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Assessment of Knowledge, Perceptions, and Practices Toward Climate Change and it's Effects on Health Among University Students in Jalalabd, Afghanistan

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ABSTRACT

Climate change (CC) is a complex global environmental challenge that has a worldwide effect on public health, development, agriculture, water supplies, and energy production. In addition to international efforts, youth engagement is vital to environmental conservation and climate action support. Therefore, the study aimed to assess knowledge, perceptions, and practices toward CC and its effects on health among university students in Jalalabd, Afghanistan. A cross-sectional online survey was conducted on 471 public and private university students in Jalalabad, Afghanistan, from September 2023 to December 2023. A non-probability-convenient sampling technique was used to select study participants. The data were analyzed using the statistical package for social sciences (SPSS) version 28. In this study, a total of 471 students were enrolled. 87.3% were male and 12.7% were female. Majority of them (95.5%) had heard of CC and believed that it affected their communities. The main sources of information about CC were television and radio (77.5%). Water-borne diseases, disruption of health services, cardiovascular and respiratory diseases, malnutrition, vector-borne disease, were identified by students as CC related health impacts. Among the students, (72.8%) had adequate knowledge, and (27.2%) were having inadequate knowledge regarding CC and its effects on health. Raising public awareness, adopting environmentally friendly technologies, increasing tree planting, and proper waste disposal were mentioned by over 90% of the students as ways to reduce CC. Most common eco-friendly practices among the students were using recyclable products (77.2%), using public transportation (77.1%), and using energy-efficient lightbulbs (75.2%). There was a significant association between the students' knowledge and their practices. In addition, university type, academic year level, and information sources were significantly related to their knowledge. The study concluded that the majority of the participants were aware of CC and agreed that CC is a serious problem, but they had inadequate practices compared to their knowledge. It is crucial to translate students' knowledge into deliberate practices. In order to implement eco-friendly practices, students must be inspired to care for the environment through various activities on important environmental days, like world environment day.

Keywords: Knowlege, Perception, Practices, University students, Climate change, Afghanistan

INTRODUCTION

Climate change is a global environmental problem that has a worldwide effect on public health, development, agriculture, water supplies, and energy production (Elsharkawy et al., 2023). Climate change can exacerbate existing health threats or create new public health challenges through a variety of pathways (Gautam et al., 2021). The impact of CC on human health can be due to the direct effects of exposure to weather events, such as heat stress, floods, droughts, and storms, with subsequent increases in respiratory and cardiovascular morbidity and mortality(Elsharkawy et al., 2023) , or indirect effects, such as people displacement, mental health disorders associated with natural disasters, the spread of vector-borne diseases, impaired air quality, and food insecurity (Nigatu et al., 2014). In addition, weakened governance capacity and economic disruptions may amplify these impacts. Thus, by the year 2030–2050, CC is predicted to cause about 250,000 additional deaths annually from malnutrition, malaria, diarrhea, and heat stress (Elsharkawy et al., 2023). Populations vulnerable to the effects of climate change are children, older people, patients with preexisting illnesses, and those living in poverty (Felicilda-Reynaldo et al., 2018). Greenhouse gases (GHGs) are the most significant drivers of CC. They include carbon dioxide, the most contributed gas, as well as methane, nitrous oxide, and

chlorofluorocarbons, among others. Currently, the main sources of GHGs are energy production, transportation, food production, housing, industry, agricultural activities, and waste (Elsharkawy et al., 2023). Climate change is complex and confusing to the public due to its nature as a persistent threat with a global effect. Public awareness is therefore an essential element of the global response to CC, as it encourages changes in people's behavior and helps them adapt to CC-related trends (Elsharkawy et al., 2023). University students are the future leaders because they have a long-term prospect. They are also vulnerable to the long-term consequences of climate change, and their engagement in climate action is essential. However, studies investigating the assessment of knowledge, perceptions, and practices toward CC and its effects on health among university students in Jalalabad, Afghanistan, are lacking. Therefore, the present study was designed to determine the knowledge, perceptions, and practices regarding CC and its effects on health among university students.

MATERIALS AND METHODS

Study setting and Design

This was a cross-sectional online survey conducted among public and private university students in Jalalabad, Afghanistan, from September 2023 to December 2023, after receiving ethical approval (referencing IRB no. 12/08-20-2023) from the Institutional Review Board (IRB) of the Faculty of Medicine, Nangarhar University. The selection criteria were: 1) Public and private universities, registered with the Ministry of Higher Education and located in Jalalabad city, Afghanistan. 2) Students who are willing to participate in the study.3) Students from all years were included in the study. 1) Students with no access to the online questionnaire. 2) Students whose questionnaires were incomplete. 3) Postgraduate students and those who were unwilling to fill out the questionnaire were excluded from the study.

Samples Size and Sampling technique

The sample size was calculated by using a single population proportion formula: $\mathbf{n = Z^2 x\ p\ (1\text{-}p)/d^2}$. Where **n** is the sample size, p is the prevalence of the knowledge level among participants expressed as a proportion of 50%, d2 is the margin of error, which is 0.5 (5%) in this case, and 1.96 is the standard normal **z**-value corresponding to the 95% confidence interval (**CI**). The required minimum sample size was 384 participants. A non-probability-convenient sampling technique was used for data gathering. To increase the study power and cover the probable non-response rate, a 15% increase in the minimum required sample size is calculated to be: 0.15 x 384 = 57.6 ≈58. Therefore, the calculated number of participants to be selected was 384+ 58 = 442.

Data collection and participants characteristics

A 79-item questionnaire was developed in English language from a similar study that was conducted in Egypt (Elsharkawy et al., 2023) and distributed using Google Form. Participants were recruited through social media (WhatsApp). The questionnaire was translated into the national language, Pashtu, and used with some minor changes according to the context to meet our study objectives. The questionnaire had five sections. The first section was on the socio-demographic characteristics of the students(Fahmy et al., 2015). The second section was about knowledge regarding CC and the United Nations Sustainable Development Goals (UNSDGs) (which are the same for all nations, including Afghanistan), government actions toward CC, and the students' information sources. The third section was about knowledge regarding the causes and impacts of CC. To assess the level of knowledge, the answers in this section were classified as correct or incorrect for each item scored, with 1 for a correct answer and 0 for an incorrect answer. A score was given for each knowledge -based question about CC and respondents who scored 50% or more considered to have adequate knowledge and those who achieved less than 50% score considered to have inadequate knowledge(Reddy et al., 2022). The fourth section allocated to their awareness of CC and their perceived solutions. The fifth section included the students' practices to reduce CC. The survey was anonymous, and the data provided by the participants was kept confidential. An introductory paragraph described the aim of the study, and informed consent was obtained from the participants. A pilot study was done on 50 students from different faculties to confirm the validity and reliability of the questionnaire. Tool reliability was tested using the Cronbach's alpha test. The result was 0.75 for knowledge, 0.72 for perception, and 0.80 for practice questions, which indicates the accepted reliability of the tool. The observation of the pilot study was not included in the final analysis.

Statistical Analysis

Initial data were entered into an Excel spreadsheet and then exported to SPSS version 28.0. The quantitative data were reported as means and standard deviations. The categorical data were summarized as

frequencies and percentages and compared using the chi-square test. The level of significance was set at $p < 0.05$.

RESULTS

Sociodemographic characteristics of study participants

A total of 471 students completed the online survey. Of them, 87.3% were male and 12.7% were female. The median age of study participants was 22 (24–21) years (range, 18–42 years). Among students, the highest response rate was observed for medical students (67.5%) and the lowest for theoretical faculty students (29.3%). Majority of the respondents were in the third (30.1%), second (27.7%), and sixth (19.5%) of the academic year level, while 11%, 9.1%, and 3% of the respondents were in the fourth, first, and fifth of the academic year level, respectively. The statistical data for the baseline information of the study participants is shown in Table 1.

Table 1. Sociodemographic characteristics of study participants [N=471].

Variables	Frequency	Percentage	p value†
Demographic characteristics			
Gender*			
- Male	411	87.3	0.000[a]
- Female	60	12.7	
Age* (in years)			
- 18-25	417	88.5	0.000[b]
- 26-33	47	10.0	
- 34-42	7	1.5	
Marital Status*			
- Single	357	75.8	0.000[a]
- Married	114	24.2	
Residence*			
- Urban	335	71.1	0.000[a]
- Rural	136	28.9	
University*			
- Public	225	47.8	0.000[a]
- Private	246	52.2	
Faculty*			
- Practical	333	70.7	0.000[a]
- Theoretical	138	29.3	

Notes: *Data presented as number, percentage, or median (interquartile range). †P-values were obtained from a Binomial test; b Chi-square test.

Knowledge of students toward climate change

Most of the students indicated that they had heard about CC (95.5%) and believed that it affected their community (99.2%). However, only 41% knew about the UNSDGs for climate action, and 31% were aware of the government's actions to mitigate CC. Nearly half of the respondents had learned about the environment and its impact on health in educational courses (44.8%), and majority of the respondents had not attended seminars or training related to CC (84.5%). The most common information sources were television and radio (77.5%), followed by educational material (65.8%), friends and family (61.6%), electronic media (60.5%), and newspapers (32.9%). Regarding knowledge about the consequences of CC, the students mentioned CC as season shifts (92.8%), changes in rainfall patterns (91.5%), drought (89.6%), extreme temperature changes (89.4%), frequent floods (80.7%), and greenhouse gases (GHG) (73.5%), but extreme cold was mentioned by only 72.6%. The main causes reported by respondents were poor industrial practices (92.8%), transportation-related carbon emissions (92.4%), burning waste (91.9%), burning fossil fuels (91.3%), polluted energy sources (90.9%), deforestation and cutting down trees (90%), natural occurrence (88.7%), forest combustion (86.6%), and electricity generation as a contributor to CC (73.7%), respectively. Regarding the health impact of CC, the most commonly noted health impacts were the extreme temperature (93.2%), followed by water shortage (91.9%), ozone hole (88.5%), forced migration (87.5%), direct physical hazards (86.8%), diarrhea and water-

borne diseases (86.2%), ice melting (85.8%), disruption of health services (83.4%), cardiovascular and respiratory diseases (82.2%), malnutrition (80%), desertification (79.8%), sea level rises (79.6%), vector-borne disease (79.4%), and loss of diversity (76.4%). Among the respondents, (72.8%) had adequate knowledge, and (27.2%) were having inadequate knowledge regarding CC and its effects on health.

Perception of students toward climate change

When asked about the perception of climate change, 94.3% of the students agreed that climate change is a serious problem, and 90% believed CC could reduce the quality of life for future generations. They also acknowledged that increasing public awareness about CC (97.7%), using environmentally friendly technologies (97.5%), increasing tree planting (97.2%), proper waste disposal (97%), legislation with enforcement of laws (96.6%), decreasing industrial pollution (96.2%), encouraging community participation (96%), encouraging water conservation and reuse (96%), and the use of renewable energy sources (94.3%) are the main activities to be taken to decrease or prevent CC. Only 87.7% of respondents felt that discouraging the construction of new buildings in vulnerable areas was important.

Practices of students toward climate change

Regarding practices to reduce the impact of CC, (77.6%) of the study subjects stated they would use the stairs instead of the elevator, while 77.2% claimed they would use recyclable products, taking public transportation instead of private cars (77.1%), using paper bags instead of plastic ones (76.1%), using energy-efficient lightbulbs (75.2%), reducing the use of plastic items (75%), turning off lights and devices when not in use (74.8%), consuming organic food (74.7%), and walking short distances rather than riding (74.4%). Other practices to adapt to CC were limiting the use of air conditioning in summer (74.3%), paying attention to water consumption (74.1%), participating in tree plantation drives (73.6%), and disposing of waste properly (73.3%).

Association between demographic variables, practices, and knowledge of students' attitudes toward CC

Regarding the association between demographic variables and students' knowledge toward CC, we found that university type ($p = 0.021$), academic year level of the students' ($p = 0.002$), and information source ($p = 0.025$, $p = 0.037$) were significantly associated. Additionally, there was a significant relationship between the students' knowledge and their practice to lessen or prevent CC.

DISCUSSION

In this online survey, 471 participants were enrolled from different disciplines to assess knowledge, perceptions, and practices towards climate change and its effects on health among university students in Jalalabad, Afghanistan. The findings indicate that the majority of the sample population was male (87.3%), which was surprising because of governmental restrictions on female students' education. Among respondents, the highest response rate was observed for medical students (67.5%) and the lowest for theoretical faculty students (29.3%).This study revealed that the majority (95.5%) of the students were aware of CC. This finding was consistent with those reported by previous studies, who stated that (98.1%, 88.3%, and 823%) of the study respondents were aware of CC (Elsharkawy et al., 2023; Ghanem, 2022; La Torre et al., 2023). Nevertheless, only 41% of study subjects knew about the UNSDGs for climate action, and 31% were aware of the government's initiatives to combat climate change. Similar findings were reported by previous studies(Elsharkawy et al., 2023; Reddy et al., 2022). The main sources of information to get information about CC are television and radio. This result was consistent with the findings of other studies (La Torre et al., 2023; Nigatu et al., 2014). In term of knowledge about CC and its effects on health, (72.8%) had adequate knowledge, and (27.2%) were having inadequate which is supported by study conducted in Egypt (Elsharkawy et al., 2023). In this study, CC knowledge was significantly associated with university type, academic year level, and information source. Additionally, there was a significant relationship between the students' knowledge and their practice to lessen or prevent CC. This study had several limitations. The first, respondent was required to answer the online questionnaire, as students with no access to the online questionnaire were excluded. Second, the participants were made up of individuals specifically belonging to the university setting, which makes it difficult to generalize the results for the entire Afghan population. Thus, it would be helpful if studies with more nationwide samples were replicated. More importantly, majority of the respondents were professionally related to the health area, and this even more limits the potential of this study to make generalizations. Strengths of this study: this study fills the gap in the scientific literature, providing an innovative focus on this emerging issue. Furthermore, it will be possible to replicate this investigation in order to assess changes in knowledge over time.

CONCLUSION

The study concluded that the majority of the participants were aware of CC and agreed that CC is a serious problem, but they had inadequate practices compared to their knowledge. It is crucial to translate students' knowledge into deliberate practices. In order to implement eco-friendly practices, students must be inspired to care for the environment through various activities on important environmental days, like world environment day. Additionally, awareness campaigns and workshops focused on improving practices are needed.

Three strategies can be used to increase awareness: First, incorporate the CC subject into the curricula of the university. The second is the use of young people's ability to organize environmental campaigns to raise public awareness, particularly in rural areas. Lastly, students take part in environmental seminars through the media.

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Authors Contributions: Sherzad developed the conception, reviewed the CC literature, formulated the study design, questionnaire, and data collection, carried out the statistical analysis and interpretation of the data, and prepared the manuscript. Zalmai, Danish and Adil assisted in data collection. Azimee edited the manuscript.

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