study reinforce international calls for integrating climate-health education into medical curricula (AAMC, 2023; Krasna et al., 2020) while it also highlighting social media's capacity to support learning and reinforce advocacy. Future planners must focus on enhancing the quality of digital information and integrating online engagement with institutional learning to fully harness the capacity of the upcoming generation of medical experts.

Conclusion

This study aimed to determine the attitudes of medical students in Peshawar regarding climate change, namely their awareness, understanding of its health consequences, and readiness to participate in advocacy efforts. It also examined the influence of social media on individuals' behaviors on climate change. The findings illustrate how forthcoming healthcare professionals will address climate change, a significant concern affecting all individuals. The findings indicate that the majority of medical students had varying degrees of knowledge on climate change and its impact on human health. They are aware of the risks, particularly as temperatures rise and health issues exacerbate. Many expressed their willingness to engage in projects related to climate change. The results indicate that children are cognizant of climate change and may desire to take action regarding it.

The students said that social media was the primary means through which they acquired knowledge about climate change. Many children indicate that Instagram, YouTube, and TikTok are their primary sources of information regarding climate change. Nevertheless, the duration of medical students' engagement with social media did not immediately influence their knowledge regarding health risks linked to climate change. This research supports a crucial assertion: just presence on social media is insufficient. The kind and caliber of information significantly influence public perceptions and actions around climate change.

Students exhibiting greater engagement with climate-related content on social media demonstrated heightened awareness of the issue and a greater propensity to take action. Aspirants to health professions may gain from high-quality, practical, and comprehensible digital content. Consequently, literature addressing the role of health workers in mitigating climate change could be highly beneficial.

This study illustrates the imperative of equipping medical students with improved resources and structured instruction on climate change. Social media may address certain deficiencies, although it cannot substitute for traditional education. Incorporating climate-health issues into medical education will guarantee that all students obtain consistent, precise, and advantageous knowledge, regardless of their engagement with social media.

This study indicates that informed youngsters can leverage technology to assist impoverished nations in addressing climate change. A significant demographic capable of substantially influencing public opinion, state policy, and the future provision of healthcare comprises students. One should not underestimate the effort required to prepare people to address climate change.

The research indicates that medical students in Peshawar possess awareness of climate change, express concern regarding it, and aspire to take action. The healthcare sector is advancing in addressing climate change. Individuals may significantly influence the battle against climate change by acquiring accurate knowledge and assistance.

Recommendations

- ▶ Future researchers to focus on exploring of the impact of various types of digital content on student's media engagement and understanding of climate issue.
- ▶ Design longitudinal studies to measure level of awareness and preparedness for climate advocacy over long period in medical students.
- ▶ Conduct studies to compare knowledge of climate change, readiness for climate change advocacy findings between private and public medical institutions to gauge institutional differences in the field.
- ▶ Expand canvas of the study to cross-regional or national level to find out trends and variations at large scale.

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