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Knowledge and Attitudes of 6th Grade Medical School Students about Global Warming, Evaluation of Behavior and Affecting Factors

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Abstract

It is important for senior medical faculty students, who are the physicians of the near future, to have knowledge about climate change and global warming, which is an important environmental problem, together with the education they receive during their university education, to develop positive attitudes and behaviors and to protect the society against health problems that will occur. The population of the study consists of 213 6th-grade 213 students of Gaziantep University Faculty of Medicine in the 2023-2024 academic year. On the basis of volunteerism, 193 students (participation rate 90%) were reached by applying a face-to-face questionnaire. The questionnaire form, which was created by reviewing the literature, consists of sociodemographic characteristics, global warming knowledge scale, global warming attitude scale, and environmentally friendly behavior scale questions. It was found that the mean scores of the global warming knowledge scale (113.71 ± 11.09) (M=110.29 ± 12.43) (p=0.047), the mean scores of the global warming attitude scale (145.75 ± 23.23) (M=134.74 ± 28.36) (p=0.004) and the mean scores of the environmentally friendly behavior scale (47.34 ± 10.55) of the female students were higher than the male students (45.10 ± 10.03) (p=0.132). It was found that 68.9% (n:133) of the students knew what greenhouse gases were, were aware that we are facing climate change due to global warming (94.8%) (n:183) and that global warming is caused by human factors (93.8%) (n:181). 93.8% (n:181) of the participants are aware that global warming and climate change negatively affect human health and that disease-carrying organisms will spread to wider areas with global warming (78.8%) (n:152). 59.1% (n: 114) of the participants stated that they tried to consume less energy, 72.5% (n:140) turned off the lights if they were the last person to leave the room, and 68.9% (n:133) paid attention to water consumption while bathing. As a result of our study, it is revealed that senior medical students have knowledge about global warming and climate change, but their attitudes and behaviors need to be increased.

Keywords: Global warming; Climate change; Public health; Environment; Medicine

Introduction

Global warming is defined as the increase in the average temperature of the Earth's surface due to natural causes or human impact [1]. Research shows that the temperature of the planet will gradually increase, but extreme weather events (intense storms, heat waves, droughts and floods) will increase in frequency and intensity and occur suddenly, with severe consequences [2].

This major threat to the world needs to be addressed holistically with human health. Our health depends on the health of the ecosystems that concern us, and these ecosystems are now threatened by deforestation, changes in agriculture and land use, and rapid urbanization [3].

Global warming refers to the increase in surface temperature, while climate change refers to changes in the Earth's climate system. WHO defines climate change as the biggest threat to global health in the 21st century. Climate change affects human health directly and indirectly. Direct health impacts include psychological effects due to exposure to high temperatures, non-communicable diseases such as respiratory and cardiovascular diseases, and extreme weather events such as droughts, floods, heat waves, storms and forest fires that lead to deaths. Climate change indirectly affects human health through ecological changes, such as food and water insecurity, accelerating the spread of infectious diseases and also leading to reduced access to health services [4].

Climate change will reduce air quality, decrease food security and disrupt water supplies and sanitation. Experts estimate that by 2030, climate change will cause an additional 250,000 deaths each year from malaria, diarrhea, heat stress and malnutrition. The most severe consequences will be seen among children, women and the poor, increasing unacceptable gaps in health outcomes. UNICEF estimates that nearly one billion children-almost half of all children in the world-are at 'extremely high risk' of the impacts of the climate crisis [5].

Research has shown that people remain insensitive to events that they think do not directly affect them, and this causes problems to persist. It is reported that determining people's level of knowledge and attitudes towards the environment and environmental problems is one of the first steps in dealing with environmental problems [6].

In this respect, revealing their level of knowledge about environmental problems is extremely important in developing positive attitudes and behaviors towards the environment. The main goal of public health is to identify problems and take precautions before the effects occur in every issue that threatens human health. For this reason, it is important for senior medical students, who are the physicians of the near future, to have knowledge about climate change and global warming, which is an important environmental problem, together with the education they receive during their university education, to develop positive attitudes and behaviors on the subject and to protect the society against health problems that will occur. In this direction, our study was conducted to evaluate the knowledge, attitudes, behaviors and factors affecting the 6th grade students of Gaziantep University Faculty of Medicine about global warming.

Materials and Methods

The study is a cross-sectional study. Ethical approval was obtained from the Gaziantep University Faculty of Medicine Non-Drug Clinical Research Ethics Committee for the study (Decision no: 2023/284, Date: 04.10.2023). The population of the study consisted of 213 6th-grade 213 students of Gaziantep University Faculty of Medicine in the 2023-2024 academic year. 193 students (participation rate 90%) were reached with the questionnaire applied by obtaining permission for face-to-face participation on a voluntary basis. The questionnaire form created by reviewing the literature has four sections. The first part consists of the sociodemographic characteristics of the students, the second part consists of the global warming knowledge scale, the third part consists of the global warming attitude scale, and the fourth part consists of the environmental friendly behavior scale questions [7-9]. The data obtained were analyzed using the SPSS 22.0 package program. The variables were examined with the tests for conformity to a normal distribution, and mean, standard deviation and minimum-maximum values were used to indicate descriptive statistics.

Student T-test and correlation analysis were used in the analyses. P-values below 0.05 were considered statistically significant.

Results

Of the 193 students who participated in the study, 91 were female (47.2%) and 102 were male (52.8%) and their mean age was 24.41 ± 1.573 (min 22-max 31). The participants' mother's education level was found to be high school and above 63.2% (n=122), father's education level was found to be high school and above 79.3% (n=153) and 79.8% (n=154) stated that the longest place of residence was the city center.

The mean global warming knowledge scale scores of female students (113.71 ± 11.09) were higher than those of male students (110.29 ± 12.43), and there was a statistically significant difference between genders (p=0.047).

68,9% (n:133) of the students know what greenhouse gases are, and 76,1% can define the greenhouse effect. (94,8%) (n:183) stated that we are facing climate change due to global warming (93,8%) (n:181), and they were aware that global warming is caused by human factors (93,8%) (n:181). 93.8% (n:181) of the participants have the knowledge that global warming and climate change have a negative impact on human health, and they are aware that disease-carrying organisms will spread to wider areas with global warming (78.8%) (n: 152).

As shown in Table 1, the mean global warming attitude scale scores of female students (145.75±23.23) were higher than those of male students (134.74 ± 28.36), and there was a statistically significant difference between genders (p=0.004).

It was found that 72.1% (n:139) of the students were interested in the effects of global warming on the environment, and 73.1% (n:141) took measures to reduce the effects. However, 19.6% (n:38) are not curious about the causes of global warming, and 10.9% (n:21) do not follow an event that occurs as a result of global warming in news bulletins.

	Global warming knowledge scale score mean (± Std.)	Global warming attitude scale score mean (± Std.)	Environmentally friendly behavior scale score mean (± Std.)
Woman	113,71 (± 11,09) p=0,047	145,75 (± 23,23) p=0,004	47,34 (± 10,55) p=0,132
Male	110,29 (± 12,43)	134,74 (± 28,36)	45,10 (± 10,03)

Table 1: Mean scores of the participants according to gender.

Considering the effects of global warming on the world, 77.7% (n: 150) of the participants stated that they act more carefully in order not to harm the environment, but 19.2% (n:37) stated that they are undecided about fulfilling their responsibilities for prevention and 17.1% (n:33) about taking measures for the future in order not to be exposed to its negative consequences. It was determined that 85% (n: 164) of the students wanted to learn what they should do to reduce global warming, and 77.2% (n:149) wanted to understand the negative consequences of global warming on life. However, 16.1% (n:31) of the students stated that they did not want to work on raising public awareness about global warming, and 17.6% (n:34) were undecided about this issue.

It was found that the mean score of the Eco-Friendly Behavior Scale of female students (47.34 ± 10.55) was higher than that of male students (45.10 ± 10.03), but there was no statistically significant difference between genders (p=0.132).

59.1% (n:114) of the participants stated that they try to consume less energy, 72.5% (n:140) of them turn off the lights if they are the last person to leave the room, 68.9% (n:133) of them take care to consume less water while bathing. Only 42% (n:81) of the participants stated that they avoid buying products from companies that harm the environment. 61.2% (n:118) preferred to walk or ride a bicycle instead of motorized vehicles for short distances. Only 31.1% (n:60) of the students took care to buy products in reusable or recyclable packages, while only 52.8% (n:102) of the students threw glass bottles, aluminum cans or paper into the recycling bin.

Table 2 shows the mean scores of the participants according to their parental education levels.

		Global warming knowledge scale score mean (± Std.)	Global warming attitude scale score mean (± Std.)	Environmentally friendly behavior scale score mean (± Std.)
Mother education level	Secondary school and less n:71	110,32 (± 11,78) p: 0,162	137,66 (± 25,82) p: 0,368	44,90 (± 10,64) p: 0,198

	High school and above n:122	112,82 (± 11,95)	141,25 (± 27,02)	46,89 (± 10,09)
Father's education level	Secondary school and less n:40	110,65 (± 12,19) p: 0,459	135,78 (± 29,30) p: 0,268	44,63 (± 11,12) p: 0,293
	High school and above n:153	112,22 (± 11,86)	141,01 (± 25,81)	46,56 (± 10,09)

Table 2: Mean scores of the participants according to their parent's level of education.

It was found that the knowledge, attitude and behavior scale scores of the participants whose parents' education level was high school and above were higher than those whose parents' education level was lower, but there was no statistically significant difference between these groups.

It was found that the mean score of the global warming knowledge scale (112) of the participants whose longest place of residence was the province (79.8%) was higher than those whose longest place of residence was the district and village (19%) (108) and the difference between the two groups was statistically significant (p=0.028). Again, although the mean score of the global warming attitude scale (140) and the mean score of the environmentally friendly behavior scale (46) were higher than the group living in the province, no statistically significant difference was found (p=0.597, p=0.832).

Table 3 shows the relationship between participants' global warming knowledge, attitude and behavior scores.

	r	p
Global warming knowledge scale score-Environmentally friendly Behavior scale score	0,194	0,007
Global warming knowledge scale score-Global warming Attitude scale score	0,483	0,000
Global warming attitude scale score-Environmentally friendly Behavior scale score	0,379	0,000

Table 3: The relationship between global warming knowledge, attitude and behavior scores of the students participating in the study.

There is a significant positive relationship between students' level of knowledge about global warming and their attitudes towards global warming at a moderate level (r=0,483; p<0,05). There is a significant positive relationship between students' level of attitude towards global warming and their level of behavior towards global warming at a moderate level (r=0,379; p<0,05). There is a significant positive relationship between students' level of knowledge about global warming and their level of behavior towards global warming at a weak level (r=0,194; p<0,05). The fact that the relationship is positive means that as the level of knowledge about global warming increases, the level of behavior and attitude towards global warming also increases (r=0.00-0.24 is taken as weak, 0.25-0.49 as moderate, 0.50-0.74 as strong, 0.75-1.00 as very strong).

Discussion

A total of three scales were used in our study, aiming to reveal the knowledge, attitudes and behaviors of medical students about global warming. Although it was observed that female medical students had higher mean scores than male students in all scales, a significant difference between genders was found only in the global warming knowledge scale and the global warming attitude scale. In another study conducted among teachers in the Black Sea region of Turkey, it was found that the mean scores of female participants in the climate change behavior scale were significantly higher than those of male participants [10]. Again, in a study conducted with education faculty students in the Mediterranean region of our country in 2022 and with medical faculty students in India in 2021, it was observed that there was no significant difference between genders in global warming knowledge levels [11,12]. This may be due to the use of different measurement tools, unbalanced distribution of participants between genders, different numbers of participants in the studies or different fields of education.

It was observed that the majority of the students participating in the study had the knowledge that global warming negatively affects human health. In many other studies conducted parallel with our study, it has been observed that the majority of the participants have knowledge that global warming affects human health negatively [11,13-15]. A study of university students in China found that very few students identified global warming as a high risk to health [16]. The reason for the different results may be due to the different characteristics of the environment in which the students live, as well as the fact that the future generation is less concerned about the issues whose consequences emerge in the long term compared to other issues.

In our study, it was found that the majority of the participants had the knowledge that anthropogenic factors play a role in global warming and that they were able to define the greenhouse effect. In parallel with our study, similar results were obtained in studies conducted with university students [7,10,11,17-21]. However, in a study conducted with high school students in Indonesia, most of the students stated that global warming is not caused by humans [15]. The

reason for the different results obtained in our study may be the different geographical locations where the participants live, as well as their different age averages and education levels.

In our study and many other studies, most of the participants stated that infectious diseases will increase with global warming [10,11,21-23]. In contrast to these studies, in the study conducted in Italy, it was observed that most of the participants did not have the knowledge that infectious diseases would increase as a result of global warming [17]. This may be due to the difference in their fields of education and knowledge levels.

It was found that 33.7% of the medical students who participated in our study did not want to participate in public awareness-raising activities on global warming or were undecided. 2021 In studies conducted with medical students in the USA and members of the American Thoracic Society in 2015, it was observed that most of the participants did not feel competent to provide information about climate change to their patients [14,20]. The reason for these attitudes may be that they do not have sufficient knowledge of how to cope with the health effects of global warming.

In our research, most of the participants stated that they pay attention to energy saving, turn off the lights when leaving the room and consume less water. However, participants were less likely to buy products in reusable or recyclable packages. In support of our study, in a study conducted in the United States, most of the participants think that reducing energy consumption and plastic use is an effective way to combat climate change [24]. However, in the study conducted in India, most of the participants also paid attention to using recyclable products [21]. The reason for these results can be interpreted as societies developing attitudes shaped by socioeconomic differences on the same issues.

Although the mean scores of the medical students who indicated the province as the place where they lived the longest were higher than those who lived in towns and villages, only the mean scores of the global warming knowledge scale were found to be statistically significant. In support of our research, a study conducted in Egypt in 2022 showed that the knowledge level of those living in the city was higher [23]. These results may be due to the fact that the level of exposure to the effects of global warming among those living in rural areas is lower than those living in urban areas and that the educational level of the families of those living in urban areas is higher than those living in rural areas.

When we look at the relationship between the three scales used in our study, it is determined that as the level of knowledge increases, the level of attitude and behavior increases significantly. Although there are few studies in the literature where knowledge, attitude and behavior are evaluated together, studies conducted in Turkey, India and China, which support our findings, have found that knowledge has a positive effect on attitude and behavior development [10,12,25].

Conclusion

As a result of our study, it is revealed that senior medical students have knowledge about global warming and climate change, but their attitudes and behaviors need to be increased. The deficiencies of future physicians in a subject that is closely related to human health may negatively affect the health literacy of society and, indirectly, the health levels. For this reason, there is a need for more studies in which knowledge, attitude and behavior are evaluated together in order to make the problem visible and to guide the way to produce solutions. In this context, it would be useful to include educational models that support attitudes and behaviors in addition to theoretical knowledge on global warming and climate change in educational curricula, especially in medical education.

Ethics Approval and Consent to Participate

Ethical approval was obtained from Gaziantep University Clinical Research Ethics Committee.

Consent for Publication

All authors accept all conditions and publication rights.

Availability of Data and Materials

Not applicable.

Competing Interests

The authors have no conflict of interests.

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Authors' Contributions

M.A.A.: The conception and design of the study, acquisition, analysis and interpretation of data, drafting the article, final approval of the version to be submitted.

N.A.: The conception and design of the study, interpretation of data, revising it critically for important intellectual content, final approval of the version to be submitted.

E.O.Ç.: The conception and design of the study, interpretation of data, revising it critically for important intellectual content, final approval of the version to be submitted.

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