

## Global warming: Nursing students' knowledge and attitudes

### *Küresel ısınma: Hemşirelik öğrencilerinin bilgi ve tutumları*

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#### Abstract

This study was conducted to evaluate the knowledge and attitudes of nursing students, who are the health professionals of the future, towards global warming. 113 senior nursing students participated in this descriptive and relationship seeking study. Personal Information Form, Global Warming Knowledge Scale and Global Warming Attitude Scale were used to collect data. Percentage, mean and standard deviation were used to determine the socio-demographic characteristics of the students. T test, one-way ANOVA, Tukey test were used for multiple comparisons to determine the difference between groups and Pearson correlation analysis were used to determine the relationship between scales to compare the socio-demographic characteristics and scores of the students from the scales. In the study, it was determined that the education levels of the families and the students' grade point averages affected their knowledge and attitude levels and that the score difference between them was statistically significant. A positive correlation was found between global warming knowledge and attitude levels. It was predicted that health problems that will arise as a result of global warming should be included in the nursing curriculum.

**Anahtar Kelimeler:** Global warming knowledge, global warming attitude, nursing, climate change.

#### Özet

Bu çalışma geleceğin sağlık profesyonelleri olan hemşirelik öğrencilerinin küresel ısınmaya yönelik bilgi ve tutumlarını değerlendirmek amacıyla yapılmıştır. Tanımlayıcı ve ilişki arayıcı nitelikteki çalışmaya 113 hemşirelik son sınıf öğrencisi katılmıştır. Verilerin toplanmasında Kişisel Bilgi Formu, Küresel Isınma Bilgi Ölçeği ve Küresel Isınma Tutum Ölçeği kullanılmıştır. Öğrencilerin sosyo-demografik özelliklerini belirlemek için yüzde, ortalama, standart sapma kullanılmıştır. Öğrencilerin sosyo-demografik özelliklerini ve ölçeklerden aldıkları puanları karşılaştırmak amacıyla gruplar arası farklılığı belirlemek için t testi, tek yönlü ANOVA, çoklu karşılaştırmalar için Tukey testi ve ölçekler arasındaki ilişkiyi belirlemek için Pearson korelasyon analizi kullanılmıştır. Araştırmada ailelerin eğitim düzeylerinin ve öğrencilerin not ortalamalarının bilgi ve tutum düzeylerini etkilediği ve aralarındaki puan farkının istatistiksel olarak anlamlı olduğu belirlenmiştir. Küresel ısınma bilgi ve tutum düzeyleri arasında pozitif bir ilişki bulunmuştur. Küresel ısınma sonucu ortaya çıkacak sağlık sorunlarının hemşirelik müfredatında yer alması gerektiği öngörülmüştür.

**Keywords:** Küresel ısınma bilgisi, küresel ısınma tutumu, hemşirelik, iklim değişikliği.

#### 1. Introduction

Climate change, which is a global risk for human health, could cause an excess of 250,000 deaths per year between 2030 and 2050 due to reasons such as malnutrition, malaria, diarrhea and heat stress [1],[2]. The World Health Organization estimates that health risks directly caused by climate change will cost between 2 and 4 billion US dollars annually by

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2030. Developing countries, which have weak health infrastructure, will struggle to cope with the impacts of climate change without preparedness and intervention support [2].

Climate change is endangering the fundamental elements of health by factors such as global warming, heat waves, extreme weather events, air quality and ecosystem degradation, and hindering the progress made in global health. While these factors directly harm human health, climate change also indirectly harms human health through pathways such as reduced drinking water sources, vector spread and air pollution [1],[3],[4].

Climate change brings along many factors that negatively affect physical and mental health directly and indirectly. Direct health effects are related to age, existing diseases and comorbidities, while indirect health effects result from the changes in the biosphere and include depression, irritability, anxiety, physical fatigue, pains, insomnia, heart failure, malnutrition, dehydration, asthma, cancers, myocardial infarction and stroke [5]–[8]. According to the research, climate change has become a health issue of the same magnitude as non-communicable and cardiovascular diseases since 2019 [9]. For these reasons, climate change should be a primary concern of the nursing profession. Nurses can offer effective solutions to the impacts of climate change on planetary health through their daily practices, research and education [6],[10]–[12]. In this regard, nurses should develop knowledge, skill, evidence-based research and collaborations that will contribute to the improvement of environmental health for all populations. The nursing profession should fulfill its leadership role in designing and implementing effective health interventions by raising the awareness of the community about environmental threats. This will require changes in behaviors and lifestyles as well as individual and collective awareness; thus, adaptation to climate change can be achieved and efforts can be made to reduce climate change [6],[11].

It is known that different countries have different approaches to reduce the environmental impacts on health. Therefore, the education of health professionals also varies according to countries. However, a common goal should be to raise awareness about the effects of climate change on health and its relationship with health practices. Turkey, which was ranked 99<sup>th</sup> in 2016, fell to the 172<sup>nd</sup> place in the environmental performance index ranking in 2022 [13]. This index evaluates two important criteria which are public health and ecosystem sustainability. This situation shows that social awareness needs to be increased to prevent global warming and improve environmental awareness.

Climate change and sustainability will be an important component of the nursing profession in the future and therefore the education system should include them in nursing programs. Studies examining climate change awareness were found when the studies conducted with nursing students were reviewed [14],[15]. A gap in the literature is the comparison of the attitudes of nursing students from different countries on climate change and sustainability. This comparison would provide information therefore contributing to the development of appropriate teaching and learning materials to increase awareness and motivation among nurses for sustainability activities in clinical practice. This study aims to determine the level of knowledge and attitude of nursing students, who will graduate, about global warming.

## **2. Methods**

The study's universe consisted of a total of 124 senior nursing students at Zübeyde Hanım Faculty of Health Sciences during the spring term of the 2022-2023 academic year, who had not received any courses, training, or attended any conferences related to global warming. The aim was to reach the entire universe of the study, and no sampling was conducted. Students who did not volunteer for the study (n = 5), who were absent (n = 5), and who made errors in the survey (n = 1) were excluded from the analysis. As a result, the target population was reached by 91% (n = 113).

### **2.1. Data collection tools for the research**

**Personal Information Form (PIF):** This form contains demographic information of the students such as age, gender, etc. that the researcher reviewed from the literature [1],[9],[12],[16] questions prepared in accordance with the guidelines.

**Global Warming Knowledge Scale (GWKS):** The scale developed by Erođlu and Aydođdu in 2016 evaluates the knowledge levels about global warming's formation, causes, emerging consequences and necessary measures to be taken. [17]. This is a 26-item Likert-type scale (strongly agree 5-strongly disagree 1). The scoring of the scale ranges from 26 to 130. A high score from the total of the scale indicates a high level of global warming knowledge [17].

**Global Warming Attitude Scale (GWAS):** The Global Warming Attitude Scale, developed by Bozdođan in 2009, is a one-dimensional, 5-point Likert-type and 37-item scale that aims to measure attitudes towards climate change [18]. The responses given to the scale consist of the options 1=strongly disagree, 2=disagree, 3=undecided, 4=agree and 5=strongly agree. To ensure consistency in the scale, reverse coding was applied to the questions with negative meaning, namely 34, 29, 28, 24, 18, 15, 12, 11, 10, 9 and 2. As the average increases, behavior and attitude towards global climate change increases [18].

### **2.2. Method of the research**

The data of the research were collected by the researcher from the 4<sup>th</sup> grade students who study in the nursing department, face to face, by giving a questionnaire form between the dates of 01.01.2023 and 31.06.2023.

### 2.3. Ethical principles of the research

Before starting the research, ethical approval (Date 27.12.2022, Decision No: 2022/15-23) was obtained from the Nięde Ömer Halis Demir University Ethics Committee. In addition, the study was started after obtaining the necessary permissions from the Zübeyde Hanım Faculty of Health Sciences.

At the beginning of the study, the students who gave their consent to participate in the study after being informed about the purpose, scope, ethical sensitivities and possible benefits of the study were administered data collection forms. The data were collected based on the students' self-report.

### 2.4. Evaluation of research data

The data obtained from the research were analyzed using Statistical Package for Social Sciences (IBM SPSS) 24.0 software. The normality distribution of the data was evaluated by Kolmogorov Smirnov test. Percentage, mean and standard deviation were used to determine the socio-demographic characteristics of the students. T test, one-way ANOVA, Tukey test were used for multiple comparisons to determine the difference between groups and Pearson correlation analysis were used to determine the relationship between scales to compare the socio-demographic characteristics and scores of the students from the scales. The level of  $p < 0.05$  was taken as the basis for statistical significance of the results.

## 3. Results

This study, which aimed to determine the knowledge and attitude levels of senior nursing students regarding climate change, found that the mean age of the students who participated in the study were  $21.81 \pm 0.94$ . It was determined that 72.5% of the students were female and 62% of them had a grade point average of 2.00-2.99, which indicated success. It was detected that the educational status of the mothers and the fathers of the students were 69.9% and 61% primary school-secondary school, respectively. It was determined that the income status of the students was at a moderate level with 81.4% (Table 1).

There was no statistically significant difference between the mean scores of GWKS and GWAS by gender, although they were higher in females ( $p > 0.05$ ) (Table 1).

It was found that there was a statistically significant difference between the weighted grade point averages and the GWKS and GWAS score averages ( $p < 0.05$ ). This difference was determined to be in favor of those who received grades of 3.00 and above (Table 1).

The educational status of the students' parents was found to have no statistically significant effect on the GWKS total score average, which was highest among those who were illiterate ( $p > 0.05$ ). However, the educational status of the students' parents was found to have a statistically significant effect on the GWAS total score average, which was also highest among those who were illiterate ( $p < 0.05$ ). This difference was found to be in favor of those who were illiterate (Table 1).

No statistically significant difference was detected between the GWKS and GWAS score averages according to income level ( $p < 0.05$ ) (Table 1).

**Table 1.** Socio-Demographic Characteristics of Participants, Comparison According to GWKS and GWAS (n:113).

	n	%	GWKS Mean±SD	p	GWAS Mean±SD	p
<b>Gender</b>						
Female	82	72.6	109.40±10.72	0.135	132.04±12.81	0.13
Male	31	27.4	106.00±10.68		127.67±15.47	
<b>Grade average</b>						
Between 2.00- 2.99	70	62	106.55±11.61	<b>0.01</b>	128.98±13.76	<b>0.04</b>
3 and above	43	38	111.55±55.00		134.16±13.26	

**Table 1.** (continued)

<b>Your mother's educational status</b>						
Illiterate	3	2.7	109.66±1.52	0.99	151.33±24.58	<b>0.03</b>
Primary school-secondary school	79	69.9	108.21±11.52		130.69±13.89	
High school	19	16.8	109.21±9.86		126.78±9.12	
University	12	10.6	108.66±8.73		133.16±11.76	
<b>Your father's education level</b>						
Illiterate	2	1.8	112.00±5.65	0.94	158.00±12.72	<b>0.02</b>
Primary school-secondary school	69	61	108.47±11.10		130.42±13.83	
High school	29	25.7	107.86±10.39		128.55±12.21	
University	13	11.5	109.23±11.15		134.07±12.19	
<b>Your monthly income situation</b>						
Low	18	15.9	109.05±8.70	0.44	132.22±19.93	0.46
Middle	92	81.4	108.10±11.05		130.32±12.16	
High	3	2.7	116. ±14.00		138.66±15.17	

It has been determined that students have moderate knowledge and attitudes towards global warming (Table 2).

**Table 2.** Distribution of scale score averages.

<b>Total Scale Scores</b>	<b>Mean±SD</b>
<b>GWKS</b>	108.47±10.77 26-130
<b>GWAS</b>	130.85±13.67 37-185

A positive correlation was found between the students' knowledge and attitudes about global warming (Table 3).

**Table 3.** The relationship between knowledge, attitude and behavior score averages regarding global warming.

	<b>Knowledge Level</b>		<b>Attitude Level</b>
Knowledge Level	r	1	0.347
	p		<b>0.00</b>
Attitude Level	r	0.347	1
	p	<b>0.00</b>	

Correlation is significant at the 0.01 level.

#### **4. Discussion**

Climate change caused by global warming is one of the most serious problems that the world faces [12],[19]. Climate change affects human health in many ways by increasing the spread of infectious diseases, air pollution, food and water scarcity, and vector-borne diseases. These effects threaten the natural balance of ecosystems and the well-being of people around the world [1]. This study investigated the knowledge and attitudes of nursing students, who are future health

professionals, regarding the formation, causes, consequences of global warming and possible measures against it. The data obtained were evaluated in the light of the literature.

This study determined that the knowledge and attitudes of senior nursing students about global warming were at an average level. The mean age of these students were  $21.81 \pm 0.94$ . Nigatu et al., Cruz et al. and Richardson et al. also conducted studies showing that health sciences, nursing and midwifery students had sufficient knowledge and attitude on global warming [20]–[22]. In the studies conducted by İncesu and Yas, as well as Tümer and colleagues, it has been determined that nursing students possess a good level of awareness regarding climate change. In another study by Küçük Biçer and Vaizoğlu, it was revealed that most of the nursing students had incorrect or incomplete information about global warming and 12.2% of them did not know the effects of global warming on health [23]. This study suggests that the moderate level of knowledge and attitude may indicate a sensitivity to climate change. The topical nature of the issue could also have positively influenced knowledge and attitudes.

It was observed that women's total scores of GWKS and GWAS were higher than men's, but this difference was not statistically significant. Similarly, in studies that measured global warming knowledge and attitude among health sciences students [21] and university students [24],[25], it was found that female students had more knowledge than male students.

This difference between genders may stem from women taking on more social responsibilities than men in social life. Considering that women's high levels of awareness can make significant contributions to the prevention and mitigation of climate change; they can be effectively included in adaptation strategies to combat climate change.

There is a statistically significant difference between the GWKS and GWAS score averages according to the weighted grade point average. This difference was in favor of the students who received a grade of 3.00 and above.

One of the most important conditions for quality improvement in nursing is the quality of education. The rapid advancement of technology and the increase of nursing research force nurses to have knowledge and critical-scientific thinking skills. In the modern education approach, instead of accepting information without questioning, it is aimed to educate individuals who research what, why and how they need to learn, think critically, use critical thinking, develop, self-confident and produce new information [26],[27]. The results of this study also support the finding that students with higher grade point averages have better knowledge and attitudes.

The total scores of GWKS and GWAS of children belonging to illiterate parents are higher than those of other parents. This result, which is in favor of children of illiterate parents, is statistically insignificant for GWKS and significant for GWAS. This result may be due to the different education levels of the mother and the father. There was no statistically significant difference between the mean scores of GWKS and GWAS according to income level, but it was found that the mean scores of knowledges and attitude level of those with high income level were higher. Contrary to the findings of this study, Şenyurt et al. found that those with low income had higher sensitivity to environmental issues [28].

A positive correlation was found between the students' knowledge and attitude levels on global warming. This result reveals that as nursing students' knowledge levels on global warming increase, their awareness of global warming will also increase.

## 5. Conclusion

It was determined that the knowledge and attitude levels of the final year nursing students about global warming were adequate/medium. Although the students had adequate knowledge and attitude levels, social awareness should be increased to prevent global warming and raise environmental awareness. The effects of global warming on health should be included in the curriculum of nurses, who are the cornerstones of health care, and activities that will increase awareness on this issue should be planned.

## 6. Author contribution statement

Kezban KORAŞ SÖZEN (KKS) contributed to the conception and design of this study; KKS collected the data of the study; KKS; performed the statistical analysis the manuscript; KKS; critically reviewed the manuscript and supervised the whole study process.

## 7. Ethics Committee approval and conflict of interest statement

The study was started after an ethics committee approval was obtained from the Nigde Omer Halisdemir University Ethics Committee (Date: 27.12.2022, Decision No: 2022/15-23) and an institutional permission was granted from the institution where the study was conducted. This study has no conflict of interest with any person/institution.

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