



## Perception of Climate Change at Ain Shams Medical Campus: A Survey of Egyptian Medical Students

Mohamed Momen, MD, Aya Mostafa Abdellatif, MD, Shaimaa Samy Yousef, MD

Department of Community, Environmental and Occupational Medicine, Faculty of Medicine, Ain- Shams University, Cairo, Egypt.

### ABSTRACT

**Background:** Climate change represents a great health risk to humanity and healthcare system. Professionals all over the world are taking action to mitigate its impacts. **Objective:** to evaluate the perception of medical students at Ain Shams University (ASU) towards climate change, its health impact, and responsibilities for the future. **Method:** A cross-sectional study was carried out among medical students at ASU. The data were gathered using an electronic questionnaire covering socio-demographic characteristics and perceptions towards climate change using 5- point Likert scale. **Results:** Among 503 participants; 78.5% were 20-25 years old, 54.9% were females, 68.2% were living in urban places, and 57.9% were in academic years. Most students agreed or strongly agreed towards the health impacts of climate change, the importance of receiving education on climate change, and implementation of environmentally sustainable, energy-efficient practices. Furthermore, females and those from urban sites reported a statistically significant disagreement regarding receiving previous medical education about climate change ( $p < 0.001$ ). After applying multi-variate analysis, clinical medical study was a significant predictor for positive perception regarding the health impact of the climate change. **Conclusion:** Medical students have good perception of climate change and the importance of teaching it in medical programs. The results provide helpful insights about the factors that influence medical students' views on the health implications of climate change, which may inspire the development of personalized interventions to improve medical students' knowledge and attitudes towards climate change.

#### Submission Date:

2023-07-04

#### Revision Date:

2023-08-20

#### Acceptance Date:

2023-09-06

#### Key Words:

Perception, Climate change, Health impact, Ain Shams University, Medical Students

### INTRODUCTION

One of the most significant risks to human health is climate change, which is considered the biggest global health issue that the healthcare industry needs to be ready to address<sup>1,2</sup> The World Health Organization (WHO) says that environmental factors cause 23% of all deaths around the world, and according to the prediction, climate change is anticipated to result in an increase of approximately 250,000 annual mortalities by the year 2030.<sup>3</sup> Climate change has been found to intensify the

prevalence and severity of chronic illnesses. Additionally, individuals who are exposed to extreme weather and pollutants in the environment are likely to experience elevated risks of injury and mortality. Climate change also affects the geographic distribution and seasonal variation of infectious and vector-borne diseases. The vulnerable populations most affected by these changes are children, the elderly, people with diseases or health disparities, and communities

**Corresponding Author:** Shaimaa Samy Yousef, Public Health and Community Medicine Department, Faculty of Medicine, Ain- Shams University, Cairo, Egypt. Email: shaimaasamy@med.asu.edu.eg

with limited resources.<sup>4,5</sup> Consequently, the impacts of climate change will disproportionately affect socioeconomically disadvantaged and vulnerable communities, characterized by a higher prevalence of climate-sensitive diseases. This exacerbates existing health disparities and places an increased strain on the healthcare infrastructure within these regions.<sup>6</sup>

Healthcare professionals bear a unique responsibility for safeguarding public health from the adverse impacts of climate change. Previous research has demonstrated that the current state of the health community's preparedness in detecting, preventing, and mitigating climate-related health issues, as well as in developing suitable adaptations, is inadequate.<sup>7</sup> Climate change readiness has not been given sufficient emphasis in the health sector of numerous nations.<sup>2,8</sup>

Similar to how leaders address emerging challenges, health professionals tasked with addressing climate change can demonstrate its impact on health, promote environmentally sustainable healthcare, emphasize the health advantages of mitigation policies, provide care for affected individuals, remain attentive to emerging risks, and conduct research to gather evidence supporting adaptation efforts.<sup>9,10</sup>

To combat the health effects of climate change, medical students must be involved. In Egypt, people who have studied either clinical medicine or preventive medicine oversee public health. The present cohort of medical students will engage in professional medical practice from the 2020s to the 2060s, which is a time when health problems linked to climate change are likely to become more common. How well they handle the greatest challenge of the current century may rest on the knowledge and skills they have learned from their current education. Assessing students' views or perceptions on climate change and figuring out how student-level factors affect these views could lead to the creation of curricula that support students' own goals and can be used with more students from different backgrounds. Few studies have been carried out in Egypt to assess the perception of medical students towards climate change. In 2023, Ghanem et al. studied knowledge, perception, and behaviors of non-medical students in Egypt towards climate change and revealed that there

was a good level of awareness among students, although some participants knew nothing about how climate change affects their health.<sup>11</sup>

Additionally, Elsharkawy et al. in 2023 studied knowledge, perception, and practices related to climate change among students enrolled in practical and theoretical faculties at Al-Azhar University for Girls in Cairo. The findings revealed that participants' faculty and information sources were significantly associated with their climate change knowledge.<sup>12</sup>

None of the previous studies have focused on medical students in Egypt to assess their perception and attitudes towards climate change. Therefore, it is crucial for educational planning to investigate the perspectives of current medical students on climate change and their potential contributions towards addressing this issue. Yet, there are few studies that have been conducted in Egypt to find the best ways to improve education. So, we aimed to evaluate the perception of medical students towards climate change, its health impact, and their responsibility for it in the future.

## METHODS

A descriptive cross-sectional study was carried out among medical students at faculty of medicine, Ain Shams University, in Cairo from November 2022 to April 2023.

Using Epi Info 7 Program for sample size calculation, setting confidence interval at 95%, it is estimated that sample size of at least 385 medical students was enough to detect positive attitude and perception among medical students towards climate change of about  $50\% \pm 5\%$ .<sup>13</sup> Regarding sample method, a convenience non-random sample was used.

An anonymous electronic survey was conducted among a sample of Egyptian medical students, ASU. Study participants were asked to complete the questionnaire that was sent through their official emails in English language. The questionnaire included two parts: Section I included sociodemographic characteristics (age, gender, residence, and year of study). Section II included 18-items with 5 points Likert-scale. The answer categories of the first 17-items were ranging from strongly disagree to strongly agree. It was assessing student background, perspectives on climate change,

**Table (1): Socio-demographic Characteristics of participants (N=503):**

Characteristic	N (%)
<b>Age</b>	
<20 years	94 (18.7)
20-25 years	395 (78.5)
>25 years	14 (2.8)
<b>Gender</b>	
Male	227 (45.1)
Female	276 (54.9)
<b>Residence</b>	
Urban	343 (68.2)
Rural	160 (31.8)
<b>Stage of study</b>	
Academic	291 (57.9)
Clinical	212 (42.1)

its impact on health, and medical students' responsibilities for it in the future.<sup>14-16</sup>. The 18<sup>th</sup> question was added "*In your opinion, you can explain the links between the environmental effects of climate change and human health*" and the answers were very strong, strong, neutral, weak, and very weak.

**Validation of data collection tool:** The questionnaire was revised by two public health experts from other Egyptian universities, and recommended modifications were done. A pilot study was performed on 40 medical students to test accuracy and the language of the questions. Pilot data were not included, and no correction was done as regard the wording of the questions. All students indicated that the questions were clear and easy to be understood.

**Data Management:** Data was revised, coded, tabulated and introduced to a PC using Statistical package for Social Science (SPSS). Data cleaning and checking for quality of data and data entry was performed. Data was presented and suitable analysis was done (frequency, percentage, and chi-square). A value of  $p \leq 0.05$  was considered significant.

The 25-point score assessing perception of climate change's health impact was calculated. It included 5 statements: *climate change will impact future generations, climate change negatively impacts our lives, it is important for physicians to be educated on climate change, a climate change curriculum should be included in medical education, medical school has educated me on climate change*. The 25-point score was calculated by summing the 5- point Likert scale

for each participant. It was defined as: strongly disagree = 1; disagree = 2; neutral = 3; agree = 4; strongly agree = 5. Reliability of the 25-point score was assessed and the Cronbach's Alpha was 0.7, indicating that the scale was consistent. Additionally, a multivariate analysis was done to predict significant factors associated with 25-point score assessing perception of climate change's health impact among medical students.

## RESULTS

The study has included 503 medical students from faculty of medicine at Ain Shams University. The participants' socio-demographic characteristics revealed that most of them were between the ages of 20 and 25 (78.5%), female (54.9%), and lived in urban areas (68.2%). In terms of study stage, most participants (57.9%) were in the academic years (year 1 to year 3) rather than the clinical years (42.1%, Table 1).

Most of students agreed or strongly agreed that the climate is changing (84.9%), and 81.2% of them reported that there is evidence of climate change. Additionally, most students (80.5%) have claimed humans accountable for climate change. However, nearly (20%) of students assumed that individual actions had no impact on climate change, and (28.1%) believed that climate change was irreversible. (55.4%) of students reported that the severity of climate change was exaggerated (Table 2).

Most students agreed or strongly agreed that climate change impact future generations (80.3%) and negatively impact their lives (65%). Despite three-quarters of students addressing the importance of physicians being educated on climate change, only half of students showed interest in the idea that climate change curriculum must be integrated in medical education, with only 21.5% reporting that medical school has educated them about climate change (Table 3).

Two-thirds of students are concerned about climate change, and (73.4%) believe that they can make a positive contribution to their environment. Similarly, (73.4%) showed an interest in being informed about environmental problems, and (66.2%) of students believed that healthcare professionals should inform the public regarding climate change. However, only

**Table (2): Perspectives of medical students regarding climate change:**

Questions and Responses	N (%)
<b>I believe our climate is Changing</b>	
Strongly disagree	12 (2.4)
Disagree	16 (3.20)
Neutral	48 (9.5)
Agree	235 (46.7)
Strongly agree	192 (38.2)
<b>There is evidence of climate change</b>	
Strongly disagree	8 (1.6)
Disagree	21 (4.20)
Neutral	66 (13.1)
Agree	283 (56.3)
Strongly agree	125 (24.9)
<b>Humans are responsible for climate change</b>	
Strongly disagree	15 (3.0)
Disagree	30 (6.00)
Neutral	53 (10.5)
Agree	250 (49.7)
Strongly agree	155 (30.8)
<b>Individual actions make no impact on climate change</b>	
Strongly disagree	110 (21.9)
Disagree	228 (45.3)
Neutral	64 (12.7)
Agree	75 (14.9)
Strongly agree	26 (5.2)
<b>Climate change is irreversible</b>	
Strongly disagree	19 (3.8)
Disagree	176 (35.0)
Neutral	167 (33.2)
Agree	111 (22.1)
Strongly agree	30 (6.0)
<b>The severity of climate change is exaggerated</b>	
Strongly disagree	15 (3.0)
Disagree	80 (15.90)
Neutral	129 (25.6)
Agree	228 (45.3)
Strongly agree	51 (10.1)

(40.8%) of students feel prepared to address the health effects of climate change, and (76.6%) of students reported that hospitals should apply environmentally sustainable, energy-efficient practices (Table 4).

This study has shown that female students and those from urban sites reported a statistically significant disagreement regarding receiving previous medical education for climate change in comparison to higher rates of agreement among male students and those from rural areas (p-value <0.001, Table 5). Additionally, multivariate analysis of factors associated with 25-point score assessing perceptions of climate change's health impact among medical

**Table (3): Perceptions of medical students regarding health impacts of climate change:**

Questions and Responses	N (%)
<b>Climate change will impact future generations</b>	
Strongly disagree	11 (2.2)
Disagree	25 (5.0)
Neutral	63 (12.5)
Agree	231 (45.9)
Strongly agree	173 (34.4)
<b>Climate change negatively impacts our lives</b>	
Strongly disagree	20 (4.0)
Disagree	52 (10.3)
Neutral	104 (20.7)
Agree	201 (40.0)
Strongly agree	126 (25.0)
<b>It is important for physicians to be educated on climate change</b>	
Strongly disagree	10 (2.0)
Disagree	32 (6.4)
Neutral	90 (17.9)
Agree	260 (51.7)
Strongly agree	111 (22.1)
<b>A climate change curriculum should be included in medical education</b>	
Strongly disagree	53 (10.5)
Disagree	90 (17.9)
Neutral	109 (21.7)
Agree	183 (36.4)
Strongly agree	68 (13.5)
<b>Medical school has educated me on climate change</b>	
Strongly disagree	90 (17.9)
Disagree	203 (40.4)
Neutral	102 (20.3)
Agree	79 (15.7)
Strongly agree	29 (5.8)

students showed that clinical medical study was a significant predictor (Table 6).

**DISCUSSION**

The findings of this study convey valuable insights into medical students' perceptions on climate change and its health effects. The results suggest that while most of medical students recognize the existence of climate change and its potential impact on health, there are still gaps in their knowledge and attitudes towards addressing the issue.

The majority of the participants were in the age group 20-25 years with slightly more female participation, which is consistent with similar studies conducted among medical students.<sup>17,18</sup>

The study found that the majority of the medical students agreed or strongly agreed that climate change is happening, and humans are accountable for it,

**Table (4): Perceptions of medical students regarding their responsibility and ability towards climate change:**

Questions and Responses	N (%)
<b>I am concerned about climate change</b>	
Strongly disagree	15 (3.0)
Disagree	45 (8.9)
Neutral	141 (28.0)
Agree	225 (44.7)
Strongly agree	77 (15.3)
<b>I can make a positive contribution to our environment</b>	
Strongly disagree	4 (0.8)
Disagree	23 (4.6)
Neutral	107 (21.3)
Agree	261 (51.9)
Strongly agree	108 (21.5)
<b>It is important to me to be informed about environmental problems</b>	
Strongly disagree	9 (1.8)
Disagree	18 (3.6)
Neutral	102 (20.3)
Agree	265 (52.7)
Strongly agree	109 (21.7)
<b>Physicians should inform the public about climate change</b>	
Strongly disagree	16 (3.2)
Disagree	54 (10.7)
Neutral	100 (19.9)
Agree	232 (46.1)
Strongly agree	101 (20.1)
<b>I feel prepared to manage the health effects of climate change</b>	
Strongly disagree	17 (3.4)
Disagree	110 (21.9)
Neutral	171 (34.0)
Agree	169 (33.6)
Strongly agree	36 (7.2)
<b>Hospitals should implement environmentally sustainable, energy-efficient practices</b>	
Strongly disagree	7 (1.4)
Disagree	19 (3.8)
Neutral	92 (18.3)
Agree	274 (54.5)
Strongly agree	111 (22.1)
<b>In your opinion, you can explain the links between the environmental effects of climate change and human health as:</b>	
Very strong	95 (18.9)
Strong	214 (42.5)
Neutral	140 (27.8)
Weak	41 (8.2)
Very weak	13 (2.6)

which is consistent with other studies conducted among medical students.<sup>19,20</sup> This result is also in line with two recent Egyptian studies reporting that most of university students heard about climate change and believed it had influenced their life with percent ranging from 82.6% to 88.3%.<sup>11,12</sup> These high percent in awareness about climate change may be a result of national Egyptian efforts in this area and the Egypt hosting for COP27 conference and associated media

messages as these percentages are higher than that reported in 2009 to be 54% only.<sup>21</sup>

Despite the high percentage (80.5%) agreeing that humans are responsible for climate change; 20% agreed that individual actions had no impact on climate change; this might reflect the need to emphasize the responsibility towards environmental issues on individual level in undergraduate curriculum rather beside the governmental and institutional responsibility. And about 28 % of students believed that climate change is irreversible. These results are quite in the same direction of that found in an Indian study, in 2022, that stated that among 903 medical students; 97.4% agreed that ‘human actions are also the cause for global warming, 25% agreed that global warming is irreversible.<sup>18</sup>

Another study carried out to assess the knowledge and awareness about global warming and climate change among Turkish medical students in 2019 found that (94.8%) of the participants agreed that human activities attribute to climate change.<sup>22</sup>

The study also found that most of the participants (80.3%) believed that climate change will impact future generations and negatively impact their lives, which is consistent with other studies conducted among medical students.<sup>3,17</sup> But higher than the result reported by Elsharkawy et.al., 2023 that was (69%).<sup>12.</sup>

In the current study only (21.5%) stated that the medical school educated them about climate change. Also, most of the participants believed can have positive contribution to the environment, and more than two thirds believed that healthcare professionals should inform the public about climate change. These results are in line with an Italian study published in 2020 in which (25.8%) of participating healthcare professionals and students reported that their university study addressed global warming and climate change and the majority agreed that they could contribute to climate change impact mitigation.<sup>23</sup>

Interestingly, the study found that female students and those from urban sites reported a statistically significant disagreement regarding receiving previous medical education for climate change and the higher agreement among male students that indicate their higher interest in receiving a more informative education in climate change topic. However, this finding suggests that the current medical education

**Table (5): Factors affecting perceived medical education about climate change among participants:**

		Medical school has educated me on climate change.					P value
		Strongly disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly agree N (%)	
<b>Age (in years)</b>	< 20	15 (16.7)	46 (22.7)	20 (19.6)	11 (13.9)	2 (6.9)	0.170
	20-25	74 (82.2)	151 (74.4)	79 (77.5)	67 (84.8)	24 (82.8)	
	>25	1 (1.1)	6 (3.0)	3 (2.9)	1 (1.3)	3 (10.3)	
<b>Gender</b>	Male	47 (52.2)	70 (34.5)	48 (47.1)	40 (50.6)	22 (75.9)	<0.001*
	Female	43 (47.8)	133 (65.5)	54 (52.9)	39 (49.4)	7 (24.1)	
<b>Residence</b>	Urban	76 (84.4)	145 (71.4)	64 (62.7)	45 (57.0)	13 (44.8)	<0.001*
	Rural	14 (15.6)	58 (28.6)	38 (37.3)	34 (43.0)	16 (55.2)	
	Academic	50 (55.6)	124 (61.1)	63 (61.8)	44 (55.7)	10 (34.5)	
<b>Type of study</b>	Clinical	40 (44.4)	79 (38.9)	39 (38.2)	35 (44.3)	19 (65.5)	0.079

\* Statistically significant at  $p$ -value  $< 0.05$

system in Egypt may not be adequately addressing the issue of climate change, and there may be a need for targeted interventions to improve awareness and education among medical students which can be achieved through public health curriculum in medical school. This result is consistent with previous findings that education can enhance climate change awareness and comprehension.<sup>24</sup>

Furthermore, the study discovered that clinical medical study is a major predictor of medical students' assessments of climate change's health impact. This research emphasizes the necessity of including climate change education in the medical curriculum, as clinical experience may be an effective strategy to raise students' understanding of climate change's health impacts. This finding emphasizes the importance of incorporating climate change education into the medical curriculum to prepare future healthcare providers to manage the health effects of climate change.

This result is consistent with prior research, which has found that education can increase healthcare practitioners' abilities to manage climate change and its consequences on health.<sup>25</sup>

Overall, the findings of the study highlight the need for education regarding climate change and its health impacts, along with the potential for medical students having a crucial role in addressing this challenge in the future. The results additionally provide helpful insights into the factors that influence medical students' views of the health implications of climate

change, which may inspire the development of personalized interventions to improve medical students' knowledge and attitudes towards climate change.

**Limitations:** This research was limited to faculty of medicine at ASU and convenient sampling was used. Therefore, obtained results cannot be generalized to all students at ASU and other Egyptian universities, because every university has its specific characteristics, so, further studies with a broader scale have to be conducted. Additionally, the source and nature of students' knowledge towards climate change has not been assessed well due to the large number of sources that can students received and that may need more qualitative research to be conducted.

## CONCLUSIONS

Medical students have good perception of climate change and the importance of teaching it in medical programs. This will give future physicians the tools they need to deal with the health problems caused by climate change. Moreover, specific educational interventions that have tailored methods are needed to teach all students about climate change in depth, focusing on environmental accountability at individual, community, and institutional levels.

**Ethical Considerations:** Approval of the Research Ethical Committee of the Faculty of Medicine, ASU was obtained (FWA 000017585) (FMASU R112/2023). Participants provided informed consent as well, as they were

**Table (6): Factors associated with 25-point score assessing perception of climate change's health impact among medical students:**

Item	B	Std. error	P-value
<b>Age (in years)</b>			
< 20	Ref.		
20-25	-0.181	0.351	0.607
>25	1.005	0.846	0.235
<b>Gender</b>			
Male	Ref.		
Female	0.245	.252	.332
<b>Type of study</b>			
Academic	Ref.		
Clinical	.876	.282	<b>.002*</b>
<b>Residence</b>			
Urban	Ref.		
Rural	.400	.270	.140
Constant	16.87	0.334	<.001

\* Statistically significant at  $p$ -value  $< 0.05$

informed about the purpose of the study at the start of the questionnaire and verified that their participation is voluntary before being asked if they wanted to participate in the study or not.

**Funding source:** This work didn't receive any fund.

**Conflict of interest:** All authors have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

**Acknowledgement:** The authors would like to thank all medical students and physicians who have participated in completing the questionnaire.

**Author contributions:** Mohamed Momen: conceptualization, literature search, methodology writing, data collection, statistical analysis and critical review & editing; Aya Mostafa Abdellatif: literature search, ethical approval, discussion writing, and writing the original draft; Shaimaa Samy Yousef: literature search, data collection, ethical approval, statistical analysis, and editing. All authors have read and approved the published version of the manuscript.

## REFERENCES

- Smith KR, Woodward A, Campbell-Lendrum D, Chadee Trinidad DD, Honda Y, Liu Q, et al. 1 Human Health: Impacts, Adaptation, and Co-Benefits Coordinating Lead Authors: Lead

Authors: Contributing Authors. Available at:

[https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap11\\_FINAL.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap11_FINAL.pdf)

- Watts N, Adger WN, Agnolucci P, Blackstock J, Byass P, Cai W, et al. Health and climate change: policy responses to protect public health. *The Lancet*. 2015 Nov;386(10006):1861-914.
- WHO, 2023. Climate change and health. Available at: <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>.
- Hales S, Kovats S, Lloyd S, Campbell-Lendrum D, Organización Mundial de la Salud. Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. World Health Organization; 2014.
- Crimmins A, Balbus J, Gamble JL, Beard CB, Bell JE, Dodgen D, et al. Executive Summary. *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment* [Internet]. Washington, DC; 2016. Available from: <https://health2016.globalchange.gov/downloads#executive-summary>
- Protecting health from climate change: World Health Day 2008. World Health Organization; 2008. Available at: <https://www.emro.who.int/pdf/world-health-days/2008/overview.pdf?ua=1>
- Maibach EW, Chadwick A, McBride D, Chuk M, Ebi KL, Balbus J. Climate change and local public health in the United States: Preparedness, programs and perceptions of local public health department directors. *PLoS One*. 2008 Jul 30;3(7).
- Friedrich MJ. Medical Community Gathers Steam to Tackle Climate's Health Effects. *JAMA*. 2017 Apr 18;317(15):1511.
- Green EIH, Blashki G, Berry HL, Harley D, Horton G, Hall G. Preparing Australian medical students for climate change. *Aust Fam Physician*. 2009 Sep;38(9):726-9.

10. Gill M, Stott R. Health professionals must act to tackle climate change. *Lancet*. 2009 Dec 12;374(9706):1953-5.
11. Ghanem A. Assessment Knowledge, Perception, and Behaviors towards Climate Change among Universities Youth in Egypt. *Athens Journal of Mediterranean Studies*. 2022 Dec 19;9(1):69-84.
12. Elsharkawy SA, Elsheikh AA, Refaat LAR. Knowledge, perception, and practices regarding climate change among students of Al-Azhar University for Girls in Cairo, Egypt. *J Public Health (Bangkok)*. 2023 Apr 12
13. Fleiss JL, Levin B, Paik, MC 2003. *Statistical Methods for Rates and Proportions*. Third Edition. John Wiley & Sons. New York.
14. Gomez J, Goshua A, Pokrajac N, Erny B, Auerbach P, Nadeau K, et al. Teaching medical students about the impacts of climate change on human health. *The Journal of Climate Change and Health*. 2021 Aug; 3:100020.
15. Sarfaty M, Kreslake JM, Casale TB, Maibach EW. Views of AAAAI members on climate change and health. *Journal of Allergy and Clinical Immunology: In Practice*. 2016 Mar 1;4(2):333-335.e26.
16. Maibach EW, Kreslake JM, Roser-Renouf C, Rosenthal S, Feinberg G, Leiserowitz AA. Do Americans Understand That Global Warming Is Harmful to Human Health? Evidence From a National Survey. *Ann Glob Health*. 2015 Nov 27;81(3):396.
17. Liao W, Yang L, Zhong S, Hess JJ, Wang Q, Bao J, et al. Preparing the next generation of health professionals to tackle climate change: Are China's medical students ready? *Environ Res*. 2019 Jan; 168:270-7.
18. Reddy GP, Rajamouli J, Arora KD, Jothula KY, Amaravadi S, Boda A. Knowledge, perceptions and practices of medical students towards climate change and global warming: A cross sectional study. *J Family Med Prim Care*. 2022 Jun;11(6):2557-64.
19. Kjellstrom T, McMichael AJ. Climate change threats to population health and well-being: the imperative of protective solutions that will last. *Glob Health Action*. 2013 Apr 3; 6:20816.
20. McMichael C, Barnett J, McMichael AJ. An ill wind? Climate change, migration, and health. *Environ Health Perspect*. 2012 May;120(5):646-54.
21. 25-Nation 2009 Pew Global Attitudes Survey,2009. Available at <https://www.pewtrusts.org/en/research-and-analysis/reports/2009/07/23/25nation-2009-pew-global-attitudes-survey>
22. Deveci SE, Kurt O, Pirinçci E, Oğuzöncül AF. Knowledge and awareness of a medical faculty students in Turkey about global warming, climate change and their consequences<p> Türkiye'de bir tıp fakültesi öğrencilerinin küresel ısınma, iklim değişikliği ve sonuçları ile ilgili bilgi durumları ve farkındalıkları. *Journal of Human Sciences*. 2019 Jun 29;16(2):679-89.
23. La Torre G, De Paula Baer A, Sestili C, Cocchiara RA, Barbato D, Mannocci A, et al. Knowledge and perception about climate change among healthcare professionals and students: A cross-sectional study. *South East Eur J Public Health*. 2020; 13:1-19.
24. Lorenzoni I, Nicholson-Cole S, Whitmarsh L. Barriers perceived to engaging with climate change among the UK public and their policy implications. *Global Environmental Change*. 2007 Aug;17(3-4):445-59.
25. Haines A, McMichael AJ, Smith KR, Roberts I, Woodcock J, Markandya A, et al. Public health benefits of strategies to reduce greenhouse-gas emissions: overview and implications for policy makers. *The Lancet*. 2009 Dec;374(9707):2104-14.

**Cite this article as** Mohamed Momen, et al. Perception of Climate Change at Ain Shams Medical Campus: A Survey of Egyptian Medical Students. *Egyptian Journal of Community Medicine*, 2024;42(1):22-29.  
**DOI:** 10.21608/ejcm.2023.220870.1264