T.C.
REPUBLIC OF TÜRKİYE
HACETTEPE UNIVERSITY
INSTITUTE OF HEALTH SCIENCES

ASSESSING KNOWLEDGE OF HACETTEPE UNIVERSITY FACULTY OF HEALTH SCIENCES FOURTH-YEAR STUDENTS ON HEALTH IMPACTS OF CLIMATE CHANGE

Senikiwe KGATLHEGANG

Public Health Program
MASTER THESIS

ANKARA
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APPROVAL PAGE

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08 Temmuz 2024

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ETHICAL DECLARATION

I hereby confirm that all the information and documents used in this study were obtained in accordance with academic rules. I have presented all visual, audio-visual and written information and results following the scientific ethics guidelines. I have not manipulated any data used in this study, and I have cited all the sources used according to scientific norms. The thesis is original, except for the cases cited. My thesis, supervisor (Prof. Dr. Kerim Hakan ALTINTAŞ) supervised me during the writing process, which was in accordance with the Hacettepe University Institute of Health Sciences Writing Directive.

Senikiwe KGATLHEGANG

ACKNOWLEDGEMENTS

To my supervisor Prof. Dr. Kerim Hakan Altıntaş who supported and guided me throughout my master‘s studies, I am deeply grateful for your assistance and constant encouragement. You made this master’s journey easier and worthwhile. Thank You.

To my sister Kereeditse Kgatlhegang, your constant encouragement and support kept me going.

To all my friends who continuously gave me moral support, pushed me to keep going, and offered motivational words, your support meant a lot.

Thank you very much.

ABSTRACT

Kgatlhegang, S.C., Assessing Knowledge of Hacettepe University Faculty of Health Sciences Fourth Year Students on Health Impacts of Climate Change, Hacettepe University, Graduate School of Health Sciences, Public Health Program, Master's Thesis, Ankara, 2024. The study aimed to assess the knowledge of Hacettepe University Faculty of Health Sciences fourth-year students on thealth impacts of climate change. This descriptive study was conducted in the Hacettepe University Faculty of Health Sciences in the Departments of Audiology, Child Development, Nutrition and Dietetics, Ergotherapy, and Speech and Language Development. There was no sampling as it was aimed to include all fourth-year Faculty of Health Sciences students in the study. 414 (72.4%) students took part in this study. Results from this study show that, although students had good knowledge on nature and causes of climate change and general effects of climate change, they portrayed relatively lower knowledge on impacts of climate change on human health. Majority of the students (97.3%) had not received any education on health impacts of climate change. Social media (85.0%) was the most commonly used source of information about climate change health impacts. The main barriers faced in obtaining information about climate change health impacts were insufficient provision of climate change education (32.1%), information pollution (23.2%), and lack of access to climate change information (16.4%). Knowledge of nature and causes of climate change varied according to region and marital status. Region of origin had a significant influence on knowledge about climate change health impacts. Usage of school, seminars and workshops as information sources was positively associated with knowledge of nature and causes of climate change and climate change health impacts. There was a low positive correlation between knowledge scores of nature and causes of climate change and health impacts. A moderate positive association was found between knowledge scores of effects of climate change and health impacts of climate change. Appropriate climate change educational platforms should be availed for health science students and curriculum reforms should be done to include climate change and health topics.

Key Words: Climate Change, Health, Health Sciences' Students, Impacts, Knowledge.

ÖZET

Kgatlhegang, SC, Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi 4. Sınıf Öğrencilerinin İklim Değişikliğinin Sağlık Etkileri Üzerindeki Bilgilerinin Değerlendirilmesi, Hacettepe Üniversitesi Sağlık Bilimleri Enstitüsü Halk Sağlığı Programı Yüksek Lisans Tezi, Ankara, 2024. Araştırma Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi dördüncü sınıf öğrencilerinin iklim değişikliğinin sağlık üzerindeki etkileri konusundaki bilgilerini değerlendirmeyi amaçlamıştır. Tanımlayıcı tipte olan bu çalışma Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi Odyoloji, Çocuk Gelişimi, Beslenme ve Diyetetik, Ergoterapi ve Dil ve Konuşma Terapisi Bölümlerinde gerçekleştirilmiştir. Araştırmaya Sağlık Bilimleri Fakültesi dördüncü sınıf öğrencilerinin tamamının dahil edilmesi amaçlandığından örnekleme yapılmamıştır. Araştırmaya fakültede kayıtlı 572 dördüncü sınıf öğrencisinden 414 öğrenci katılmıştır (72.4%). Veri toplama Kasım ve Aralık 2023 tarihleri arasında yapılmıştır. Veri toplamak için araştırmacılar tarafından geliştirilen yapılandırılmış bir anket kullanılmıştır. Anket Türkçe ve İngilizce olarak mevcuttur. Bilgi soruları üç bölüme ayrılmıştır; iklim değişikliğinin doğası ve nedenleri, iklim değişikliğinin etkileri ve iklim değişikliğinin sağlık üzerindeki etkileri. Bilgi sorularına “doğru cevaplar” için 1, “Bilmiyorum ve “yanlış cevaplar” 0 puan verilmiştir. Her bilgi bölüme 10 sorudan oluşuyormaktadır. Katılımcıların her bilgi bölümünde alabileceği ez an puan 0 ve her bilgi bölümünde alınabilecek en yüksek puan ise 10’dur. Veriler, Sosyal Bilimler İstatistik Paket Programı (SPSS) versiyon 25 kullanılarak analiz edilmiştir. Verilerin analizinde tanımlayıcı istatistikler kullanılmıştır. Bağımlı ve bağımsız değikşenler arasındaki ilişkiler Mann-Whitney U testi, Kruskal Wallis testi ve Spearman korelasyon testleri kullanılarak araştırılmiştir. Kategorik değişkenler arasındaki ilişkileri araştırmak için ki kare testleri kullanılmıştır. Çoklu doğrusal regresyon analizi, yordayıcı ve bağımlı değişkenler arasındaki ilişkiyi incelemiştir. Bu çalışmadan elde edilen sonuçlar, öğrencilerin iklim değişikliğinin doğası - nedenleri ve iklim değişikliğinin genel etkileri konusunda iyi bilgiye sahip olmalarına rağmen, iklim değişikliğinin insan sağlığı üzerindeki etkileri konusunda nispeten daha az bilgi sahibi olduklarını göstermektedir. Öğrencilerin çoğunluğu (%97,3) iklim değişikliğinin sağlık üzerindeki etkileri konusunda herhangi bir eğitim veya öğretim almamıştır. İklimin sağlık üzerindeki etkileri konusunda en sık kullanılan bilgi kaynağı

sosyal medya (%85,0) olmuştur. İklim değişikliğinin sağlık üzerindeki etkileri hakkında bilgi edinmede karşılaşılan temel engeller; iklim değişikliğine ilişkin eğitimin yetersiz verilmesi (%32,1), bilgi kirliliği (%23,2) ve iklim değişikliği bilgilerine erişim eksikliğidir (%16,4). Katılımcıların %93,2'si bölümlerinin sağlık bilimleri öğrencilerini iklim değişikliğinin sağlık üzerindeki etkileri konusunda bilgilendirmek için yeterince çaba göstermediğini düşünmektedir. İklim değişikliğinin doğası ve nedenleri hakkındaki bilgi, bölgeye ve medeni duruma göre farklılık göstermektedir. Menşe bölgesinin iklim değişikliğinin sağlık üzerindeki etkilerine ilişkin bilgi üzerinde önemli bir etkisi bulunmaktadır. Bilgi kaynağı olarak okul, seminer, çalıştay ve konferansların kullanılması ile iklim değişikliğinin doğası ve nedenleri ve iklim değişikliğinin sağlık üzerindeki etkileri hakkındaki bilgiyle pozitif ilişki bulunmaktadır. İklim değişikliğinin sağlık etkileri arasında alerjiler ve hava kirliliğine bağlı solunum yolu hastalıkları gibi iklim değişikliğinin dolaylı sağlık etkileri en az bahsedilenler olmuştur. İklim değişikliğinin doğası ve nedenleri bilgi puanları ile iklim değişikliğinin sağlık üzerindeki etkileri bilgi puanları arasında düşük pozitif korelasyon bulunmaktadır (<0,001). İklim değişikliği etkileri bilgi puanları ile iklim değişikliğinin sağlık üzerindeki etkileri bilgi puanları arasında orta düzeyde pozitif bir korelasyon bulunmaktadır (<0,001). Katılımcıların %73,9'u iklim değişikliğinin sağlık üzerindeki etkilerini öğrenmek istemektedirler. Bu çalışma, sağlık bilimleri müfredatında iklim değişikliği ile ilgili derslerin eksikliğini ve bölümlerin iklim değişikliği ve insan sağlığı konusuna eğitimde yer vermediğini ortaya çıkarmıştır. Öğrencileri iklim değişikliğinin sağlık üzerindeki zararlı etkileriyle baş etmeye hazırlamak ve donatmak amacıyla sağlık bilimleri öğrencilerine yönelik iklim değişikliği ve sağlık konularını kapsayacak şekilde müfredat reformları yapılmalıdır. Sağlık bilimleri öğrencileri için uygun iklim değişikliği eğitim platformları sağlanmalıdır. Sosyal medya, sağlık bilimleri öğrencilerini iklim değişikliğinin sağlık üzerindeki etkileri konusunda eğitmek için bir platform olarak kullanılabilir; çünkü araştırmadaki birçok katılımcı, iklim değişikliğinin sağlık etkileri hakkındaki bilgilere erişmek için sosyal medyayı kullandıklarını belirtmişlerdir.

Anahtar Kelimeler: İklim Değişikliği, Sağlık, Sağlık Bilimleri Öğrencileri, Etkileri,

Bilgi

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ABBREVIATIONS

CFCs	Chlorofluorocarbons
CH_4	Methane
CO_2	Carbondioxide
COP	Conference of Parties
CVD	Cardiovascular diseases
EPA	Environmental Protection Agency
GHGs	Greenhouse gases
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
N_2O	Nitrous oxide
NASA	National Aeronautics and Space Administration
NCEI	National Centers for Environmental Information
NDCs	Nationally Determined Contributions
NOAA	National Oceanic and Atmospheric Administration
NRDC	Natural Resource Defense Council
PFCs	Perfluorocarbons
SDGs	Sustainable Development Goals
SF6	Sulfur hexafluoride
UN	United Nations
UNFCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization
WMO	World Meteorological Organization

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1. INTRODUCTION

Climate change is a big universal public health problem. The World Health Organization has described climate change as the largest health issue towards the human race in the 21st century. There is indisputable evidence proving that the world's climate is changing at an unparalleled rate. Although climate changes have been noticed since ancient times, the ongoing warming is occuring at a speed not witnessed in the last 10,000 years (1). According to the United Nations, "climate change refers to long-term shifts in temperatures and weather patterns" (2). These shifts occur naturally as a result of shifts in the sun's activity or enormous volcanic eruptions or man-made. However, from the 1800s, the principal cause of climate change has been anthropogenic activities, mainly through the combustion of fossil fuels such as oil, coal and gas.

The Intergovernmental Panel on Climate Change (IPCC), states that "Since systematic scientific assessments began in the 1970s, the influence of human activity on the warming of the climate system has evolved from theory to established fact" (3). During the past 200 years, the rapid increase of fossil fuel-dependent economies, particularly the escalating CO_2 after World War II is without a doubt the main reason for the escalating climate disaster. From around 1850, CO_2, the major greenhouse gas, has increased at a dangerous pace, nearing what mathematicians term "exponential." According to IPCC's Sixth Assessment 2021 report, man's emissions of gases that trap heat have so far raised temperatures by roughly 1.1 degrees Celsius (2 degrees Fahrenheit) from pre-industrial period starting in 1750 (3). Human activities have indeed given rise to atmospheric gases that have absorbed a lot of the Sun's energy in the globe's system. This additional energy has heated the land, atmosphere and oceans, and caused extensive and accelerated shifts in the cryosphere, atmosphere, biosphere, and oceans. Fossil fuel combustion produces greenhouse gas emissions that function as a blanket surrounding the Earth, entrapping the sun's heat and increasing temperature (2). The major contributors to the world's climate change are oil, gas, and coal. These fossil fuels account for more than 75 percent of universal greenhouse gas emissions and approximately 90 percent of the total CO_2 emissions.

The average surface temperature of the earth has increased around 1 degree Celsius (2 degrees Fahrenheit) from the late 1900s, a shift mainly driven by raised CO_2 emissions in the atmosphere and other anthropogenic activities (4). The majority of the warming happened in the last 40 years and the seven last years were the warmest. According to independent assessments carried out by National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA); 2016 and 2020 were the hottest years since the beginning of modern recordkeeping (1). In 2016, global average temperatures were 0.99 degrees Celsius (1.78 degrees Fahrenheit) hotter than the mid-20th century's average. This marked 2016 as the third consecutive year to set a new global mean surface temperature record (4).

In July 2023, the world experienced a historic event: It has officially been stated that; July 2023 became the warmest month to ever be recorded in the previous 120000 years. According to official data from the World Meteorological Organization (WMO) and the European Commission's Copernicus Climate Change Service, the average temperatures during this period were roughly 1.5°C above pre-industrial times before Earth underwent significant warming due to human activities.

Events like El Niño or La Niña, which hit up or cool down the upper part of the tropical Pacific Ocean causing changes in wind and weather patterns, lead to momentary changes in mean temperatures worldwide. Researchers have estimated that El Niño's direct natural warming impact of the tropical Pacific escalated annual global temperature abnormally in 2016 by 0.12 degrees Celsius (0.2 degrees Fahrenheit) (4).

Climate change has decreased the Antarctic Greenland's ice sheet mass. Data from NASA's Gravity Recovery and Climate Experiment shows that from 1993 to 2019, Greenland has lost 279 billion tons of ice on average annually. On the other hand, Antarctica's ice mass has decreased by approximately 148 billion tons of ice yearly (5). Furthermore, all over the world, glaciers are continuously retreating, the Andes, Himalayas, Alaska, Africa, Rockies and Alps included (1). The satellite's observations show that amounts of Northern Hemisphere's snow cover have declined in the last five decades, with the snow melting too early (6). In the past century, sea levels increased by roughly 20 centimeters (8 inches) worldwide. However, the speed

of increase last two decades is almost twice that of the previous century and is increasing slightly year by year.

Climate change is no longer a problem of the future as its devastating effects are already being experienced globally threatening hundreds of millions of lives and livelihoods. Climate change has caused widespread catastrophic impacts on ecosystems, people, food and water security, settlements, infrastructure and incalculable losses to people and governments. According to IPCC's 6th Assessment Report (AR6WGIII), climate change is already causing more frequent and more severe storms, floods, water scarcity, droughts, rising sea levels, shifting of plant and animal geographic biodiversity, wildfires and other extreme weather events (3). Climate change is certainly impacting health directly through an increase in the intensity of extreme weather events like heatwaves, floods and indirectly through worsening of air quality, threats to water and food safety and availability, changing trends in infectious disease spread and exacerbating mental health problems resulting from climate change outcomes (7).

Health impacts of climate change include rising cardiovascular and respiratory diseases, injuries, increases in illnesses transmitted by food, water and vectors such as ticks and mosquitoes (Malaria, West Nile Virus, Dengue, Tick-borne Encephalitis). Climate change may intensify current health problems or give rise to new and unanticipated public health threats. Additionally, climate change threatens majority of the social health determinants such as access to healthcare, livelihoods, safety and social welfare structures. The aforementioned climate-sensitive health threats disproportionately affect the most vulnerable and disadvantaged groups, particularly children, impoverished communities, ethnic minorities, poor communities, older people, displaced people, migrants and those with underlying health conditions (8).

Globally, air pollution contributed to approximately 6.67 million mortalities in 2019. Air pollution was the 4th leading risk factor for death worldwide (9). Extremely hot temperatures lead to heat cramps, heatstroke, exhaustion, and heat related deaths.

Heat waves are also linked to increments in hospital admissions among people with cardiovascular, kidney, and respiratory diseases. Research shows that worldwide, more than 5 million deaths occur annually due to extreme temperatures (10).

WHO further predicts that between the years 2030 and 2050, 250000 additional deaths are expected to occur as a result of malnutrition, malaria, diarrhea and heat stress due to climate change (11). In the last decade (2010–2019), about 23.1 million people have been displaced by weather-related events annually and countless people have been left vulnerable to poverty (12).

Türkiye is extremely vulnerable to climate change because of being located in part of Mediterranean Europe's southern belt. According to the UN, Türkiye is already experiencing observed warming trends in temperatures and declining trends in precipitation.

Besides frequent earthquakes, Türkiye is prone to natural disasters like floods, accelerating water stress, and land degradation in some parts of the country (13). Rising temperatures accompanied by a decrease in precipitation are contributing to extreme water stress, especially in the country's southern and western regions (13). In Türkiye, 36698 deaths were attributed to ambient air pollution in 2016 (14) According to the Türkiye 2022 Climate Assessment Report, 2022 became the year with the most extreme weather events of all times in Türkiye. In 2022, there were 1030 extreme weather events in Türkiye. The average temperature in Türkiye in 2022 was 14.5°C, which is 0.6°C higher than the average of 13.9°C recorded from 1991-2020. Furthermore, 2022 was marked as the seventh hottest year in the country's history (15). In July 2023 Türkiye experienced increased heat waves with temperatures reaching as high as 50 degrees Centigrade.

Although climate change's effects are apparent, insufficient research has been done to assess the knowledge of the impacts of climate change on human health. University students are future leaders and policy-makers; therefore it is of utmost importance that they are knowledgeable regarding health effects of climate change. University students studying health and related topics are also the perfect agents of change against climate change as they will become the caretakers of the entire

population. Therefore, they must be knowledgeable about climate change, its impacts on human health, and how they can mitigate these negative impacts and provide health services amidst the changing climate. Health science students can promote climate change action through health education and by encouraging communities to participate in environmental sustainability. Knowledgeable health science students are likely to become health professionals who take part in sustainable health care.

This study is important as it finds the gaps in knowledge about the impacts of climate change on health, barriers to accessing information related to health impacts of climate change, and will potentially contribute to development of climate change tailored curriculum to suit health students.

The objectives of the study were as follows;

1.1. Short Term Objectives

- To assess the knowledge of Hacettepe University Faculty of Health Sciences fourth-year students on the health impacts of climate change.
- To assess factors associated with knowledge of the health impacts of climate change amongst the students.

1.2. Long Term Objectives

- To contribute to the existing body of scientific knowledge about climate change and health.
- To encourage further research on knowledge of the health impacts of climate change.
- To contribute to the improvement of interventions related to learning about climate change and its impacts on health among university students.

2. LITERATURE REVIEW

2.1. Introduction

This chapter provides a comprehensive review of all the literature available on climate change and health. Initially, this chapter will discuss the nature and causes of climate change, then move on to describe general effects of climate change and then health impacts of climate. The chapter will also discuss international agreements on climate change, climate change and mitigation and eventually knowledge about health impacts of climate change.

2.2. Nature and Causes of Climate Change

Climate change occurs due to both natural and human forces. However, climate records suggest that today's climate change, especially the change that has happened from the beginning of the industrial revolution, is occurring considerably more quickly than anytime before. NASA has also stated that "Even though natural causes contribute to climate change, their influence is too insignificant and occurs very slowly to be attributed to the accelerated climate change witnessed in the latest decades (16). Human activities have caused a rise in the amount of the major greenhouse gases from the beginning of the Industrial Revolution. Currently, the volumes of carbon dioxide, nitrous oxide, and methane in the atmosphere are more than ever recorded in the past 800,000 years (17).

2.2.1. Human Causes of Climate Change

Burning of Fossil Fuels

According to Natural Resource Defense Council (NRDC,2023), the Earth's climate is changing as humans are releasing heat-trapping GHGs such as CO_2, CH_4, N_2O and water vapor into the atmosphere, primarily by fossil fuel combustion (18). Therefore, as consumption of fossil fuels like coal, oil and natural gas increases, so does the amount of these gases in the Earth's atmosphere. Globally, power generation is responsible for approximately 23 billion tons of CO_2 emissions per year and IPCC (2018) maintains that an increase in CO_2 is the greatest contributor to global warming

(19). Pachauri et.al also states that emissions of CO_2 from fossil fuel burning and from industrial processes accounted for approximately 78% of the overall GHG emissions increase from 1970- 2010 (20).

Transportation

The vehicles, planes and ships that humans use for transportation of people and commodities are a major source of global GHG emissions as burning fossil fuels such as gasoline and diesel releases carbon dioxide. Research done by Preti et al. discovered that transportation is singlehandedly responsible for about 19.2% of global CO_2 (21). Furthermore, fossil-fuelled transportation emissions also produce smog, soot and other harmful air pollutants.

Industry and Manufacturing

Factories and facilities that manufacture goods such as steel, clothes, iron and electronics emit significant amounts of greenhouse gases mainly due to the machinery used to produce these goods. Cement production also contributes to climate change, and accounts for 5-8% of worldwide anthropogenic CO_2 emissions every year (22). The Environmental Protection Agency (EPA), states that approximately 24% of global greenhouse emissions are due to industrial processes.

Agriculture

Agricultural activities including usage of nitrogen-based fertilizers, raising livestock and growing paddy rice increase the concentrations of Nitrous oxide (N_2O) and Methane (CH_4) which are significant contributors to climate change (23**).** Ruminants especially sheep and cows produce huge amounts of methane during the digestion of their food and through their waste.

Deforestation

Trees assist in regulating climate by absorbing CO_2 in the atmosphere. Once trees are cut down or burned, that favorable effect is lost and carbon stored in the trees and the soil is released back into the atmosphere, further contributing to the greenhouse

effect. According to Adnan et.al, the current rate of deforestation has led to an unprecedented buildup of CO_2 in the atmosphere in the past years (24).

Land Use Change

Changes in land use or intensification of land use have led to land degradation, desertification and climate change. Changes in land use includes transforming forests and peatlands into agricultural areas and cities. This in turn releases the carbon stored in the soil and biomass, which in turn adds to a further 12 percent of global emissions of CO_2 (25). Changes in land use results in both warming and cooling effects as they affect the amount of sunlight sent back into space.

Urbanization

Urbanization is perceived as an economy's leading force, facilitating migration of labor from the rural agriculture sector to the urban industry sector thereby contributing to economic development. However, Zhange et al. are of the view that unplanned and uncontrolled urbanization can have detrimental consequences not only on the economy but can also result in deforestation, environmental degradation and contribute to climate change (26). Urbanization may contribute to increased warming in cities and their surroundings. This is called the heat island effect. As stated by the United Nations Framework Convention on Climate Change (UNFCC), cities occupy only 2 percent of the world's surface, yet they consume as much as 78% of the world's energy and release over 60% of greenhouse gas emissions (27). This is because urban areas cater to many household demands such as heating, cooling and wastewater management. Additionally, urban residents use more goods and services which results in the release of massive volumes of greenhouse gasses.

Emissions of Pollutants

IPCC declares that some agricultural and industrial operations release pollutants (besides GHGs) that emit aerosols (tiny droplets or particles suspended in the atmosphere) (28). These aerosols also have an influence in cloud formation which can cause a warming or cooling effect based on their nature and locations. Chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), hydrochlorofluorocarbons

(HCFCs), hexafluoride (SF6) perfluorocarbons (PFCs), sometimes known as F-gases, are commonly used in solvents, coolants, pesticides, fire extinguishers, aerosol propellants and foaming agents. Unlike water vapor and ozone, F-gases have a lengthy atmospheric lifespan, and a number of these gases will continue to have an impact on climate for many decades or centuries (29)

2.2.2. Natural Causes of Climate Change

Sun's Intensity

Climate is influenced by natural changes that affect the quantity of solar energy reaching the surface of the Earth (19). This means that changes occurring in the sun and the angle of the sun can have an effect on the intensity of the sunlight reaching the Earth's surface. Scientists suggest that solar output may directly affect climate by affecting the amount of the atmosphere and the Earth's solar heating and indirectly, by affecting the process of cloud forming (19). The sunlight's intensity can result in warming up or cooling of the Earth.

Changes in the Earth's Orbit

A variety of elements affecting the climate of the Earth are related to the Earth's position in space in relation to the sun. These elements include the "Earth's axial tilt angle (Earth's obliquity), Earth's position in time in the precession of the solstices and equinoxes (with different Earth-Sun distances during any given season) the eccentricity of Earth's orbit (how circular/elliptical Earth's orbit is)" (30). All the above elements determine which segments of the Earth receive sunlight which can contribute to climate change.

Volcanic Eruptions

When volcanic eruptions occur, they discharge lava or molten rock, from deep beneath the Earth's surface as well as ashes, dust particles and greenhouse gases which influence climate. Volcanic ash and dust can hang in the atmosphere for several months, blocking sunlight from reaching the Earth (31). This in turn causes the earth to be cooler as solar radiation is blocked. When volcanic eruptions occur, huge

quantities of sulfur dioxide and various aerosols can be discharged into the stratosphere, thereby decreasing atmospheric transparency and consequently, the quantity of solar radiation reaching Earth's surface (31). In 1991, during Mount Pinatubo's eruption in the Philippines almost 20 million tons of sulfur dioxide was discharged into the stratosphere and the dispersion of this gas cloud all over the world led to a temporary drop in global temperatures from 1991 to 1993 by approximately 0.5°C (1°F) (31).

2.3. Effects of Climate Change

Ndzeobi asserts that climate change poses the graviest environmental issues that the human race has yet to face. It is far more serious than simply hot air and melting of ice (32). Climate change's implications go beyond where humans can inhabit and cultivate their food.

Extreme Weather Events

IPCC's Sixth Assessment Report (2023) revealed that shifts in a lot of extreme weather and climate incidents have occurred dating back to around 1950 (33). This includes extreme temperatures, heavy rainfall, flooding, wildfires, hurricanes and tropical cyclones.

NOAA's National Centers for Environmental Information (NCEI)'s scientists declared the summer of 2023 as the planet's hottest year on record since the 1850's with temperatures reaching 1.18°C (2.12°F) more than the 20th-century's average of about 13.9°C (57.0°F) (34). Higher temperatures exacerbate heat-related diseases and make working outside or moving around hard. Furthermore, when temperatures rise, wildfires start and spread more quickly. In France, over 5,000 people lost their lives as a result of the excessive high temperatures in 2023. Of all these deaths, about 3,700 were people aged over 75 (35). This shows that the elderly are more susceptible to mortality due to high temperatures.

Hurricanes are becoming more frequent, intense and more destructive. Hurricane Harvey caused immeasurable damage in the Texas coast surrounding Houston in 2017, leading to catastrophic flooding as a result of the historic amount of

rain. This resulted in damages amounting to more than a hundred billion dollars and more than 30,000 people were displaced (36). As seas become warmer, hurricanes are expected to happen more often in the coming years.

Floods are also occurring more frequently because of climate change. Otto et al. mention that in 2022, heavy rains and flooding affected over 33 million people, 1.7 million houses were damaged and 1500 people died (37). Floods also result in infrastructural damage and prevent access to essential health care services.

Climate change is causing forest fires to be more common and widespread, destroying nearly twice as much tree cover as they did 20 years ago. The 2023 forest fire in Northern Greece was the worst fire the country has experienced in 20 years and the largest wildfire ever recorded in the EU. The Evros region of East Macedonia and Thrace, near the Turkish border, was drastically affected, resulting in tragic loss of life and evacuations (38). Canada also experienced an extremely high number of wildfires in 2023. These large wildfires started in early May until October and affected Alberta, British Columbia and Saskatchewan. These fires destroyed approximately 18 million hectares of land in total (38). Just like floods, wildfires result in property and infrastructural damage and affect access to healthcare services.

Climate change and food security

Food production and food availability is affected by climate change, this in turn affects global food security. The 2018 heat wave in that engulfed Europe led to low crop yields, where some harvests falling by approximately 50% (39). This led to higher food costs and decreased food supply and availability for disadvantaged groups, worsening food insecurity. Vulnerable groups are the most affected by global food insecurity resulting from climate change. The World Bank (2023), reported that by June 2022, 345 million persons in 82 countries had acute food insecurity compared to 135 million in 2019 (40). As occurrences of extreme weather events intensify, food insecurity also increases in most parts of the earth. Climate change also affects the conditions under which food is produced. Lake et al. state that climate change will cause food to be produced in different environments due to altered ecosystems that also alter agricultural conditions (41). Food may also be affected from farm to table as

high temperatures can contribute to an increase in bacterial replication therefore increasing food risks (41). This leads to loss of food due to spoilage and ultimately food shortages.

Melting of Glaciers

Human-made influences have impacted the universal water cycle contributing to the melting and retreat of glaciers. IPCC (2014) states that climate change has significantly contributed to melting of the Arctic ice since 1979 and has made significant ocean heat content increase globally (0-700m) (42). Melting glaciers increase the risks of natural disasters like floods, debris flows and damages to villages and infrastructure.

Sea-level rise

Climate change causes an increase in average sea levels as a result of thermal expansion of seas, and the melting of ice sheets and glaciers. According to a study conducted by Hansen in 2016, since 1900 sea levels have increased by a global average of approximately 17 cm due to thermal increase of ocean water and melting of glaciers (43). The rise in sea levels results in sea water occupying land hence causing flooding, displacement of coastal communities and loss of fresh water sources.

Climate change and drought

It is estimated that, around a third of African people currently live in areas prone to droughts and 220 million people are susceptible to drought every year (44). The horn of Africa has been battling with harsh droughts particularly Ethiopia and Tanzania which recorded the worst droughts in 2000, 2009 and 2011 (45). These frequent droughts have been attributed to climate change. Furthermore, deserts are expanding, covering more land and decreasing land available for food growth. Additionally,a lot of communities are currently facing the risk of not having adequate water daily. The World Bank Group further projects that, by the year 2030, climate change might force over 100 million people worldwide into excessive poverty (40). Populations that are already highly vulnerable will be disproportionately affected by the drought and the resulting poverty. These include small-scale farmers, rural and

river villages and poor communities that rely on agricultural food production and freshwater availability.

Poverty and Displacement

Climate change exacerbates elements that force and make people stay in poverty. Floods can destroy urban slums, damaging homes and making it challenging for people to do work outside. A report by the United Nations states that disasters caused by weather-related events displace about 23 million people annually, ad leave a lot more people susceptible to poverty. The report further stated that in the past decade, weather-related disasters have caused displacement more than twice as much as conflict and violence have (46). Climate change-induced poverty and displacement result in poor living conditions and overcrowding making it easier for diseases to spread.

Loss of Biodiversity

Climate change poses threats to the existence of both marine and land organisms. These threats get bigger as temperatures rise. The United Nations points out that the climate change crisis ismaking the world lose species at a rate 1,000 times more than at any previous time recorded in history (47). Loss of biodiversity causes animal migration and plant extinction. Biodiversity loss also jeopardizes the ecosystem's ability to absorb carbon and diminishes its ability to provide protection and resilience against climate change.

2.4. Climate Change and Health Impacts

Climate change is a big worldwide public health issue, with serious health consequences expected to manifest in varying ways in various regions of the world. Figure 2.1 illustrates the health risks associated with climate change.

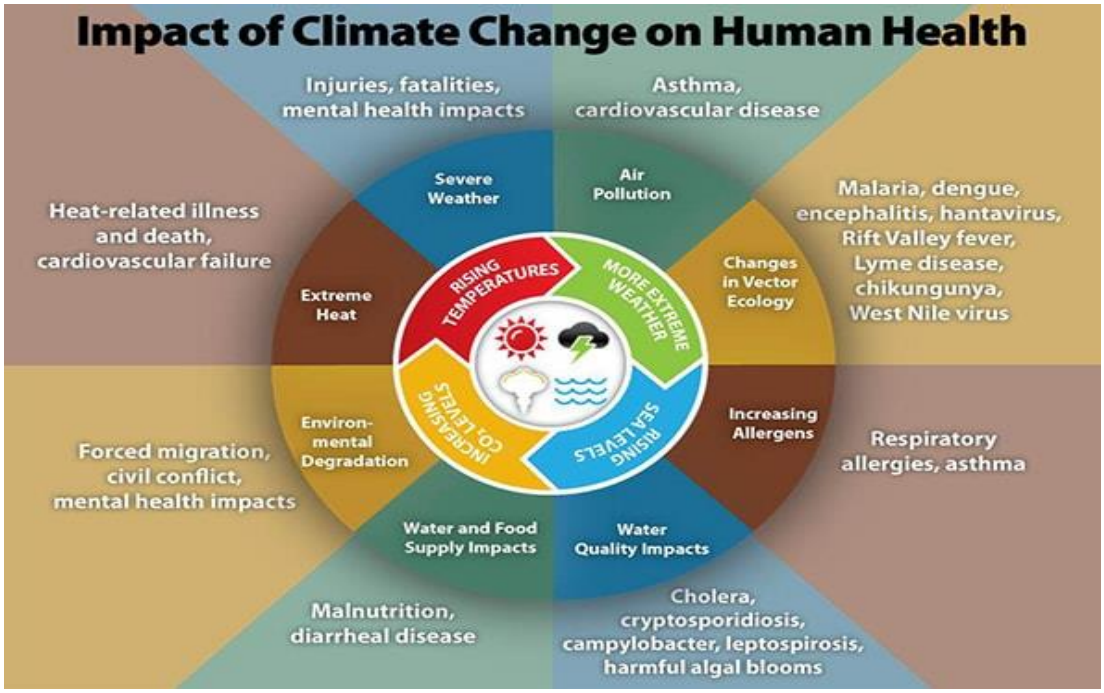

Figure 2.1. Health Issues associated with climate change. Source: Centres for Disease Control,2021

Climate change and mental health

Climate change may cause an increase in the occurrence of mental and social disorders like anxiety, post-traumatic stress, depression, drug and substance abuse, suicides and violence. According to Ebi et al. extreme weather events and climate-related disasters are likely to have long-term mental health repercussions in communities communities affected by these events, particularly if they lead to community displacement or deterioration of livelihoods (48). A study by Paranjoythy et al. revealed that people affected by the floods that occurred in Gloucestershire and Yorkshire England in the summer of 2007 were 2–3 times more likely to report mental health issues compared to those not affected by the floods (49). Frequently reported mental health problems included anxiety, psychological distress, post-traumatic disorder and depression.

Research further shows that children and people who reside in low- and middle-income countries are more susceptible to mental health impacts of climate change (50). This is because these communities are already struggling with other multiple stress factors such as poverty, conflicts and droughts, and they do not have the capability to adapt to the extra stress brought about by climate change effects. For

instance, in India, suicides of up to 60,000 farmers in the past three decades have been linked to climate change (51).

Climate change and cardiovascular diseases

Over the past few years, climate change has increasingly been associated with a large burden of cardiovascular diseases (CVD). Results from a study conducted in Taiwan show that for every 1% increase in temperature, deaths resulting from cardiovascular diseases increased by roughly 0.226% (52). Similarly, a study conducted in the USA showed that extreme heat was associated with an estimated additional mortality of 5,958 (95% CI, 1847-10,069) caused by CVDs throughout summers between 2008 and 2017 (53). The elderly (≥65 years) and people with pre-existing medical issues are much more susceptible to CVDs associated with temperature extremes.

Climate change and diarrheal diseases

Climate change impacts the global food system in direct and indirect ways, posing new challenges to food safety and human health. Changes in temperature and precipitation may influence the spread, survival and replication of bacteria that cause foodborne diseases. Ghaemi et al. report that the seasonal trend of diarrhea is largely recorded during the warmer months in Iran (54). Correspondingly, each 1°C increase in weekly temperature in Europe leads to an estimated 5-10% increase in salmonellosis cases (55). This is because warmer temperatures accelerate the growth rate of bacteria.

Following floods, both high- and low-income nations have observed an increase in diarrheal illnesses. For instance, in July 2019, about 3 million people were victims of floods in Bangladesh, and roughly 11500 of them contracted diarrheal and various other waterborne infections. This resulted in 101 fatalities between 10-25 July 2019 (56). Increased flooding and extreme precipitation alongside insufficient water and sewerage systems can play a role in bacterial and viral contamination due to challenges in accessing potable drinking water and sewage overflows, thereby heightening exposure to diarrheal diseases causing microorganisms.

Climate change and vector-borne diseases

Climate change is predicted to modify the geographical location, seasonality and distribution and spread of disease vectors, thereby exposing much more populations to ticks carrying Lyme disease and also mosquitoes transmitting Dengue, West Nile, and Zika viruses. in their study, Negev et al. discovered that an increase in West Nile Fever has occurred in several Mediterranean countries in the past few years. These countries saw an unusually high number of West Nile Fever cases during the hot summer of 2020 (57). In Israel, there was a change in seasonality of the West Nile Virus was detected, where outbreaks of the disease began earlier than previous years (57). Changes in the seasonality of vector-borne illnesses make it very challenging to estimate outbreaks of diseases rendering prevention and control strategies ineffective.

Furthermore, very high temperatures and frequent and more intense precipitation occurrences may create conditions that promote the transfer of vector-borne diseases into new geographical areas. Nel et al.'s study also found that, Malaria's geographical range is expected to expand in Africa, extending to countries such as South Africa where temperatures in most parts are currently too cool for malaria transmission to occur (58). In Northern America, the emergence of chikungunya and Zika Virus and the increase of hantavirus cardiopulmonary syndrome associated to the El Niño events is a clear indicator of climate change shifting infectious disease geographical ranges (59).

Climate change and mortality

According to research published in Nature Climate Change, 37% of hot-season heat-related mortalities in 2021 were linked to climate change and there was an increase in these deaths in all continents (60). Another study by Chouhary et al. analysed emergency room visits, hospital admissions and emergency medical service calls in USA and found that, hotter days were linked to an increase in heat-related ailments and mortality (61). Climate change increases mortality as a result of cardiorespiratory diseases, other illnesses and adverse pregnancy outcomes.

Research shows that at the moment around 125 million people are exposed to heat waves in various regions of the world. According to the Emergency Events Database, between 1969 and 2018, a total of 10,009 extreme weather events led to disasters and killed more than two million people (62). In 2003, heatwaves claimed the lives of over 70,000 people in Europe. France experienced the greatest mortality impact, with 14,800 excess mortalities occurring in the first 3 weeks of August 2003 compared to numbers expected during that time of year (63).

Climate change and airborne diseases

Climate change also affects air quality, leading to detrimental health outcomes. Changes in weather trends impact air quality through increasing and dispersing air pollutants including dust, ground-level ozone, fine particulates and wildfire smoke. The evidence from the latest heat waves, for example, the 2003 heatwave indicates that a third of UK's excess mortality reported in the course of a heat wave might be due to exposure to increased amounts of PM_{10} and O_3 (64).

Pollen is a crucial element in asthma, which may trigger inflammation of the airway, coughing, and difficulties breathing in people whose immune systems are hypersensitive to stimuli such as pollen. Weather changes exacerbate asthma as a result of elevate levels of pollen in the air.

Climate change and malnutrition

Climate change also creates prolonged threats to global food security and nutrition by reducing crop yields, degrading nutrient quality and dietary diversity and disrupting water and sanitation. Furthermore, spikes in food prices, disruptions in trade and transportation, reduced incomes, and damage to market infrastructures limit access to food, resulting in poor quality, and diversity of diets, compromising global nutrition.

Women, young children, the chronically ill, the elderly as well as poor communities are more vulnerable. The World Food Programme mentions that hunger and malnutrition risks may increase by 20% with undernutrition accounting for the majority of child deaths as a result of climate change by 2050 (65). Another study discovered that in Kenya the previous four rainy seasons that failed have left

approximately 1.4 million children struggling with limited access to nutritive food and potable drinking water (66). Children in communities that are dependent solely on agriculture are more likely to be affected by malnutrition associated with climate change.

Climate change and health systems

As negative climate change health impacts increase so does the demand for healthcare services. Although health systems have a fundamental role to play in combatting climate change, they are also enormously impacted by climate change. Climate change exacerbates the load on already fragile health systems, impairing their availability, affordability, accessibility, and quality of care

According to Smith, 2020 health systems are affected by climate change in a number of ways, including disrupting access to healthcare services. Extreme weather events cause electric power outages which can affect the availability of health services, the capacity to communicate and carry out some operations during emergencies. Findings from Smith, 2020's state that heat waves disrupt health systems and services, by leading to an upsurge in patient volumes and closure of surgery rooms (67)**.** Climate change also compromises health infrastructure, drainage and sanitation systems, storage of medicines, medical equipment and affects the thermal comfort of patients and staff (68).

Furthermore, extreme weather occurrences may lead to loss of hospital records and affect laboratory functions leading to evacuation with negative consequences for the populations serviced. For instance, in 2017, fierce wildfires in British Columbia, Canada happened, affecting 19 health facilities leading to evacuation of around 880 patients, causing displacement of almost 700 health personnel, and costing the Interior Health Authority 2.7 million CAN$ (69).

2.5. International Agreements on Climate Change

Montreal Protocol, 1987

The Montreal Protocol, although not designed to address climate change, was one historical environmental agreement that served as a precedent for future climate diplomacy. The Montreal Protocol marked the beginning of the UN's efforts to tackle global environmental problems (70). Eventually, every country in the world the treaty. This protocol includes provisions on control measures for ozone-depleting substances like CFCs, HCFCs and methyl bromides. Türkiye ratified the Protocol on 19 December 1991 and has accepted all the amendments of the Protocol.

UN Framework Convention on Climate Change (UNFCCC), 1992.

It was the first global agreement that explicitly aimed to address climate change. UNFCCC led to thd establishment of the Conference of the Parties (COP), an annual forum for global discussions focusing on stabilization of greenhouse gas concentrations in the atmosphere. The Kyoto Protocol and the Paris Agreement were produced by these sessions (70). The major goal of this Convention is to attain stabilization of atmospheric greenhouse gas concentrations at levels that will hinder threatening anthropogenic interferences with the climate system. Türkiye joined the UNFCCC on 24 May 2004.

The Kyoto Protocol, 2005

Adopted at Kyoto, Japan in 1997 and enacted in 2005, the Kyoto Protocol was the first international legally binding climate change treaty. It called for developed countries to decrease emissions by atleast an average of 5% lower than 1990 levels. It established a framework to track the progress of countries. The protocol exclusively binds developed countries and places a higher burden on these countries as it recognizes that they are primarily accountable for the current high concentrations of GHG's in the atmosphere (70). Türkiye joined the Protocol on 26 August 2009.

The Paris Agreement, 2015

The Paris Agreement was signed by 196 Parties during the UN Climate Change Conference (COP21) held in Paris, France, on December 2015. It requires each and every country to set emissions-reduction pledges. Governments establish targets called Nationally Determined Contributions (NDCs), to prevent the international average temperatures from increasing to 2°C (3.6°F) beyond preindustrial levels. They also strive to keep temperatures lower than 1.5°C (2.7°F). The agreement also intends to achieve worldwide net-zero emissions, this is whereby the quantity of GHGs emitted is equal to the amount being removed from the atmosphere during the second half of the century. This is also termed being carbon-neutral or climate neutral (70). Implementation of the agreement requires economical and social reforms using the highest available science in the world. The Paris Agreement is built on a five year cycle of increasingly enthusiastic climate action that is implemented by all countries. Since 2020, countries submit their national climate action plans to the secretariat (71). Türkiye signed the agreement on 22 April 2016 but has to date not yet ratified the agreement.

2.6. Climate Change Mitigation and Adaptation

The UN has put climate change at Goal 13 of its Sustainable Development Goals (SDGs) and calls for emergency actions to fight against climate change and its threatening impacts. According to Watts et al. failure to adequately respond to climate change can sabotage all the achievements made in the last 50 years in global health (72). The health risks related to climate change may be minimized through adaptation and mitigation strategies. IPCC has defined mitigation as deliberate human interventions intended to decrease sources of or enhance GHGs sinks. It also defines adaptation as a process of adjusting to the actual or the expected climate and its impacts (20).

SDG 13 calls for strengthening the capacity for resilience and adaptation regarding climate-related disasters. It also aims to promote education, knowledge and awareness regarding climate change adaptation and impact reduction (73). Knowledge is a crucial driver of global climate change actions as increased awareness and

knowledge about the environment and education about climate change can immersely contribute to successful adaptation and mitigation strategies. According to UNFCCC Article 6; " countries should establish and implement educational programmes and public awareness initiatives about climate change and related impacts." Article 12 of UNFCCC COP 21, 2015 also highlights the significance of climate education in boosting climate change action.

2.7. Climate Change Health Impacts Knowledge

Health professionals are often regarded as very reliable sources of health information for the general public. Public trust on health professionals makes them valuable messengers in disseminating crucial information about climate change and human health. As a result, health professionals play an special and essential part in educating their patients, communities, leaders and policymakers about the detrimental health impacts of climate change (74). This study further found that when health professionals are the ones providing or disseminating information about climate change related health impacts, patients reported improved levels of awareness and showed more willingness to adopt climate-friendly behavior (74). For that reason, the preparedness and knowledge of health professionals is an essential component of global response towards climate change.

University education is a perfect beginning point for equipping health professionals with adequate skills to deal with health impacts of climate change because schools and public health programs play a crucial role in training current health science students into future health professionals. A study conducted among public and health professionals indicated that most of the health professionals acknowledged that climate change is a big public health problem and recognized necessity to further learn about these health threats and actions that they can take to mitigate such risks (75). Studies have found that health science students' sense of responsibility in climate action increased as a result of education on health impacts of climate change. Climate education is strongly linked to the students' desire and eagerness to advocate for policies that will protect climate and human health. A study by Gomez et al. discovered that a climate science course designed for preclinical medical students led to improvement of several indicators of student learning that

extended far beyond basic climate knowledge. These measures included positive changes in students' self-reported knowledge levels, beliefs, and attitudes towards health impacts of climate change and the percieved obligation for physicians to address climate-related issues in their future areas of practice (76). These results prove that education is crucial for enhancing climate change health impacts knowledge and action.

2.8. Barriers and Challenges to Climate Change Information

Despite the established importance of educating health science students about health impacts of climate change, there are several barriers and challenges in this area. These include inadequate resources and funding for climate change education, conflicting priorities within the school curriculum, and a lack of teacher training and competence on the subject. Furthermore, misinformation and politicization of climate change and associated health impacts can hinder attempts to educate students and raise awareness about the issue. Findings from a survey conducted in the USA in 2018 show that climate change was not an educational priority in most of the medical schools. Out of the 147 medical schools included in the survey, only a third had included any climate change education in the medical curriculum (77). Lack of climate change focused education in schools is a worrying issue as schools influence knowledge, awareness and behavior of future health professionals. Health science students who are knowledgeable on climate change's health impacts become more equipped and empowered to critically evaluate and handle climate-change related health impacts, as well as educate communities.

3. METHODOLOGY

3.1. Study Location

This research was conducted in Hacettepe University to assess the knowledge of Hacettepe University Health Sciences Faculty fourth-year students on health impacts of climate change. The study was done in Hacettepe University Faculty of Health Sciences located in Sıhhiye Campus in Ankara, Türkiye. Hacettepe University was officially founded on July 8, 1967 including the Faculties of Medicine, Health Sciences, Science and Social Sciences.

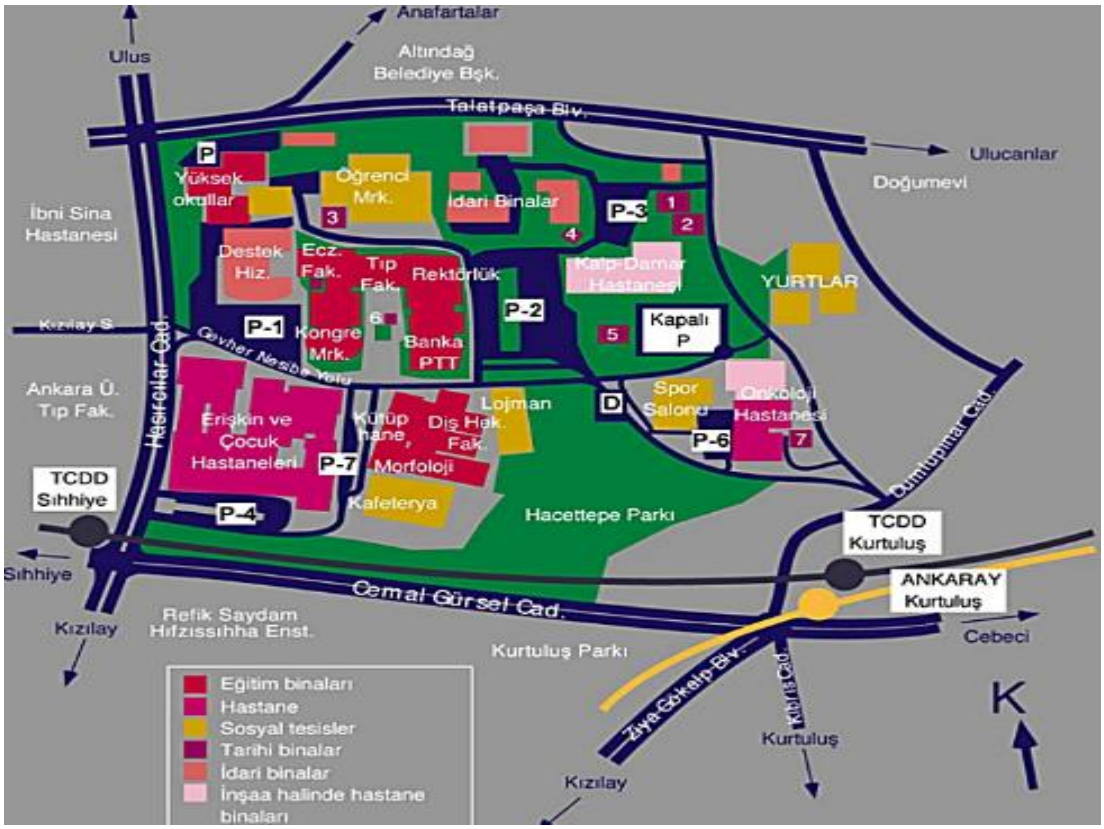

Figure 3.1. The schematic plan of Sıhhiye Campus, Hacettepe University (2023)

The Faculty of Health Sciences was founded in 2007. It has five departments; Audiology, Child Development, Occupational Therapy, Nutrition and Dietetics, and Speech and Language Therapy. The duration of study for all the five disciplines is 4 years. The Faculty of Health Sciences currently has 2197 registered students.

The Department of Audiology was established on May 11th, 2011. Undergraduate education was started in 2012. There are 23 academic staff members in the Department of Audiology.

The Department of Child Development and Education was founded in 1968 as Department of Child Development and Education under the Home Economics Academy, Faculty of Health Sciences, Hacettepe University. The Department currently has 13 academic staff members.

The Department of Nutrition and Dietetics was founded in 1962. The Department of Nutrition and Dietetics was initially placed under different faculties and colleges throughout the years. It was finally affiliated to Hacettepe University Faculty of Health Sciences in 2007. The Department of Dietetics and Nutrition has 18 staff members.

The Department of Occupational Therapy was established in 2009 as in Türkiye's first occupational therapy undergraduate department. There are 19 academic members in the Department of Occupational Therapy.

Speech and Language Therapy started in 1989 in Hacettepe University as Masters and Doctoral Degree programs. On April 18th, 2013 the undergraduate degree program in Language and Speech Therapy was started. The department has 8 academic staff members.

3.2. Population of the Research

3.2.1. Research Universe

The population of the study was health science students from the 5 departments; Department of Audiology, Department of Child Development, Department of Nutrition and Dietetics, Department of Occupational Therapy and Department of Speech and Language Therapy. The target population was all fourth-year students of the Faculty of Health Sciences. There was no sampling as it was aimed to include all fourth-year Faculty of Health Sciences students in the study without choosing a sample.

The Faculty of Health Sciences has 2197 undergraduate students and there are 572 registered fourth-year students; (Department of Audiology=142, Department of Child development=105, Department of Nutrition and Dietetics=79, Department of Occupational Therapy=79, Department of Speech and Language Therapy=133.

Table 3.1. The distribution of registered fourth year students according to department, gender and participation in the study (Faculty of Health Sciences, Ankara, November-December 2023)

Department	Gender	Number of registered students	Percentage of registered students (%)	Number of students who participated	Rate of participation (%)
Audiology	Male	40	28.2	9	22.5
	Female	102	71.8	65	63.7
	Total	142	100	74	52.1
Child Development	Male	1	1.0	1	100.0
	Female	104	99.0	71	68.3
	Total	105	100	72	68.6
Nutrition and Dietetics	Male	7	6.2	7	100.0
	Female	106	93.8	100	94.3
	Total	113	100	107	94.7
Occupational Therapy	Male	6	7.6	6	100.0
	Female	73	92.4	62	84.9
	Total	79	100	68	86.1
Speech and Language Therapy	Male	28	21.1	13	46.4
	Female	105	78.9	80	76.2
	Total	133	100	93	69.9
Faculty of Health Sciences	Male	82	14.3	36	43.9
	Female	490	85.7	378	77.1
	Total	572	100	414	72.4

3.2.2. Inclusion Criteria

The participants were included in the study if they were:

- Fourth-year undergraduate students of the Faculty of Health Sciences,
- Full-time students,

- Active students
- Informed about the study, agreed to participate in the study, and signed a consent form.

3.2.3. Exclusion Criteria

The participants were excluded from the study if they were:

- Fourth-year health sciences students who were not available or active during data collection
- Students from other years of the faculty,
- Students from other faculties

A total of 414 fourth-year Faculty of Health Sciences students took part in the study.

3.3. Variables of the Study

3.3.1. Independent Variables

- Age
- Gender
- Marital Status
- Department of study
- Region of origin
- Training/Education on health impacts of climate change
- Sources of information

3.3.2. Dependent Variables

- Knowledge regarding the impact of climate change on health
- Knowledge on nature and causes of climate change
- Knowledge on effects of climate change

3.4. Research Method and Data Collection Tools

3.4.1. Type of Research

This research is a descriptive study.

3.4.2. Data Collection Tool

A structured questionnaire was used to collect data on the knowledge of fourth-year health science students on health impacts of climate change (Appendix 2). To cater for both local and international students, the questionnaire was available in Turkish and English languages. There were 5 foreign fourth year students (Audiology=1, Child Development=1, Nutrition and Dietetics=1, Ergotherapy=2, Speech and Language Development=1. A total of three foreign students participated in the study (Audiology=1, Ergotherapy=2). The questionnaire consisted of 41 questions, divided into six sections: The first section included 5 socio-demographics questions on age, gender, marital status, department of study and region of origin.

The second section consisted of 2 items on sources of information regarding climate change and its health impacts. The third section included 10 items on nature and causes of climate change, section four had 10 items on effects of climate change. The fifth section consisted of 10 items on the impacts of climate change on human health and the sixth section consisted of 4 items assessing the challenges and demands for climate change education and training among the participants.

3.4.3. Development of the Data Collection Tool

To develop the questionnaire on knowledge of health impacts of climate change, the researchers intensively reviewed available literature on climate change and health and derived items from various sources (78,87,89,90,99) (Table 4.5, Table 4.24 and Table 4.41). All knowledge questions had responses of 1 for correct answers, 0 for ‘I don't Know’, and incorrect answers. The questionnaire had both short-answer and multiple-choice questions and completing the questionnaire took approximately 15 minutes. The reliability of the knowledge domains was tested by computing Cronbach's Alpha. It was r- 0.50 for nature and causes of climate change section, r

=0.62 for effects of climate change section and r=0.71 for health impacts of climate change.

3.4.4. Data Collection

The questionnaire was administered to the participants in lecture halls during their lectures from November to December 2023. Permission was taken from the professors responsible for the lecture and the questionnaires were given to the professors to distribute to the participants during lectures. Written consent from participants was obtained prior to collecting the data. Participation in the research study was on a voluntary basis.

3.5. Data Analysis

Data was analyzed using Statistical Package for the Social Sciences (SPSS) version 25. The data was cleaned, sorted and questionnaires were checked for completeness and inconsistencies. Descriptive analysis of the demographic characteristics of participants was done using frequencies, minimum and maximum values, percentages, median, mean and standard deviation. The Kolmogorov-Smirnov test was used to test the distribution of knowledge scores (nature and causes of climate change, effects of climate change and impacts of climate change on human health). The test showed that all the knowledge scores were not normally distributed. The relationship between dependent and independent variables was explored using non-parametric tests such as Mann-Whitney U test, Kruskal Wallis test and Spearman correlation tests. Chi square tests were used to determine if there was any statistical difference among departments according to sociodemographic characteristics and climate change training or education. Spearman's correlation was used to explore if there was a relationship between nature and causes of climate change knowledge and effects of climate change knowledge with climate change health impacts knowledge. A multiple linear regression analysis was conducted to examine the relationships between predictor and dependent variables. A p-value of <0.05 was considered statistically significant.

Knowledge scores were calculated by computing correct statements. For each correct answer, a score of one point was given and a score of zero was given for incorrect and ‘I don't know’ answers. The mean scores and standard deviation for the entire study group were computed for all knowledge sections (nature and causes of climate change section, effects of climate change section and impacts of climate change on health section).

3.6. Ethical Approval and Consent

Ethical approval for this study was approved by the Hacettepe University Health Sciences Research Ethics Committee (reference SBA 23/260 dated 24.10.2023). Permission to conduct this study was also obtained from the Department of Public Health and the Faculty of Health Sciences (Appendix 3). Before administration of questionnaires, the purpose of the study was explained briefly and written informed consent was obtained from the participants. Participants were made aware that participation in the study was entirely voluntary and that they had the freedom of choosing not to participate in the study and to end their participation at any point. Participants were also informed that information obtained through this questionnaire will remain confidential and will only be used for research purposes (or "scientific purposes"). Also feedback in electronic format was given to the participant using an information sheet (Appendix 6).

3.7. Manpower of the Research

The research was conducted by Professor Kerim Hakan Altıntaş, the primary researcher (Supervisor) and Senikiwe Chanda Kgatlhegang (Assistant Researcher). All the aspects of the study were supervised and consulted through the primary researcher. The planning and preparatory work for the research was done by the primary researcher and the assistant researcher. The assistant researcher collected data. Data analysis and report writing were done by both the principal researcher and the assistant researcher.

3.8. Timeline of the Research

The timeline of the study was as follows;

Table 3.2. Timeline of the research

TIMELINE OF THE RESEARCH						
DURATION	**JUNE 2023**	**JULY-SEPTEMBER 2023**	**OCTOBER-NOVEMBER 2023**	**NOVEMBER-DECEMBER 2023**	**JANUARY-MAY 2024**	**JUNE 2024**
IDENTIFY TOPIC						
LITERATURE REVIEW						
RESEARCH PROPOSAL						
ETHICS BOARD APPROVAL						
DATA COLLECTION						
DATA ANALYSIS AND INTERPRETATION						
PRESENTATION OF REPORT						

3.9 Budget of the Research

The expenses of the research were as follows;

Table 3.3. Budget of the research

RESEARCH BUDGET			
EXPENSES	**UNIT**	**COST PER UNIT (TL)**	**TOTAL COST (TL)**
Stationary			
Stapler	1	50	50
Binder	6	7	42
Transportation	2	240	480
Printing Costs			
Research Proposal	3	50	150
Questionnaire	435	5	2175
Final Report	5	100	500
TOTAL COST			**3397**

4. RESULTS

The findings of this study will be presented using tables and figures.

4.1. Results Related to Sociodemographic Characteristics

A total of 414 students participated in the study. As shown in Table 4.1 most of the participants were 22 years old (n=173, 41.4%), followed by 23 and above (n=125, 30.2%) and 21 and below (n=116, 28%). The minimum age of participants included in this study was 21 and the maximum age of participants was 51. The mean age of the participants was 23.4±4.5. The majority of the of the participants were female (n=378,91.3%) and 90.3% (n=374) of the participants were single while 9.7% (n=40) were married.

Table 4.1. Sociodemographic characteristics of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Characteristic (n=414)	n	%
Age		
21 and below	116	28.0
22	173	41.8
23 and above	125	30.2
Mean±SD=23.4±4.5	*Median=22.0*	*Min.-Max.= 21-51*
Gender		
Female	378	91.3
Male	36	8.7
Marital Status		
Single	374	90.3
Married	40	9.7
Department		
Audiology	74	17.9
Child Development	72	17.4
Nutrition & Dietetics	107	25.8
Ergotherapy	68	16.4
Speech & Language Development	93	22.5
Region of Origin		
Central Anatolia	149	36.0
Black Sea	65	15.7
Eastern Anatolia	25	6.0
Marmara	54	13.1
Mediterranean	50	12.1
Southern Anatolia	51	12.3
Aegean	17	4.1
Foreigner	3	0.7

Nutrition and Dietetics had the most respondents (n=107, 25.8%), followed by Speech and Language Development (n=93, 22.5%), Audiology (n=74, 17.9%), Child Development (n=72, 17.4%). Ergotherapy department had the least number of participants (n=68, 16.4%).

Most of the participants came from Central Anatolia (n=149, 36.0%). 15.7% (n=65) were from the Black Sea region, and 13.1% (n=54) of the participants were from Marmara region. Almost the same number of participants were from Southern Anatolia (n=51, 12.3%) and Mediterranean region (n=50, 12.1%). Participants originating from Eastern Anatolia were (n=25, 6.0%) and participants from the Aegean region were (n=17, 4.1%). Only 0.7% (n=3) of the participants were foreigners (Table 4.1). These participants originated from Greece, Iran, and Northern Cyprus.

Table 4.2. Distribution of sociodemographic characteristics of fourth-year students according to their departments (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

	Departments												
	Audiology (n=74)		Child Development (n=72)		Nutrition & Dietetics (n=107)		Ergotherapy (n=68)		Speech & Language Development (n=93)		Total (n=414)		
Characteristic	n	%	n	%	n	%	n	%	n	%	n	%	P value
Age													
≤21	16	21.6	22	30.6	32	29.9	24	35.3	22	23.7	116	28.0	
22	40	54.1	23	31.9	45	42.1	25	36.8	40	43.0	173	41.8	p=0.215 X^2=10.778
≥23	18	24.3	27	37.5	30-	28.0	19	27.9	31	33.3	125	30.2	
Gender													
Female	65	87.8	71	98.6	100	93.5	62	91.2	80	86.0	378	91.3	p=0.57 X^2=9.172
Male	9	12.2	1	1.4	7	6.5	6	8.8	13	14.0	42	8.7	
Marital Status													
Single	71	95.9	62	86.1	101	94.4	60	88.2	80	86.0	374	90.3	p=0.075 X^2 =8.485
Married	3	4.1	10	13.9	6	5.6	8	11.8	13	14.0	40	9.7	
Region													
Central Anatolia	23	31.1	30	41.7	33	30.8	24	35.3	39	41.9	149	36.0	
Black Sea	20	27.0	6	8.3	15	14.0	11	16.2	13	14.0	65	15.7	
Marmara	6	8.1	13	18.0	15	14.0	11	16.2	9	9.7	54	13.1	
Mediterranean	10	13.5	9	12.5	19	17.8	4	5.9	8	8.6	50	12.1	
Southern Anatolia	9	12.2	9	12.5	16	15.0	8	11.8	9	9.7	51	12.3	
Eastern Anatolia	5	6.8	2	2.8	2	1.9	6	8.8	10	10.7	25	6.0	
Aegean	-	-	3	4.2	7	6.5	2	2.9	5	5.4	17	4.1	
Foreigner	1	1.3	-	-	-	-	2	2.9	-	-	3	0.7	

There wasn't a statistically significant difference among the departments as far as age is concerned (p=0.215). 54.1% (n=40) of the participants from Audiology department, 31.9% (n=23) participants from Child development, 36.8% (n=25) of the participants from Ergotherapy department, 42.1% (n=45) of the participants from Nutrition and Dietetics program, and 43.0% (n=40) of the participants from Speech and Language Development department were 22 years old. Among the ≥23 age group, 24.3% (n=18) of the participants were from Audiology department, 37.5% (n=27) participants from Child development, 37.5% (n=37), 27.9% (n=19) of the participants from Ergotherapy department, 28.0% (n=30) of the participants from Nutrition and Dietetics program, and 33.3% (n=31) of the participants from Speech and Language Development department were 22 years old. 21.6 % (n=16) of the participants were from Audiology department, 30.6 % (n=22) participants from Child development, 35.3% (n=24) of the participants from Ergotherapy department, 29.9% (n=32) of the participants from Nutrition and Dietetics program, and 23.7% (n=22) of the participants from Speech and Language Development department were ≤21 years old.

There was no statistically significant difference among departments according to gender (p=0.57). 87.8% (n=65) of the participants from Audiology department, 98.6% (n=71) participants from Child development, 91.2% (n=62) of the participants from Ergotherapy department, 93.5% (n=100) of the participants from Nutrition and Dietetics program, and 86.0% (n=80) of the participants from Speech and Language Development department were female. 12.2% (n=9) of the participants from Audiology department, 1.4% (n=1) participants from Child development, 8.8% (n=6) of the participants from Ergotherapy department, 6.5% (n=7) of the participants from Nutrition and Dietetics program, and 14.0% (n=13) of the participants from Speech and Language Development department were male.

In terms of marital status, there was no statistically significant difference among departments as far as marital status is concerned (p=0.075). 95.9% (n=71) of the participants from Audiology department, 86.1% (n=62) participants from Child development, 88.2% (n=60) of the participants from Ergotherapy department, 94.4% (n=101) of the participants from Nutrition and Dietetics program, and 86.0% (n=80) of the participants from Speech and Language Development department were

single.4.1% (n=3) of the participants from Audiology department, 13.9% (n=10) participants from Child development, 11.8% (n=8) of the participants from Ergotherapy department, 5.6% (n=6) of the participants from Nutrition and Dietetics program, and 14.0% (n=13) of the participants from Speech and Language Development department were married.

There was a statistically significant difference among departments according to region of origin (p=0.028). 0% (n=0) of the participants from Audiology department, 4.2% (n=3) participants from Child development, 2.9% (n=2) of the participants from Ergotherapy department, 6.5% (n=7) of the participants from Nutrition and Dietetics program, and 5.4% (n=5) of the participants from Speech and Language Development department were from the Aegean region. Among participants from the Black Sea region, 27.0% (n=20) of the participants from Audiology department, 8.3% (n=6) participants from Child development, 16.2% (n=11) of the participants from Ergotherapy department, 14.0% (n=15) of the participants from Nutrition and Dietetics program, and 14.0% (n=13) of the participants from Speech and Language Development department.31.1% (n=23) of the participants from Audiology department, 41.7% (n=30) participants from Child development, 35.3% (n=24) of the participants from Ergotherapy department, 30.8% (n=33) of the participants from Nutrition and Dietetics program, and 41.9% (n=39) of the participants from Speech and Language Development department were from Central Anatolia region. Among participants from Eastern Anatolia region, 6.8% (n=5) of the participants from Audiology department, 2.8% (n=2) participants from Child development, 8.8% (n=6) of the participants from Ergotherapy department, 1.9% (n=2) of the participants from Nutrition and Dietetics program, and 10.7% (n=10) of the participants from Speech and Language Development department. 1.3% (n=1) of the participants from Audiology department, 0% (n=0) participants from Child development, 2.9% (n=2) of the participants from Ergotherapy department, 0% (n=0) of the participants from Nutrition and Dietetics program, and 0% (n=0) of the participants from Speech and Language Development department were foreigners. Among participants from Marmara region, 8.1% (n=6) of the participants from Audiology department, 18.0% (n=13) participants from Child development, 16.2% (n=11) of the participants from Ergotherapy department, 14.0% (n=15) of the participants from Nutrition and Dietetics

program, and 9.7% (n=9) of the participants from Speech and Language Development department). 13.5% (n=10) of the participants from Audiology department, 12.5% (n=9) participants from Child development, 5.9% (n=4) of the participants from Ergotherapy department, 17.8% (n=19) of the participants from Nutrition and Dietetics program, and 8.6% (n=8) of the participants from Speech and Language Development department were from the Mediterranean region. 12.2% (n=9) of the participants from Audiology department, 12.5% (n=9) participants from Child development, 11.8% (n=8) of the participants from Ergotherapy department, 15.0% (n=16) of the participants from Nutrition and Dietetics program, and 9.7% (n=9) of the participants from Speech and Language Development department were from Southern Anatolia region.

4.2. Results Related to Climate Change Training/Education and Learning Sources

Table 4.3. Distribution of fourth-year students according to their departments and to having any training/education regarding health impacts of climate change (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Departments	Having any training/education				Total		
	Yes		No				P value
	n	%	n	%	n	%	
Audiology	1	1.4	73	98.6	74	17.9	P=0.091
Child Development	-	-	72	100.0	72	17.4	X^2=6.847
Nutrition & Dietetics	7	6.5	100	93.5	107	25.8	
Ergotherapy	1	1.5	67	98.5	68	16.4	
Speech & Language Development	2	2.2	91	97.8	93	22.5	
Total	**11**	**2.7**	**403**	**97.3**	**414**	**100.0**	

No participant in Child Development department had received training or education on the health impacts of climate change (Table 4.3). In Audiology department 98.6% (n=73) of the participants had not received any training or education on the health impacts of climate change while only 1.4% (n=1) had received training or education on the health impacts of climate change. 93.5% (n=100) of participants in Nutrition and Dietetics department had not received any training on the health impacts of climate change while 6.5% (n=7) indicated that they had received training. In Ergotherapy department, 1.5% (n=1) had received training or education regarding health impacts of climate change while 98.5% (n=67) of participants had not received training or education. 97.8% (n=91) of participants in Speech and Language development had not received any training or education on health impacts of climate change and only 2.2% (n=2) had received the training or education (Table 4.3).

There was no statistically significant difference among departments according to having any training/education regarding health impacts of climate change (p=0.091) (Table 4.3)

Table 4.4. Distribution of sources of information about health impacts of climate change among fourth-year students from different departments (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

	Departments											
	Audiology (n=74)		Child Development (n=72)		Nutrition and Dietetics (n=107)		Ergotherapy (n=68)		Speech & Language Development (n=93)		Total (n=414)	
Sources of climate change information	n	%	n	%	n	%	n	%	n	%	n	%
Social media	70	94.6	60	83.3	82	76.6	59	86.8	81	87.1	352	85.0
National or international media	27	36.5	19	26.4	27	25.2	18	26.5	23	24.7	114	27.5
School/college/university curriculum	14	18.9	17	23.6	37	34.6	8	11.8	12	12.9	88	21.3
International climate change Organizations	17	23.0	12	16.7	16	15.0	6	8.8	9	9.7	60	14.5
Seminars, workshops & Conferences	13	17.6	2	2.8	25	23.4	4	5.9	2	2.2	46	11.1
Government notifications	10	13.5	5	6.9	9	8.4	9	13.2	10	10.8	43	10.4
Non-Governmental Organizations	2	2.7	4	5.6	1	0.9	-	-	1	1.1	8	1.9
Books	-	-	-	-	-	-	-	-	1	1.1	1	0.2

Social media (n=352, 85.0%) was the most mentioned as a source of information about the health impacts of climate change among all the participants. It is also true for the participants from the departments of Audiology (n=70, 94.6%), Speech and Language Development (n=81, 87.1%), Ergotherapy (n=59, 86.8%), Child Development (n=60, 83.3%) and Nutrition and Dietetics (n=82, 76.6%). National or international media (n=114, 27.5%) was the second most popular source of information followed by school/college/university (curriculum) (n=88, 21.3%), international climate change organizations (n=60, 14.5%), seminars, workshops and conferences (n=46, 11.1%) and government notifications (n=43, 10.4%). Other sources of information (non-governmental organizations and books) were the least mentioned sources of information (n=8, 1,9% and n=1, 0.2%, respectively) (Table 4.4)

4.3. Results Related to Nature and Causes of Climate Change Knowledge

Table 4.5. The distribution of correct answers on the nature and causes of climate change according to fourth-year students from different departments (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Statement	Department										Total (n=414)	
	Audiology (n=74)		Child Development (n=72)		Nutrition & Dietetics (n=107)		Ergotherapy (n=68)		Speech & Language Development (n=93)			
	n	%	N	%	n	%	n	%	n	%	n	%
Climate change is only a result of natural activities**	70	94.6	67	93.1	105	98.1	67	98.5	89	95.7	398	96.1
Climate change is the tangible, long-term change in weather variables that is associated with the increases in the concentrations of greenhouse gases in the atmosphere* (Ref.87)	72	97.3	64	88.9	106	99.1	65	95.6	88	94.6	395	95.4
Deforestation is not one of the causes of climate change** (Ref.87)	69	93.2	67	93.1	101	94.4	68	100	90	96.8	395	95.4
Effect of human activities on temperatures of the surface of the Earth is very high*	69	93.2	63	87.5	102	95.3	63	92.6	83	89.2	380	91.8
Environmental pollution resulting from industry is one of the main causes of climate change* (Ref.87)	60	81.1	66	91.7	99	92.5	63	92.6	86	92.5	374	90.3
The transportation sector does not contribute substantially to climate change** (Ref.87)	61	82.4	58	80.6	101	94.4	64	94.1	86	92.5	370	89.4
Burning of fossil fuels such as oil and coal does not contribute to climate change** (Ref.78)	59	79.7	67	93.1	96	89.7	56	82.4	84	90.3	362	87.4
Manifestations of climate change differ from one climatic region to another* (Ref.87)	65	87.8	65	90.3	94	87.9	56	82.4	81	87.1	361	87.2
Agricultural activities such as animal and plant production do not contribute to climate change** (Ref 87)	70	94.6	50	69.4	95	88.8	61	89.7	78	83.9	354	85.5
Climate change can also be a result of natural processes like active volcanoes*	54	73.0	40	55.6	77	72.0	45	66.2	57	61.3	273	65.9

*True statement **False statement Cronbach α=0.50

Table 4.5 shows that 95.4% (n=395) of the participants knew the correct definition of climate change. The highest number of correct answers were in Nutrition and Dietetics department (n=106, 99.1%) and the lowest number of correct answers were in Child Development department (n=64, 88.9%). 96.1% (n=398) of the participants correctly answered the statement "*Climate change is only a result of natural activities*". The highest number of correct answers for this statement was in Ergotherapy department (n=67, 98.5%), while the lowest was in Child Development department (n=67, 93.1%). 87.2% (n=361) of students answered "*Manifestations of climate change differ from one climatic region to another*". For the same statement 90.3% (n=65) of the students from Child Development department answered correctly, while 82.4% (n=56) of Ergotherapy department students answered correctly. When asked if "*Environmental pollution resulting from industry is one of the main causes of climate change*" 90.3% (n=374) answered correctly. The highest number of correct answers for this question was in Ergotherapy department (n=63, 92.6%) followed by Speech and Language Development (n=86, 92.5%) and Nutrition and Dietetics (n=99, 92.5%) and the lowest number of correct answers was found among students from Audiology department (n=60, 81.1%). Upon being asked *"Burning fossil fuels like oil and coal does not contribute to climate change",* 87.4% (n=362) of all participants answered correctly, the highest number of correct answers being in Child development department (n=67, 93.1%) and the lowest was in the Audiology department (n=59, 79.7%).

The statement *"Climate change can also be a result of natural processes like active volcanoes"* had the least percentage of correct answers out of all the questions on nature and causes of climate change. Only 65.9% (n=273) of the respondents got the answer to this statement correct. 91.8% (n=380) of the participants answered *"Effects of human activities on temperatures of the surface of the earth is very high"* correctly. The participants from Nutrition and Dietetics department had the most correct answers (n=102, 95.3%), while 87.5% (n=63) of Child Development department participants got the answer correct. The *"Deforestation is not one of the causes of climate change"* statement was answered correctly by 95.4% (n=395) of the participants. All the students in Ergotherapy department answered correctly, while 93.1% (n=67) of students in Child Development department answered this question

correctly. 85.5% (n=354) of the participants included in this study answered the statement *"Agricultural activities such as animal and plant production do not contribute to climate change."* correctly. The lowest number of correct answers for this question was in Child Development department (n=50, 69.4%) and the highest were in Audiology department (n=70, 94.6%). *"The transportation sector does not contribute substantially to climate change"* question was answered correctly by 89.4% (n=370) of the participants, the highest number of correct answers was in Nutrition and Dietetics department (n=101, 94.4%) while the lowest number of correct answers was in Child Development department (n=58, 80.6%) (Table 4.5).

Table 4.6. Descriptive statistics of nature and causes of climate change knowledge score of fourth-year students according to different departments (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

	Score				
Department	Mean	Median	Std. Deviation	Minimum	Maximum
Audiology	8.8	9.0	1.5	3.0	10.0
Child Development	8.4	9.0	1.5	1.0	10.0
Nutrition & Dietetics	9.1	10.0	1.3	4.0	10.0
Ergotherapy	8.9	9.0	1.1	4.0	10.0
Speech & Language Development	8.8	9.0	1.1	5.0	10.0
Total	8.8	9.0	1.3	1.0	10.0

According to (table 4.6) the mean score of nature and causes of climate change for all departments was 8.8 ±1.3 with scores ranging from 1-10 and a median score of 9. The mean nature and causes of climate change score was lowest in Child Development department (8.4) and highest in the Nutrition and Dietetics department (9.1). The highest median score on nature and causes of climate change was in Nutrition and Dietetics department (10.0) while all the remaining departments had the same median knowledge scores (9.0). The minimum nature and causes of climate change knowledge score was in Child Development department (1.0). (Table 4.6).

4.3.1. Results Related to Nature and Causes of Climate Change Knowledge Scores

According to the Kolmogorov-Smirnov test for the nature and causes of climate change knowledge variable, it was observed that the data was not normally distributed ($p<0.001$). We therefore have significant evidence to reject the null hypothesis that the variable follows a normal distribution (Table 4.7). Based on this finding, the statistical significance of the relationship between variables was tested through non-parametric tests.

Table 4.7. Kolmogorov-Smirnov Test for nature and causes of climate change knowledge scores of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Variable	Statistic	df	Sig
Nature of Climate Change Score	0.242	414	0.000

Kolmogorov-Smirnov Normality Test

4.3.2. Climate Change Nature and Causes Knowledge Scores and Age

A Kruskal-Wallis H test showed that there was no statistically significant difference in climate change nature and causes knowledge scores between the different age groups; 21 and below (Md=9, n=116), 22 years (Md=9, n=173) and 23 and above (Md=9, n=125) ($\chi^2(2) = 4.258$, $p=0.119$) (Table 4.8).

Table 4.8. The distribution of nature and causes of climate change knowledge scores according to age of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Age Group								
21 and below		22 years		23 and above		Kruskal Wallis Test		
n	Md	n	Md	n	Md	Statistic	Df	p-value
116	9	173	9	125	9	4.258	2	0.119

Kruskal Wallis Test Md: Median

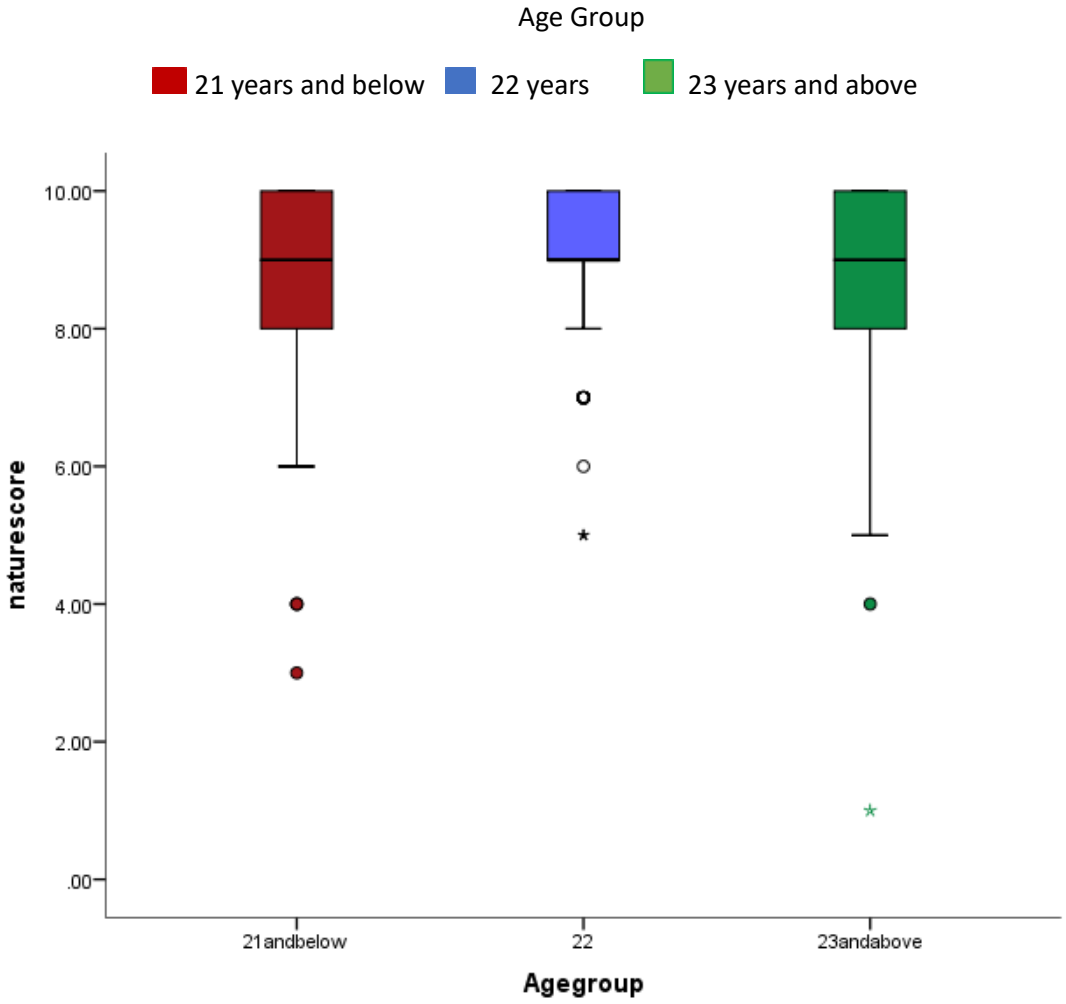

Figure 4.1. Nature and causes knowledge scores of climate change and age groups of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.3.3. Nature and Causes of Climate Change Knowledge Scores and Gender

The Mann-Whitney U test showed that there was no statistically significant difference in climate change nature and causes knowledge scores of females (Md=9, n=378), and males (Md=9, n=36) (U=6669.500, z= -0.461 *p*=0.645. Therefore, no difference between the climate change nature and causes knowledge scores of men and women can be determined with these data (Table 4.9).

Table 4.9. The distribution of nature and causes of climate change knowledge scores according to gender of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Gender						
Female		Male		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
378	9	36	9	6669.500	-0.461	0.645

Mann-Whitney U Test Md: Median

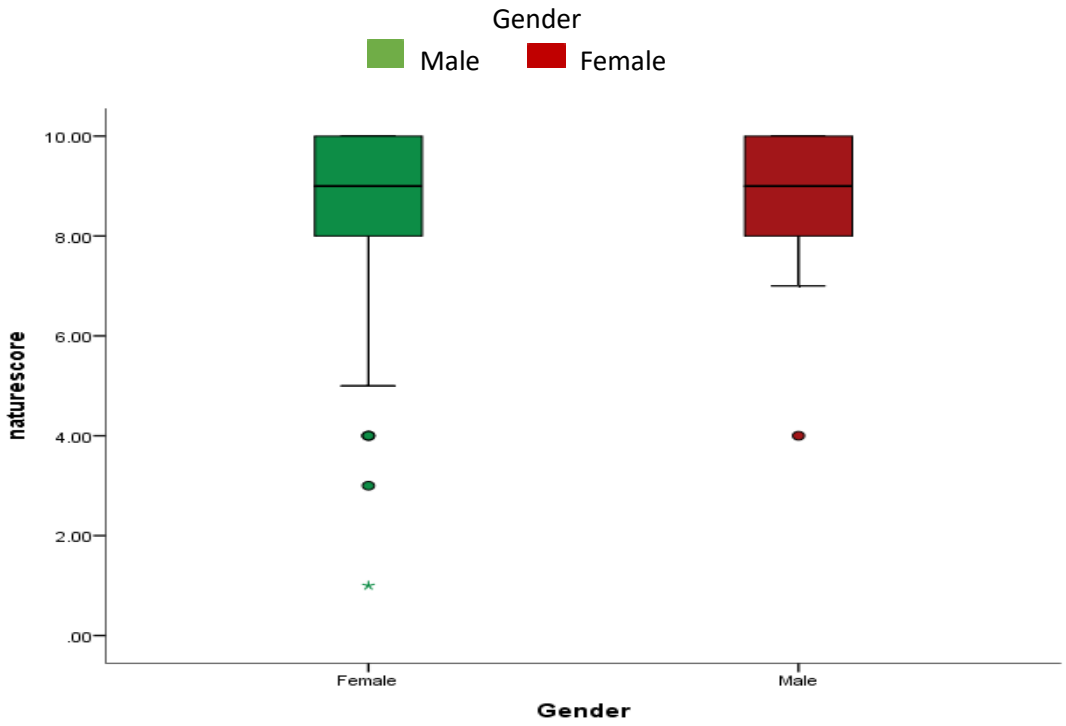

Figure 4.2. Nature and causes of climate change knowledge scores and gender of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.3.4. Nature and Causes of Climate Change Knowledge Scores and Marital Status

According to the Mann-Whitney U test there was a statistically significant difference between nature and causes of climate change knowledge scores of single (Md=9, n=374) and married students (Md=8, n=40) (U=5080.500, z=-3.501 p<0.001.). The results suggest that single students are more knowledgeable on

the nature and causes of climate change than married students, a difference that is statistically significant (Table 4.9).

Table 4.10. The distribution of nature and causes of climate change knowledge scores according to marital status of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Marital Status						
Single		Married		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
374	9	40	8	5080.500	-3.501	0.000

Mann-Whitney U Test Md: Median

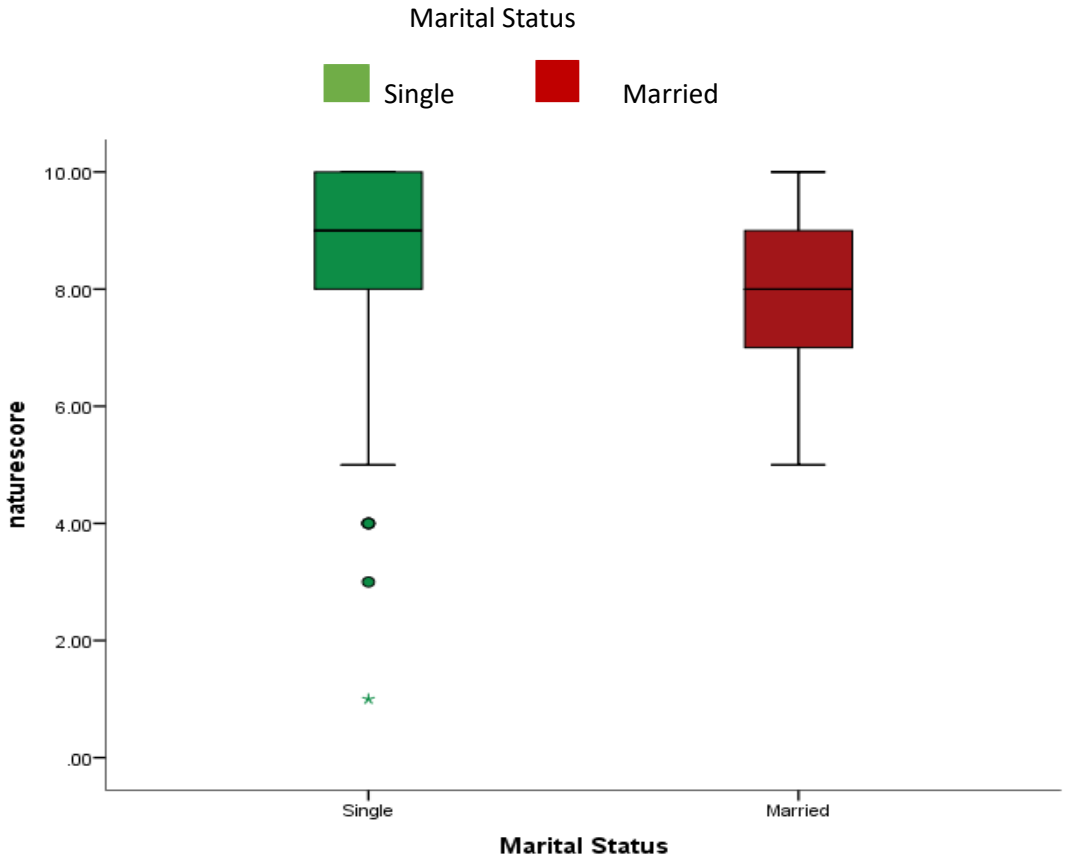

Figure 4.3. Nature and causes of climate knowledge scores and marital status of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.3.5. Nature and Causes of Climate Change Scores and Department

A Kruskal Wallis test was conducted to analyze association between nature and causes of climate change knowledge scores and department variable. The test showed

that there was a statistically significant difference in climate change nature and causes knowledge scores of students from different departments; Audiology (Md=9, n=74), Child Development (Md=9, n=72), Nutrition and Dietetics (Md=10, n=107), Ergotherapy (Md=9, n=68) and Speech and Language Development (Md=9, n=93) ($\chi^2(4) = 16.695$, $p=0.002$) (Table 4.11).

Table 4.11. The distribution of nature and causes of climate change knowledge scores according to departments of students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Department												
Audiology		Child Development		Nutrition & Dietetics		Ergotherapy		Speech & Language Development		Kruskal Wallis		
n	Md	n	Md	n	Md	n	Md	n	Md	Statistic	df	p-value
74	9	72	9	107	10	68	9	93	9	16.695	4	0.002

Kruskal Wallis Test Md: Median

The Bonferroni Pairwise test was used to check between which departments there was a statistically significant difference. There was very strong evidence ($p<0.001$, adjusted using the Bonferroni correction) of a difference between the students in Child Development and those in Nutrition and Dietetics Department. All the other groups did not have any significant difference between them (Table 4.12).

Table 4.12. Bonferroni Pairwise Test for nature and causes of climate change knowledge scores according to departments of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

	Pairwise Comparisons of Department				
Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
Child Development-Speech and Language Development	-27.902	17.896	-1.559	0.119	1.000
Child Development-Audiology	34.752	18.872	1.841	0.066	0.656
Child Development-Ergotherapy	-39.576	19.278	-2.053	0.040	0.401
Child Development-Nutrition and Dietetics*	-69.051	17.378	-3.973	0.000	0.001
Speech and Language Development-Audiology	6.850	17.759	0.386	0.700	1.000
Speech and Language Development-Ergotherapy	11.675	18.190	0.642	0.521	1.000
Speech and Language Development-Nutrition and Dietetics	41.149	16.162	2.546	0.011	0.109
Audiology-Ergotherapy	-4.824	19.151	-0.252	0.801	1.000
Audiology-Nutrition and Dietetics	-34.299	17.237	-1.990	0.047	0.466
Ergotherapy-Nutrition and Dietetics	29.474	17.681	1.667	0.096	0.955

*Statistically significant

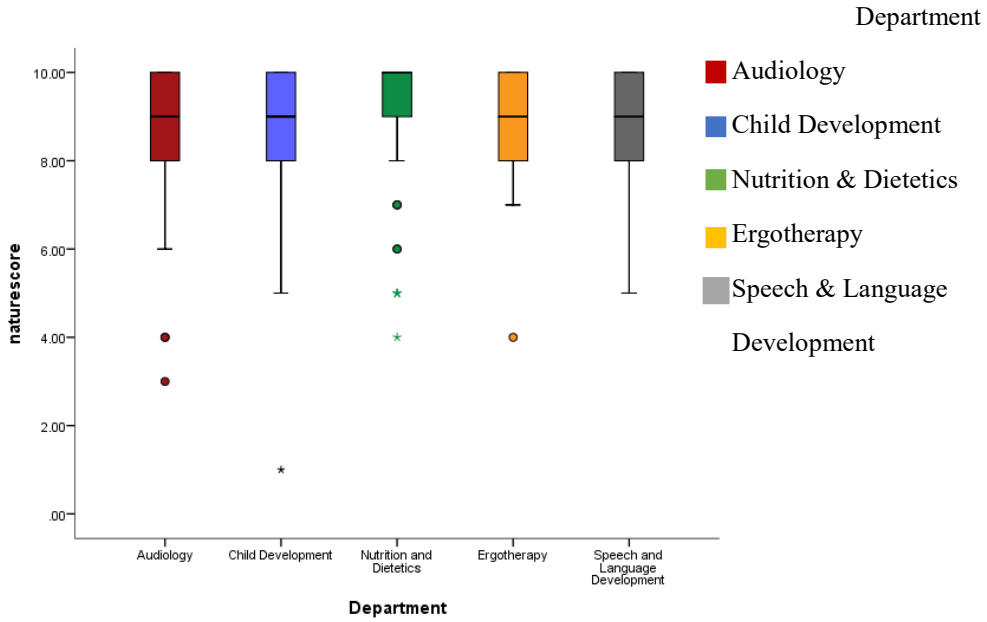

Figure 4.4. Nature and causes of climate change knowledge scores and departments of fourth year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.3.6. Nature and Causes of Climate Change Knowledge Scores and Region of Origin

A Kruskal Wallis test was conducted to analyze association between climate change nature and causes knowledge scores and region of origin variable. The Kruskal-Wallis H test showed that there was a statistically significant difference in climate change nature and causes knowledge scores of the different regions; Central Anatolia (Md=9, n=149), Black Sea (Md=10, n=65), Eastern Anatolia (Md=9, n=25), Marmara (Md=10, n=54), Mediterranean (Md=9, n=50), Southern Anatolia (Md=9, n=51), Aegean (Md=9, n=17), Foreigner (Md=8, n=3) ($\chi^2(7)=22.859$, $p=0.002$ (Table 4.13).

Table 4.13. The distribution of nature and causes of climate change knowledge scores according to region of origin of the fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Region	Mean Rank	Median	Statistic	df	p
Central Anatolia	195.27	9			
Black Sea	243.45	10			
Eastern Anatolia	183.06	9			
Marmara	249.88	10			
Mediterranean	200.56	9			
Southern Anatolia	182.98	9			
Aegean	193.50	9			
Foreigner	88.50	8			
			22.859	7	0.002

Kruskal Wallis Test

The Bonferroni Pairwise test was used to check between which regions there was a statistically significant difference. There was no statistically significant difference between region and nature and causes knowledge scores (Table 4.14).

Table 4.14. Bonferroni Pairwise Test for nature and causes of climate change knowledge scores according to region of origin of the fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
Foreigner-Southern Anatolia	94.480	67.730	1.395	0.163	1.000
Foreigner-Eastern Anatolia	94.560	69.659	1.357	0.175	1.000
Foreigner-Aegean	105.000	71.393	1.471	0.141	1.000
Foreigner-Central Anatolia	106.772	66.481	1.606	0.108	1.000
Foreigner-Mediterranean	112.060	67.767	1.654	0.098	1.000
Foreigner-Black Sea	154.954	67.323	2.302	0.021	0.598
Foreigner-Marmara	161.380	67.625	2.386	0.017	0.476
Southern Anatolia-Eastern Anatolia	.080	27.834	0.003	0.998	1.000
Southern Anatolia-Aegean	-10.520	31.928	-0.329	0.742	1.000
Southern Anatolia-Central Anatolia	12.291	18.495	0.665	0.506	1.000
Southern Anatolia-Mediterranean	17.580	22.689	0.775	0.438	1.000
Southern Anatolia-Black Sea	60.473	21.326	2.836	0.005	0.128
Southern Anatolia-Marmara	66.899	22.261	3.005	0.003	0.074
Eastern Anatolia-Aegean	-10.440	35.839	-0.291	0.771	1.000
Eastern Anatolia-Central Anatolia	12.212	24.640	0.496	0.620	1.000
Eastern Anatolia-Mediterranean	-17.500	27.926	-0.627	0.531	1.000
Eastern Anatolia-Black Sea	60.394	26.830	2.251	0.024	0.683
Eastern Anatolia-Marmara	-66.820	27.579	-2.423	0.015	0.431
Aegean-Central Anatolia	1.772	29.185	0.061	0.952	1.000
Aegean-Mediterranean	7.060	32.008	0.221	0.825	1.000
Aegean-Black Sea	49.954	31.057	1.608	0.108	1.000
Aegean-Marmara	56.380	31.706	1.778	0.075	1.000
Central Anatolia-Mediterranean	-5.288	18.633	-0.284	0.777	1.000
Central Anatolia-Black Sea	-48.182	16.947	-2.843	0.004	0.125
Central Anatolia-Marmara	-54.608	18.109	-3.016	0.003	0.072
Mediterranean-Black Sea	42.894	21.445	2.000	0.045	1.000
Mediterranean-Marmara	49.320	22.375	2.204	0.028	0.770
Black Sea-Marmara	-6.426	20.992	-0.306	0.760	1.000

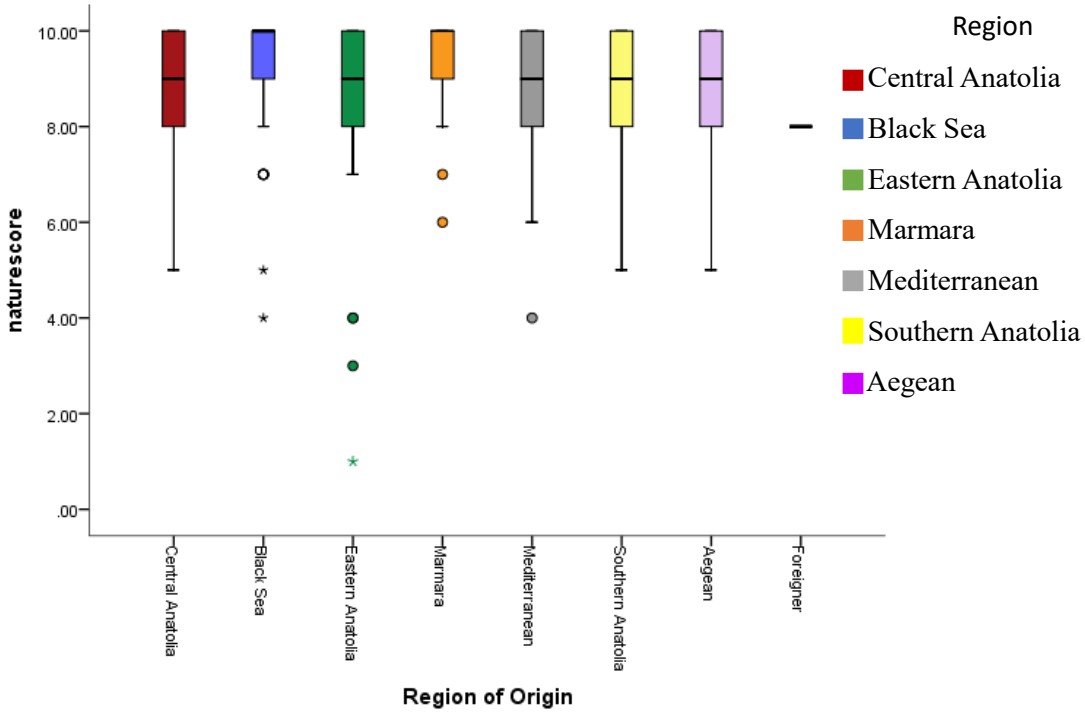

Figure 4.5. Nature and causes of climate knowledge scores and region of origin of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.3.7. Nature and Causes of Climate Change Knowledge Scores and Receipt of Training/Education Regarding Health İmpacts of Climate Change

A Mann-Whitney U test showed that there was no statistically significant difference in climate change nature knowledge scores between students who had not received climate change training/education (Md=9, n=403) and those who had received any climate change training/education (Md=10, n=11) (U=2947.000, z=1.958 *p*=0.050) (Table 4.15).

Table 4.15. The distribution of nature and causes of climate change knowledge scores according to training/education of fourth-year students on health impacts of climate change (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Training/education on health impacts of climate change						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
11	10	403	9	2947.000	1.958	0.050

Mann-Whitney U Test Md: Median

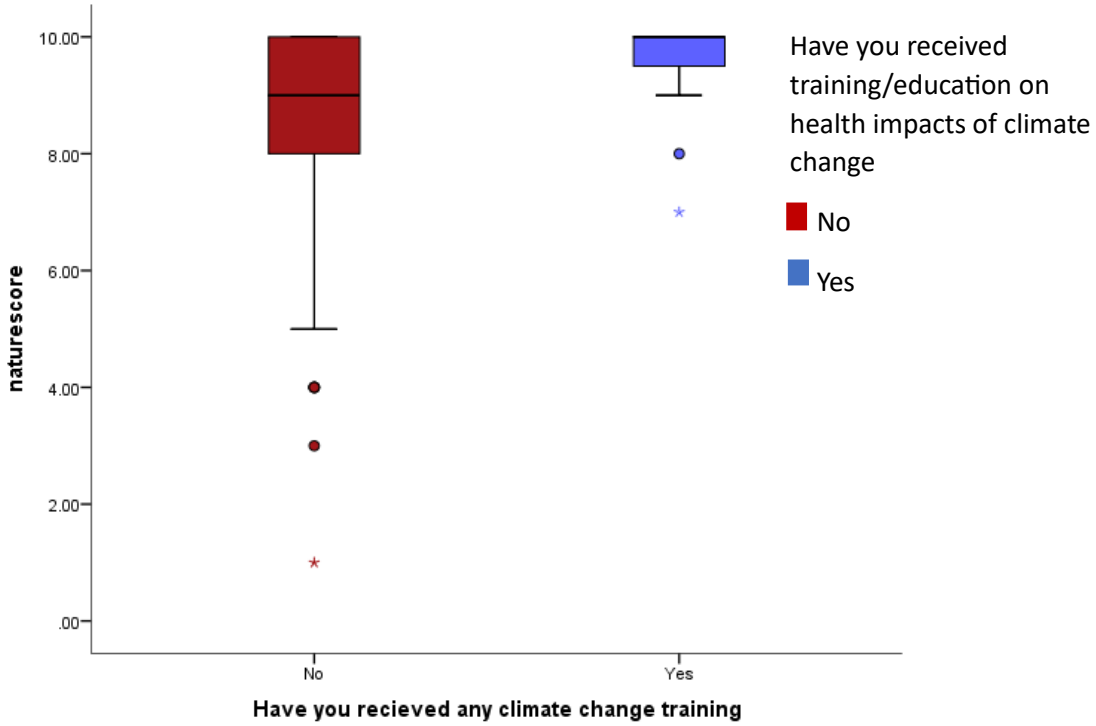

Figure 4.6 Nature and causes of climate change knowledge scores and climate change training/education of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.3.8. Nature and Causes of Climate Change Knowledge Scores and Sources of Climate Change İnformation

Nature and causes of climate change knowledge scores and social media

Mann-Whitney U test was conducted to analyze the association between nature and causes of climate change knowledge score and using social media as a source of information about the health impacts of climate change. The test showed that there was no statistically significant difference in climate change nature knowledge scores between students using social media as a source of information about the health impacts of climate change (Md=9, n=352) and those who do not use social media as a source of information about health impacts of climate change (Md=9, n=62) (U=10442.000, z=-0.568 *p*=0.570) (Table 4.16).

Table 4.16. The distribution of nature and causes of climate change knowledge scores according to usage of social media by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Social media						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
352	9	62	9	10442.000	-0.568	0.570

Mann-Whitney U Test Md: Median

Nature and causes of climate change scores and School/college/university (curriculum)

A Mann-Whitney U test showed that there was a statistically significant difference (U =11836.000, p = 0.008) in climate change nature scores between students using school as a source of information about the climate change's health impacts (Md= 9, N=88) and those who do not use school as a source of information about health impacts of climate change (Md=9, N=326).

Table 4.17. The distribution of nature and causes of climate change knowledge scores according to usage of school/college/university (curriculum) by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

School/college/college (curriculum)						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
88	9	326	9	11836.000	-2.643	0.008

Mann-Whitney U Test Md: Median

Nature and causes of climate change scores and Government notifications

According to the Mann-Whitney U test, there was no statistically significant difference in climate change nature scores between students using government notifications as an information source regarding health impacts of climate change (Md=9, n=43) and those who do not use government notifications as a source of information on health impacts of climate change (Md=9, n= 371) U=7086.500, p=0.209, z=-1.258.

Table 4.18. The distribution of nature and causes of climate change knowledge scores according to usage of government notifications by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Government notification						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
43	9	371	9	7086.500	-1.258	0.209

Mann-Whitney U Test Md: Median

Nature and causes of climate change scores and seminars, workshops and conferences

A Mann-Whitney U test showed that there was a statistically significant difference in climate change nature and causes knowledge scores between students using seminars, workshops and conferences as a source of information about the health impacts of climate change (Md=9.5, n=46) and those who do not use seminars, workshops and conferences as a source of information about health impacts of climate change (Md=9, n=368) (U=6636.000, p=0.012, z=-2.508). (Table 4.19).

Table 4.19. The distribution of nature and causes of climate change knowledge scores according to usage of seminars, workshops and conferences by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Seminars, workshops and conferences						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
46	9.5	368	9	6636.000	-2.508	0.012

Mann-Whitney U Test Md: Median

Nature and causes of climate change knowledge scores and national or international media (electronic and print)

A Mann-Whitney U test showed that there was no statistically significant difference in climate change nature and causes knowledge scores between students using national or international media (electronic and print) as a source of information about the health impacts of climate change (Md=9, n=114) and those who do not use

national or international media (electronic and print) as a source of information about health impacts of climate change (Md=9, n=300) (U=16994.000, p=0.919, z=-0.102) (Table 4.20)

Table 4.20. The distribution of nature and causes of climate change knowledge scores according to usage of national or international media (electronic and print) by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

National or international media (electronic and print)						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
114	9	300	9	16994.000	-0.102	0.919

Mann-Whitney U Test Md: Median

Nature and causes of climate change knowledge scores and international organizations working for climate change

Results from Mann-Whitney U test showed that there was no statistically significant difference in climate change nature and causes knowledge scores between students using international organizations working with climate change as a source of information about the health impacts of climate change (Md=9, n=60) and those who do not use international organizations working with climate change as a source of information about health impacts of climate change (Md=9, n=354) (U=11552.000, p=0.254, z=1.141) (Table 4.21).

Table 4.21. The distribution of nature and causes of climate change knowledge scores according to usage of international organizations working for climate change by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

International organizations working for climate change						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
60	9	354	9	11552.000	1.141	0.254

Mann-Whitney U Test Md: Median

Nature and causes of climate change knowledge scores and research articles

A Mann-Whitney U test showed that there was no statistically significant difference in climate change nature and causes knowledge scores between students using research articles regarding climate change as a source of information about the health impacts of climate change (Md=9, n=49) and those who do not use research articles regarding climate change as a source of information about health impacts of climate change (Md=9, n=365) (U=9970.000, p=0.170, z=1.371) (Table 4.22).

Table 4.22. The distribution of nature and causes of climate change knowledge scores according to usage of research articles by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Research articles						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
49	9	365	9	9970.000	1.371	0.170

Mann-Whitney U Test Md: Median

Nature and causes of climate change scores and other sources of information

The Mann-Whiney U test showed that there was no statistically significant difference in climate change nature and causes knowledge scores between students using other sources of information about the health impacts of climate change (Md=9, n=9) and those who do not use other sources of information as a source of information about health impacts of climate change (Md=9, n=405) (U=1377.000, z=-1.317, p=0.188) (Table 4.23).

Table 4.23. The distribution of nature and causes of climate change knowledge scores according to usage of other sources by fourth-year students as a of source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Other sources of information						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
9	9	405	9	1377.000	-1.317	0.188

Mann-Whitney U Test Md: Median

4.4. Results Related to Effects of Climate Change Knowledge

Table 4.24. The distribution of correct answers on effects of climate change according to fourth-year students from different departments (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Statement	Departments											
	Audiology (n=74)		Child Development (n=72)		Nutrition & Dietetics (n=107)		Ergotherapy (n=68)		Speech & Language Development (n=93)		Total (n=414)	
	n	%	N	%	n	%	n	%	n	%	n	%
Climate change may cause an increase in the frequency and intensity of extreme weather conditions such as heat waves, drought, hurricanes and heavy rains* (Ref.87)	74	100.0	69	95.8	103	96.3	68	100.0	84	90.3	398	96.1
Climate change causes biodiversity loss* (Ref.87)	74	100.0	67	93.1	101	94.4	64	94.1	88	94.6	394	95.2
Climate change brings about increase in temperatures of the Earth* (Ref.87)	67	90.5	65	90.3	103	96.3	64	94.1	86	92.5	385	93.0
Rise in water level in seas is not a result of climate change** (Ref.87)	69	93.2	65	90.3	96	89.7	59	86.8	80	86.0	369	89.1
Climate change leads to increase in soil fertility** (Ref.87)	68	91.9	58	80.6	96	89.7	59	86.8	78	83.9	359	86.7

Table 4.24. (continued) The distribution of correct answers on effects of climate change according to fourth-year students from different departments (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Statement	Departments											
	Audiology (n=74)		Child Development (n=72)		Nutrition & Dietetics (n=107)		Ergotherapy (n=68)		Speech & Language Development (n=93)		Total (n=414)	
	n	%	N	%	n	%	n	%	n	%	n	%
Decline in plant and animal food production, and, hence, deterioration of food security, may result from climate change* (Ref.87)	63	85.1	60	83.3	94	87.9	53	77.9	78	83.9	348	84.1
Shortage of water that is suitable for domestic use and for irrigation of plants and animals may result from climate change* (Ref.87)	62	83.3	56	77.8	93	86.9	52	76.5	82	88.5	345	83.3
Climate change leads to decrease in incidence of contagious and infectious plant, animal, and human diseases** (Ref.87)	60	81.1	59	81.9	93	86.9	51	75.0	80	86.0	343	82.9
Flooding is not one of the negative impacts of climate change** (Ref.78)	59	79.7	62	86.1	87	81.3	56	82.4	78	83.9	342	82.6
Forest fires are a result of climate change* (Ref.90)	53	71.6	51	70.8	89	83.2	50	73.5	73	78.5	316	76.3

*True statement ** False statement Cronbach α=0.62

When prompted with the statement "*Climate change causes biodiversity loss*.", 95.2% (n=394) of the participants answered correctly. All the participants (n=74) in Audiology department answered this question correctly while the lowest number of correct answers were observed in Child Development department (n=67, 93.1%). 86.7% (n=359) of the participants answered "*Climate change leads to increase in soil fertility?*" correctly. The highest number of correct answers was recorded in Audiology department (n=68, 91.9%) while the lowest number of correct answers was seen in Child Development department (n=58, 80.6%). "*Rise in water level in seas is not a result of climate change*" was answered correctly by a total of 89.1% (n=369) of participants, Similarly, the highest percentage of correct answers was in Audiology department (n=69, 93.2%) and the lowest percentage of correct answers was in Speech and Language Development department (n=80, 86.0%). The statement "*Climate change leads to decrease in incidence of contagious and infectious plant, animal and human diseases*" was answered correctly by 82.9% (n=343) of participants. The Nutrition and Dietetics department had the highest percentage of correct answers (n=93, 86.9%), on the other hand Ergotherapy department had the lowest percentage of correct answers (n=51, 75.0%). 84.1% (n=348) of participants were able to answer "*Decline in plant and animal food production, and, hence, deterioration of food security, may result from climate change*" correctly. All the students in Audiology (n=74) and Ergotherapy (n=68) departments answered the statement *"Climate change may cause in an increase in the frequency and intensity of extreme weather conditions such as heat waves, drought, hurricanes, and heavy rains*" correctly. When asked if *"Climate change brings about an increase in temperatures of the Earth*" 93.0% (n=385) answered correctly, the majority of participants Nutrition and Dietetics (n=103, 96.3%) answered this statement correctly, however only 90.3% (n=65) of participants in Child Development answered this correctly. 83.3% (n=345) of the total participants gave a correct answer to "*Shortage of water that is suitable for domestic use and for irrigation of plants and animals may result from climate change*" with Speech and Language Development having the highest percentage of correct answers (n=82, 88.5%) and Ergotherapy having the lowest percentage of correct answers (n=52, 76.5%). The results show that the statement "*Flooding is not one of the negative impacts of climate change*" was answered correctly by 82.6% (n=342) of the

participants. The department with the highest percentage of correct answers for this statement Child Development department (n=62, 86.1%) while Audiology had the lowest percentage of correct answers (n=5, 79.7%). Lastly, the statement "*Forest fires are a result of climate change*" had the least number of correct answers (n=316, 76.3%) among the effects of climate change questions. Nutrition and Dietetics department (n=89, 83.2%) had the highest percentage of correct answers for this question, meanwhile, Child Development department (n=51, 70.8%) had the lowest percentage of correct answers (Table 4.24)

Table 4.25. Descriptive statistics of effects of climate change knowledge score of fourth-year students according to different departments (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Department	Score				
	Mean	Median	Std. Deviation	Minimum	Maximum
Audiology	8.8	9.0	1.5	5.0	10.0
Child Development	8.5	9.0	1.6	3.0	10.0
Nutrition & Dietetics	8.9	9.0	1.5	0.0	10.0
Ergotherapy	8.5	9.0	1.7	2.0	10.0
Speech & Language Development					
Total	8.7	9.0	1.6	0.0	10.0

According to Table 4.25, the mean correct answers for questions related to the effects of climate change for all participants was 8.7 ±1.6, with scores ranging from a minimum of 0 to a maximum of 10 and a median score of 9.0. The mean effects of climate change score were lowest in Child Development and Ergotherapy departments (8.5) and highest in the Nutrition and Dietetics department (8.9). All the departments had the same median score on effects of climate change knowledge (md=9.0). The minimum effects of climate change knowledge score was in Nutrition and Dietetics department (0.0). (Table 4.25).

4.4.1. Effects of Climate Change Knowledge Scores

According to the Kolmogorov-Smirnov test for the effects of climate change knowledge variable, it was observed that the data significantly deviated from a normal distribution ($p<0.001$) (Table 4.26). Based on this finding, non-parametric tests were conducted to analyze association between effects of climate change knowledge score and independent variables.

Table 4.26. Kolmogorov-Smirnov Test for effects of climate change knowledge scores of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Variable	Statistic	df	Sig
Nature of Climate Change Score	0.788	414	0.000

Kolmogorov-Smirnov Normality Test

4.4.2. Effects of Climate Change Knowledge Scores and Age

A Kruskal-Wallis H test showed that there was no statistically significant difference in effects of climate change knowledge scores between the different age groups; 21 and below (Md=9, n=116), 22 years (Md=9, n=173) and 23 and above (Md=9, n=125) ($\chi2(2) =0.592$, $p=0.744$) (Table 4.27).

Table 4.27. The distribution of effects of climate change knowledge scores according to age of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Age Group								
21 and below		22 years		23 and above		Kruskal Wallis Test		
n	Md	n	Md	n	Md	Statistic	df	p-value
116	9	173	9	125	9	0.592	2	0.744

Kruskal Wallis Test Md: Median

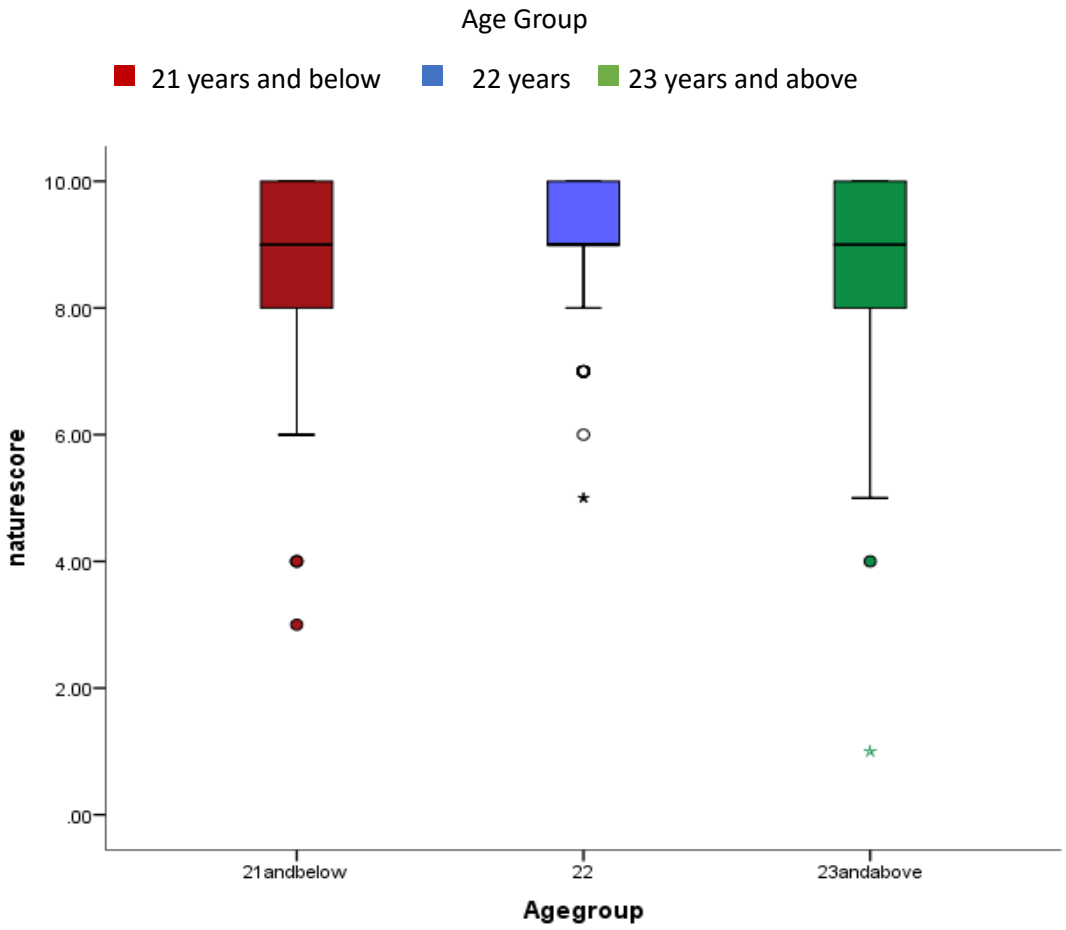

Figure 4.7. Effects of climate change knowledge scores and age groups of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.4.3. Effects of Climate Change Score and Gender

Mann-Whitney U test showed that there was no statistically significant difference in effects of climate change knowledge scores between females (Md=9, n=378), and males (Md=9, n=36) (U=7865.000, z=-0.173 p=0.863) (Table 4.28).

Table 4.28. The distribution of effects of climate change knowledge scores according to gender of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Gender						
Female		Male		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
378	9	36	9	7865.000	-0.173	0.863

Mann-Whitney U Test Md: Median

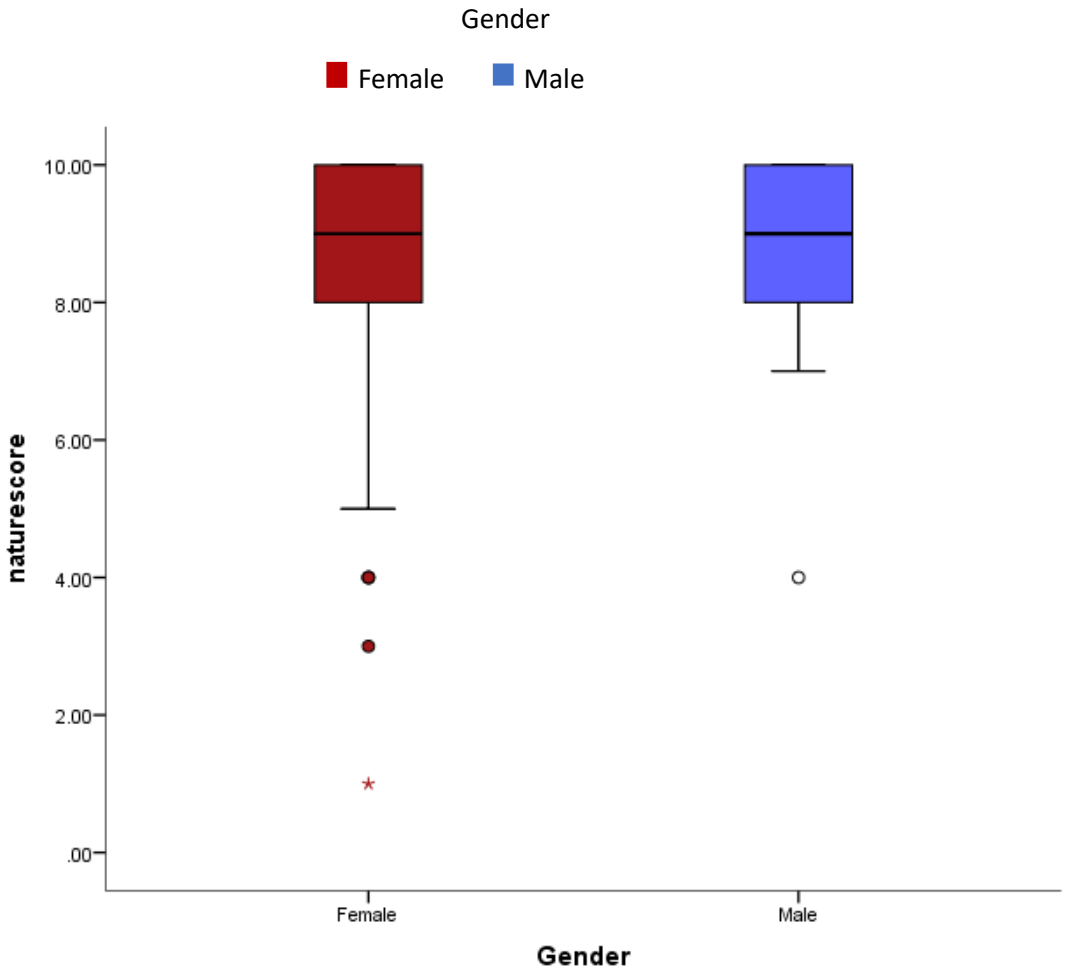

Figure 4.8. Effects of climate change knowledge scores and gender of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.4.4. Effects of Climate Change Knowledge Score and Marital Status

According to the Mann-Whitney U test, there was no statistically significant difference in effects of climate change knowledge scores between married (Md=8, n=40), and single students (Md=9, n=374) (U=7377.000, z=-0.150 *p*= 0.881) (Table 4.29).

Table 4.29. The distribution of effects of climate change knowledge scores according to marital status of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Marital Status						
Single		Married		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
374	9	40	8	7377.000	-0.150	0.881

Mann-Whitney U Test Md: Median

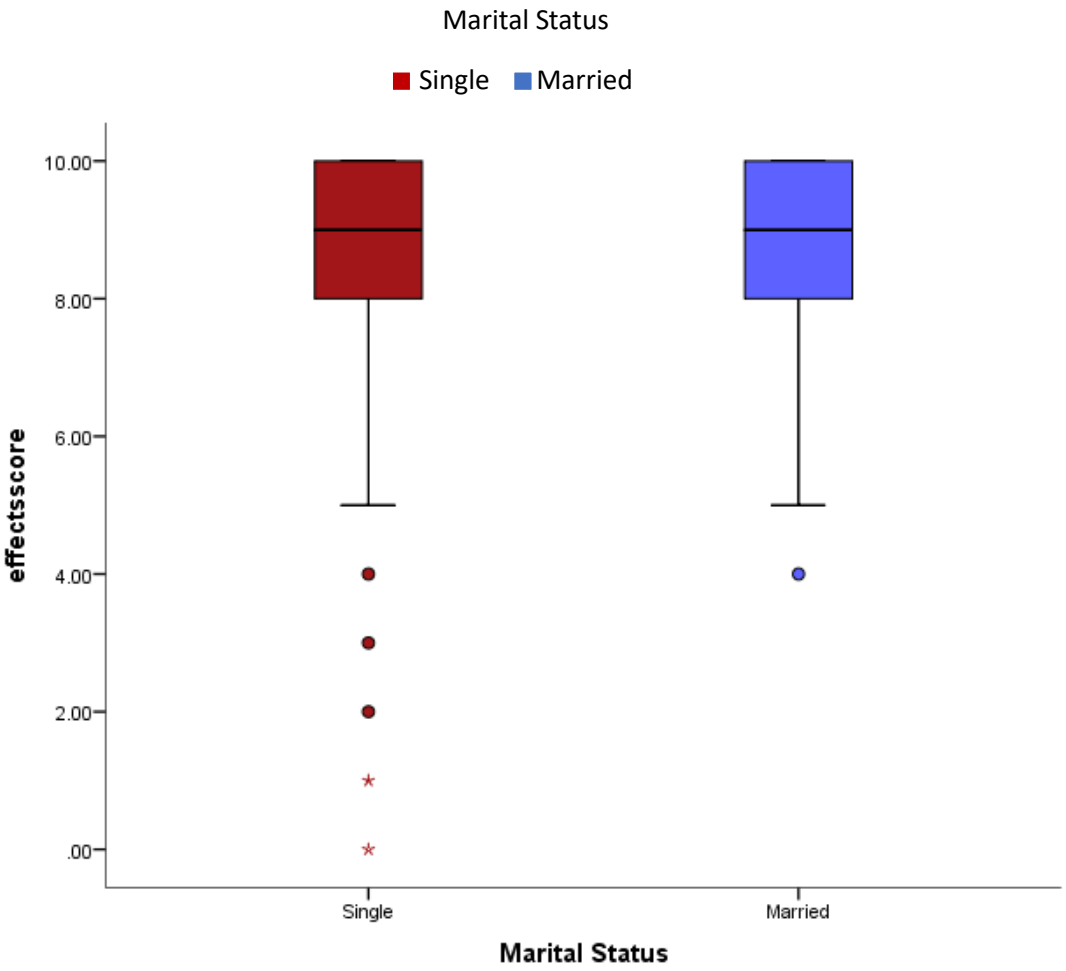

Figure 4.9. Effects of climate change knowledge scores and marital status of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.4.5. Effects of Climate Change Knowledge Score and Department

A Kruskal-Wallis H test was conducted to assess the relationship between effects of climate change knowledge scores and department. The results showed that

there was no statistically significant difference in the effects of climate change knowledge scores between the different departments of study: Audiology department (Md=9, n=74), Child Development department (Md=9, n=72), Nutrition and Dietetics department (Md=10, n=107), Ergotherapy department (Md=9, n=68) and Speech and Language Development department (Md=9, n=93) ($\chi^2(4)=6.227$, $p=0.183$) (Table 4.30).

Table 4.30. The distribution of effects of climate change knowledge scores according to departments of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Department												
Audiology		Child Development		Nutrition & Dietetics		Ergotherapy		Speech & Language Development		Kruskal Wallis		
n	Md	n	Md	n	Md	n	Md	n	Md	Statistic	df	p-value
74	9	72	9	107	10	68	9	93	9	6.227	4	0.183

Kruskal Wallis Test Md: Median

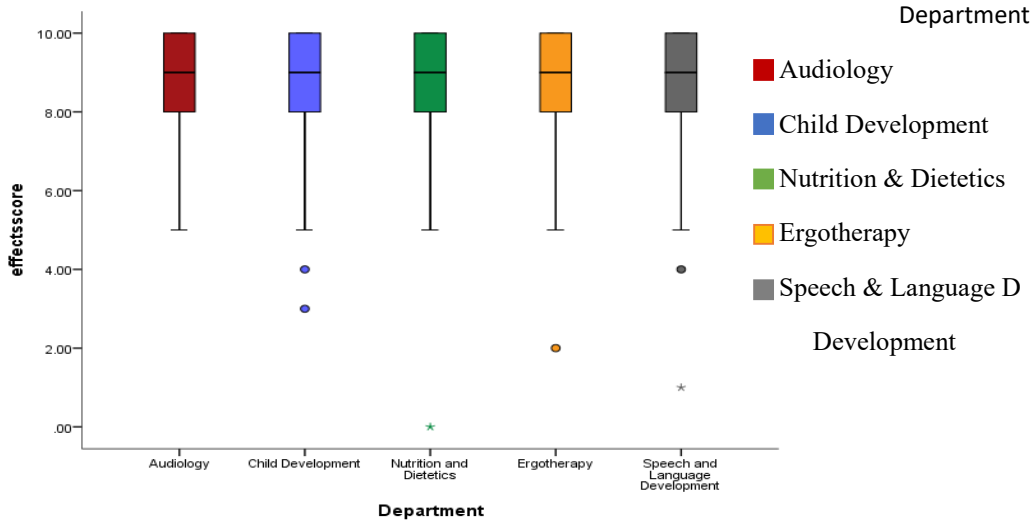

Figure 4.10. Effects of climate change knowledge scores and departments of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.4.6. Effects of Climate Change Knowledge Scores and Region of Origin

The results of the Kruskal-Wallis H test showed that there was no statistically significant difference in effects of climate change knowledge scores between the different regions; Central Anatolia (Md=9, n=149), Black Sea (Md=10, n=65), Eastern Anatolia (Md=9, n=25), Marmara (Md=10, n=54), Mediterranean (Md=9, n=50), Southern Anatolia (Md=9, n=51), Aegean (Md=9, n=17), Foreigner (Md=8, n=3) ($\chi^2(7)=6.246$, $p=0.511$) (Table 4.31).

Table 4.31. The distribution of effects of climate change knowledge scores according to region of origin of the fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Region	Mean Rank	Median	Statistic	df	p
Central Anatolia	210.84	9			
Black Sea	227.58	10			
Eastern Anatolia	199.40	9			
Marmara	202.01	10			
Mediterranean	212.32	9			
Southern Anatolia	194.16	9			
Aegean	174.94	9			
Foreigner	120.67	8			
			6.246	7	0.511

Kruskal Wallis Test

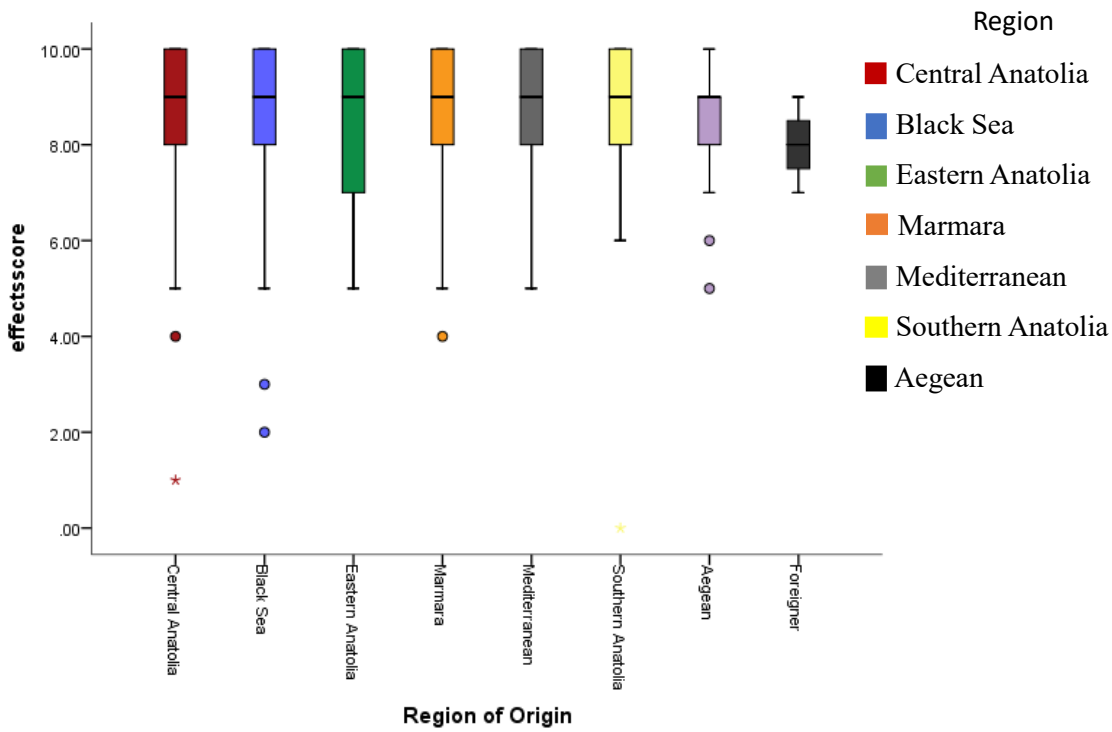

Figure 4.11. Effects of climate change knowledge scores and region of origin of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.4.7. Effects of Climate Change Knowledge Score and Receiving Climate Change Training/Education

A Mann-Whitney U test showed that there was no statistically significant difference in effects of climate change knowledge scores between students who had received climate change training/education (Md=10, n=11) and those who had not received any climate change training/education (Md=9, n=403) (U = 2948.000 z= 1.956 p = 0.050) (Table 4.32).

Table 4.32. The distribution of effects of climate change knowledge scores according to training/education of fourth-year students on health impacts of climate change (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Training/education on health impacts of climate change						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
11	10	403	9	2948.000	1.956	0.050

Mann-Whitney U Test Md: Median

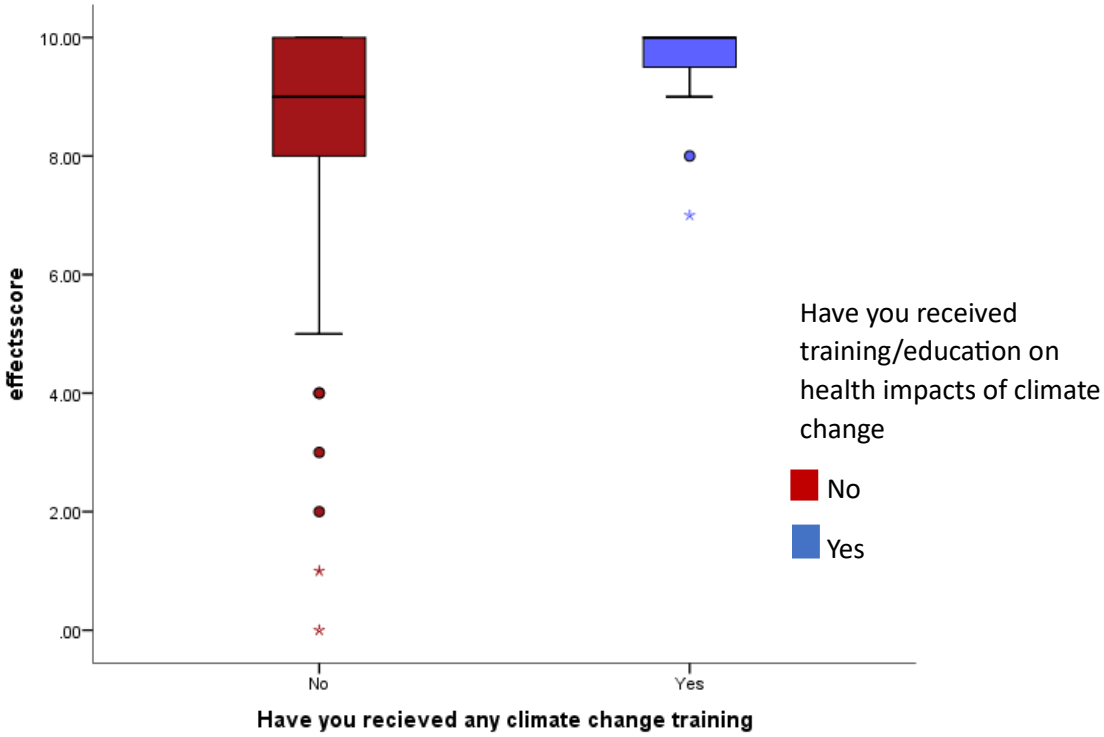

Figure 4.12. Effects of climate change knowledge scores and climate change training/education of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.4.8. Nature and Causes of Climate Change Knowledge Scores and Sources of Climate Change İnformation

Effects of climate change knowledge score and social media

A Mann-Whitney U test showed that there was no statistically significant difference in effects of climate change knowledge scores between students using social media as a source of information about the health impacts of climate change (Md=9, n=352) and those who do not use social media as a source of information about health impacts of climate change (Md=9, n=62) (U=11838.000, z=1.116 *p*=0.264) (Table 4.33).

Table 4.33. The distribution of effects of climate change knowledge scores according to usage of social media by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Social media						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
352	9	62	9	11838.000	1.116	0.264

Mann-Whitney U Test Md: Median

Effects of climate change knowledge score and school/college/university (curriculum)

A Mann-Whitney U test showed that there was a statistically significant difference in effects of climate change knowledge scores between students using school/college/university (curriculum) as a source of information about the health impacts of climate change (Md= 10, n=88) and those who do not use school/college/university (curriculum) as a source of information about health impacts of climate change (Md=9, n=326) (U=12050.000, z=-2.411, p=0.016.) (Table 4.34).

Table 4.34. The distribution of effects of climate change knowledge scores according to usage of school/college/university (curriculum) by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

School/University/College (curriculum)						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
88	10	326	9	12050.000	-2.411	0.016

Mann-Whitney U Test Md: Median

Effects of climate change knowledge score and government notifications

The results of the Mann-Whitney U test showed that there was no statistically significant difference in effects of climate change knowledge scores between students using government notifications as a source of information about the health impacts of climate change (Md=9, n=43) and those who do not use government notifications as a source of information about health impacts of climate change (Md=9, n= 371) (U=7164.500, p=0.252, z=-1.144.) (Table 4.35).

Table 4.35. The distribution of effects of climate change knowledge scores according to usage of government notifications by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Government notifications						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
43	9	371	9	7164.500	-1.144	0.252

Mann-Whitney U Test Md: Median

Effects of climate change knowledge score and seminars, workshops, and conferences

A Mann-Whitney U test showed that there was a statistically significant difference in effects of climate change knowledge scores between students using seminars, workshops and conferences as a source of information about the health impacts of climate change (Md= 10, N=46) and those who do not use seminars, workshops and conferences as a source of information about health impacts of climate change (Md=9, N=368) (U=6279.500, p=0.003, z=-2.989.) (Table 4.36).

Table 4.36. The distribution of effects of climate change knowledge scores according to usage of seminars, workshops and conferences by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Seminars, workshops and conferences						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
46	10	368	9	6279.500	-2.989	0.003

Mann-Whitney U Test Md: Median

Effects of climate change score and national or international media (electronic print)

A Mann-Whitney U test showed that there was no statistically significant difference in effects of climate change knowledge scores between students using government notifications as a source of information about the health impacts of climate change (Md=9, n=114) and those who do not use government notifications as a source

of information about health impacts of climate change (Md=9, n=300) (U=16480.500, p=0.551, z= -0.596) (Table 4.37).

Table 4.37. The distribution of effects of climate change scores according to usage of national or international media (electronic and print) by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

National or international media (electronic and print)						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
114	9	300	9	16480.500	-0.596	0.551

Mann-Whitney U Test Md: Median

Effects of climate change knowledge score and international organizations working for climate change

The Mann-Whitney U test showed that there was no statistically significant difference in effects of climate change knowledge scores between students using international organizations working with climate change as a source of information about the health impacts of climate change (Md=9, n=60) and those who do not use international organizations working with climate change as a source of information about health impacts of climate change (Md=9, n=354) (U=9891.500, p=0.374, z=-0.890.) (Table 4.38).

Table 4.38. The distribution of effects of climate change scores according to usage of international organizations working for climate change by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

International organizations working for climate change						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
60	9	354	9	9891.500	-0.890	0.374

Mann-Whitney U Test Md: Median

Effects of climate change knowledge score and research articles

A Mann-Whitney U test showed that there was no statistically significant difference in the effects of climate change knowledge scores between students using research articles as a source of information about the health impacts of climate change (Md=9, n=49) and those who do not use research articles related to climate change (Md=9, n=365) (U=8510.000, p=0.565, z=-0.576.) (Table 4.39).

Table 4.39. The distribution of effects of climate change knowledge scores according to usage of research articles by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Research articles						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
49	9	365	9	8510.000	-0.576	0.565

Mann-Whitney U Test Md: Median

Effects of climate change knowledge score and other sources

A Mann-Whitney U test showed that there was no statistically significant difference in effects of climate change knowledge scores between students using other sources of information regarding the health impacts of climate change (Md= 9, n=9) and those who do not use other sources of information regarding health impacts of climate change (Md=9, n=405) (U= 2241.500, z=1.235, p=0.217.) (Table 4.40).

Table 4.40. The distribution of effects of climate change knowledge scores according to usage of other sources of information by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Other sources of information						
Yes		No		Mann-Whitney U Test		
N	Md	N	Md	Statistic	Z	p-value
9	9	405	9	2241.500	1.235	0.217

Mann-Whitney U Test Md: Median

4.5. Results Related to Impacts of Climate Change on Health Knowledge

Table 4.41. The distribution of correct answers on health effects of climate change according to fourth-year students from different departments (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Statement	Departments										Total (n=414)	
	Audiology (n=74)		Child Development (n=72)		Nutrition & Dietetics (n=107)		Ergotherapy (n=68)		Speech & Language Development (n=93)			
	n	%	n	%	n	%	n	%	n	%	n	%
Climate change causes injuries due to severe storms, floods, droughts, fires* (Ref.99)	65	87.8	69	95.8	103	96.3	65	95.6	86	92.5	388	93.7
Infectious diseases can decrease due to climate change**	63	85.1	65	90.3	96	89.7	57	83.8	83	89.2	364	87.9
Heat-related effects (heat stroke, heat rush, dehydration) are not a result of climate change** (Ref.89)	72	97.3	56	77.8	90	84.1	58	85.3	84	90.3	360	87.0
Climate change causes malnutrition as a result of food insecurity* (Ref.89)	66	89.2	65	90.3	95	88.8	53	77.9	76	81.7	355	85.7
Climate change does not increase food and waterborne diseases such as diarrhea** (Ref.89)	61	82.4	60	83.3	97	90.7	55	80.9	82	88.2	355	85.7

Table 4.41. (continued) The distribution of correct answers on health effects of climate change according to fourth-year students from different departments (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Statement	Departments										Total (n=414)	
	Audiology (n=74)		Child Development (n=72)		Nutrition & Dietetics (n=107)		Ergotherapy (n=68)		Speech & Language Development (n=93)			
	n	%	n	%	n	%	n	%	n	%	n	%
Mental health issues (depression, anxiety, stress) can be an effect of climate change* (Ref.99)	54	73.0	60	83.3	93	86.9	66	97.1	79	84.9	352	85.0
Air pollution-related respiratory illness (asthma, allergies) (decrease due to climate change** (Ref.99)	65	87.8	51	70.8	87	81.3	54	79.4	73	78.5	330	79.7
Vector-borne illnesses (West Nile virus, Dengue, Tick Borne Encephalitis, Lyme disease, Malaria) decrease due to climate change** (Ref.99)	50	67.6	57	79.2	82	76.6	43	63.2	72	77.4	304	73.4
Increased allergic reactions due to exposure to plants or mold are a result of climate change* (Ref.89)	47	63.5	46	63.9	76	71.0	50	73.5	65	69.9	284	68.6
Climate change increases the risk of cardiovascular disease related mortality*	47	63.5	43	59.7	64	59.8	50	73.5	57	61.3	261	63.0

*True statement **False statement Cronbach α=0.71

The results from Table 4.41. show that 93.7% (n=388) of the participants answered the statement "*Climate change causes injuries due to severe storms, floods, droughts, fires*" correctly. Nutrition and Dietetics had the highest percentage of correct answers (n=103, 96.3%), while Audiology had the lowest percentage of correct answers (n=65, 87.8%). In response to the statement "*Air pollution related respiratory illness (asthma, allergies) decrease due to climate change*" surprisingly only 79.7% (n=330) of the participants answered correctly. The highest percentage of correct answers for this question was in Audiology department (n=65, 87.8%) and the lowest percentage of correct answers was in Child Development department (n=51, 70.8%). The statement "*Heat related effects (heat stroke, heat rush, dehydration) are not a result of climate change*" was answered correctly by 87.0% (n=360) of the participants. Similarly, Audiology department had the highest percentage of correct answers (n=72, 97.3%), while Child Development department had the lowest percentage of correct answers (n=56, 77.8%). 85.0% (n=352) of participants in this study answered "*Mental health issues (depression, anxiety, stress) can be an effect of climate change*" correctly. Ergotherapy had the highest percentage of correct answers (97.1% n=66) and Audiology had the lowest percentage of correct answers for this statement (73.0% n=54).

The statement "*Vector-borne illnesses (West Nile Virus, Dengue, Tick Borne Encephalitis, Lyme Disease, Malaria) decrease due to climate change*" was answered correctly by 73.4% (n=304) of the participants, Child Development had the highest percentage of correct answers (79.2%, n=57) while Ergotherapy had the lowest had the lowest percentage of correct answers for this statement (63.2%, n=43). When asked if "*Increased allergic reactions due to exposure to plants or mold are a result of climate change*?", 68.6% (n=284) of the total participants answered correctly, Ergotherapy department had the highest percentage of correct answers (n=50, 73.5%), while Audiology department had the lowest percentage of correct answers (n=47, 63.5%). In response to statement "*Climate change does not increase food and waterborne diseases such as diarrhea*", 85.7% (n=355) of the participants gave a correct answer. The highest percentage of correct answers was in Nutrition and Dietetics department (n=97, 90.7%), however Ergotherapy department (n=55, 80.9%) had the lowest percentage of correct answers for this statement.

For the statement "*Climate change increases the risk of cardiovascular disease-related mortality*", only 63.0% (n=261) of the participants were able to answer correctly. A total of 85.7% (n=355) of the participants gave a correct answer to *"Climate change causes malnutrition as a result of food insecurity*". Child Development department (n=65, 90.3%) showed the highest percentage of correct answers, while Ergotherapy department (n=53, 77.9%) showed the least percentage of correct answers to this statement. Finally, the statement "*Infectious diseases can decrease due to climate change*" was answered correctly by 87.9% (n=364) of the participants, with 90.3% (n=65) of participants from Child Development department answering the statement correctly, while only 83.8% (n=57) of Ergotherapy participants answered the statement correctly (Table 4.41).

Table 4.42. Descriptive statistics of health impacts of climate change knowledge score of fourth-year students according to different departments (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Department	Score				
	Mean	Median	Std. Deviation	Minimum	Maximum
Audiology	8.0	8.0	2.0	4.0	10.0
Child Development	8.0	8.0	2.0	2.0	10.0
Nutrition & Dietetics	8.3	9.0	2.1	1.0	10.0
Ergotherapy	8.1	9.0	2.1	2.0	10.0
Speech & Language Development	8.1	8.0	1.9	0.0	10.0
Total	8.1	9.0	2.0	0.0	10.0

According to (table 4.42) the mean score of health impacts of climate change for all departments was 8.1 ±2.0 with scores ranging from 0-10 and a median score of 9. The mean health impacts of climate change score was lowest in Audiology and Child Development department (8.0) and highest in the Nutrition and Dietetics department (8.3). The highest median score on health impacts of climate change was in Nutrition and Dietetics department (9.0) and Ergotherapy (9.0) while all the remaining departments had the same median knowledge scores (8.0). The minimum

health impacts of climate change knowledge score was in Speech and Language Development department (0.0). (Table 4.42).

4.5.1. Impacts of Climate Change on Human Health Knowledge Scores

According to the Kolmogorov-Smirnov test for the impacts of climate change on health variable, it was observed that the data significantly deviated from a normal distribution ($p<0.001$) (Table 4.43). Based on this finding, non-parametric tests were conducted to analyze the association between the impacts of climate change on health knowledge score and independent variables.

Table 4.43. Kolmogorov-Smirnov Test for impacts of climate change on health score of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Variable	Statistic	df	Sig
Nature of Climate Change Score	0.186	414	0.000

Kolmogorov-Smirnov Normality Test

4.5.2. Impacts of Climate Change on Human Health Knowledge Scores and Age

A Kruskal-Wallis H test showed that there was no statistically significant difference in impacts of climate change on human health knowledge scores between the different age groups; 21 and below (Md=9, n=116), 22 years (Md=9, n=173) and 23 and above (Md=8, n=125) ($\chi^2(2) = 2.401$, $p=0.301$) (Table 4.44).

Table 4.44. The distribution of impacts of climate change on health knowledge scores according to age of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Age Group								
21 and below		22 years		23 and above		Kruskal Wallis Test		
n	Md	n	Md	n	Md	Statistic	df	p-value
116	9	173	9	125	8	2.401	2	0.301

Kruskal Wallis Test Md: Median

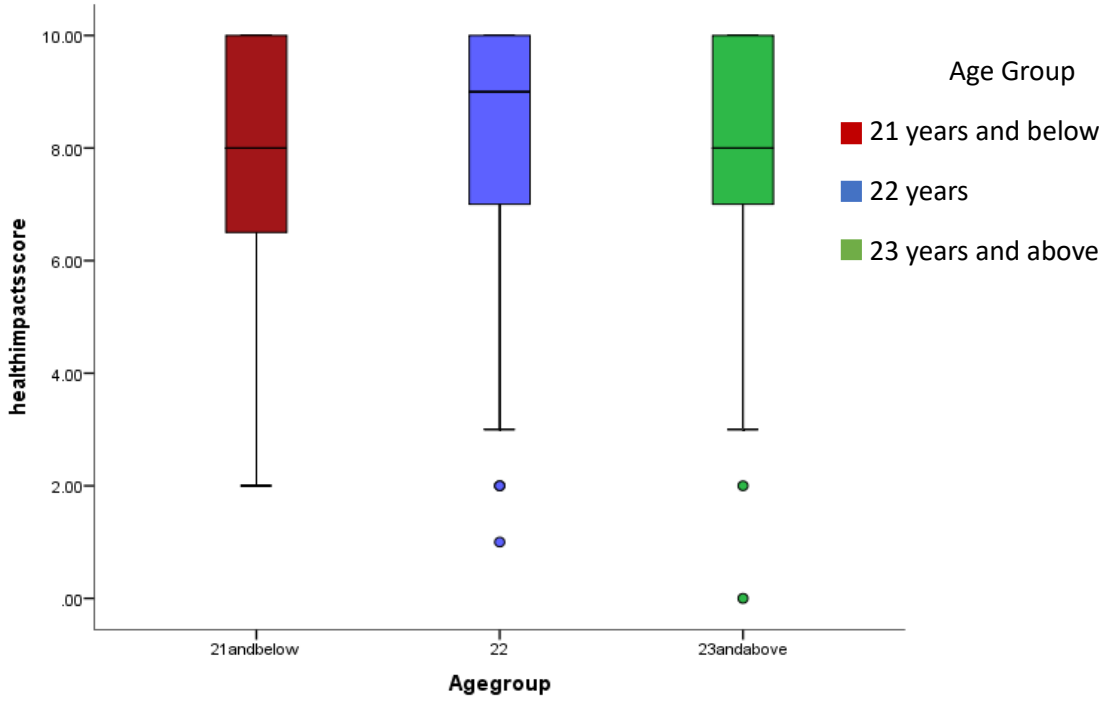

Figure 4.13. Impacts of climate change on health knowledge scores and age of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023

4.5.3. Impacts of Climate Change on Human Health Scores and Gender

A Mann-Whitney U test showed that there was no statistically significant difference in impacts of climate change on health knowledge scores between the different genders; females (Md=9, n=378), and males (Md=8.5, n=36) (U=6808.000, z=-0.246 *p* =0.806) (Table 4.45). Therefore, no difference between the health impacts of climate change scores of men and women can be determined with these data.

Table 4.45. The distribution of impacts of climate change on health knowledge scores according to gender of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Gender						
Female		Male		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
378	9	36	8.5	6808.000	-0.246	0.806

Mann-Whitney U Test Md: Median

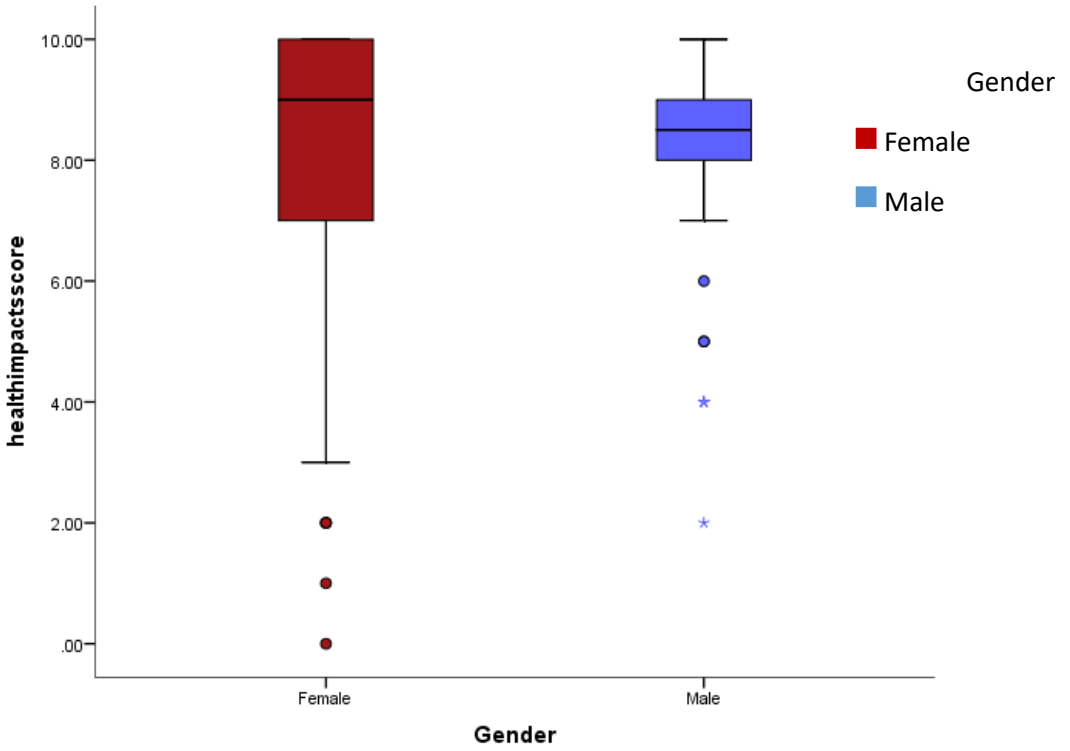

Figure 4.14. Impacts of climate change on health scores and gender of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.5.4. Impacts of Climate Change on Human Health Scores and Marital Status

Results of the Mann-Whitney U test showed that there was no statistically significant difference in impacts of climate change on human health knowledge scores between married (Md=8, n=40) and single students (Md=9, n=374) (U=6821.500, z=-0.939 *p*=0.348) (Table 4.44).

Table 4.46. The distribution of impacts of climate change on health knowledge scores according to marital status of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Marital Status						
Single		Married		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
374	9	40	8	6821.500	-0.939	0.348

Mann-Whitney U Test Md: Median

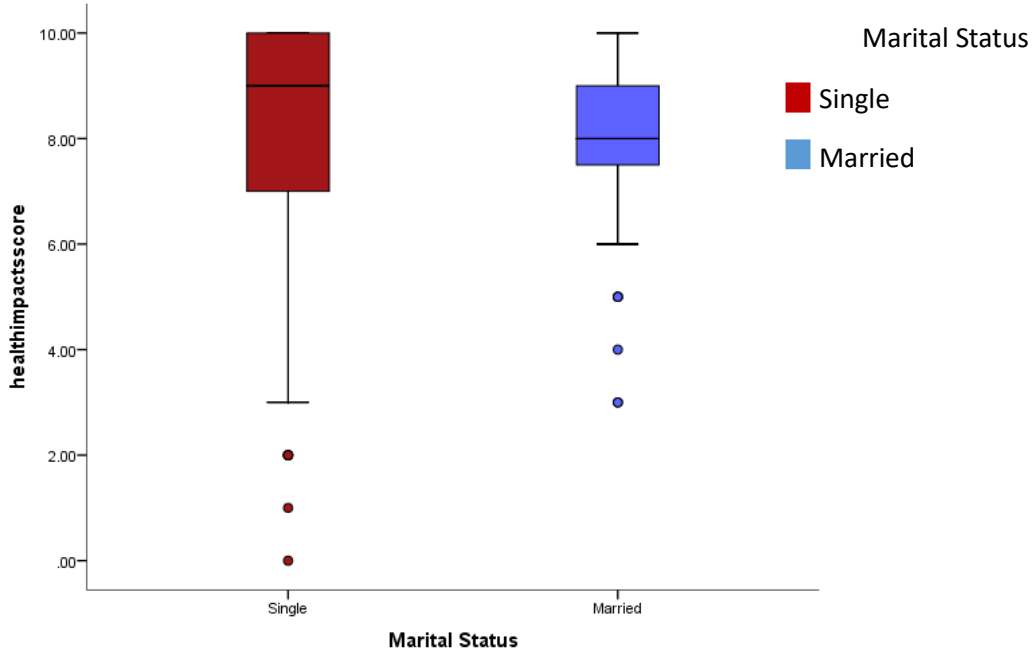

Figure 4.15. Impacts of climate change on health knowledge scores and marital status of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.5.5. Impacts of Climate Change on Human Health Knowledge Scores and Department

A Kruskal-Wallis H test showed that there was no statistically significant difference in impacts of climate change on health knowledge scores between the different departments of study: Audiology department (Md=9, n=74), Child Development department (Md=9, n=72), Nutrition and Dietetics department (Md=9, n=107), Ergotherapy department (Md=9, n=68) and Speech and Language Development department (Md=8, n=93) ($\chi^2(4)=2.521$, $p=0.641$) (Table 4.47).

Table 4.47. The distribution of impacts of climate change on health knowledge scores according to departments of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Department												
Audiology		Child Development		Nutrition & Dietetics		Ergotherapy		Speech & Language Development		Kruskal Wallis		
n	Md	n	Md	n	Md	n	Md	n	Md	Statistic	df	p-value
74	9	72	9	107	9	68	9	93	8	2.521	4	0.641

Kruskal Wallis Test Md: Median

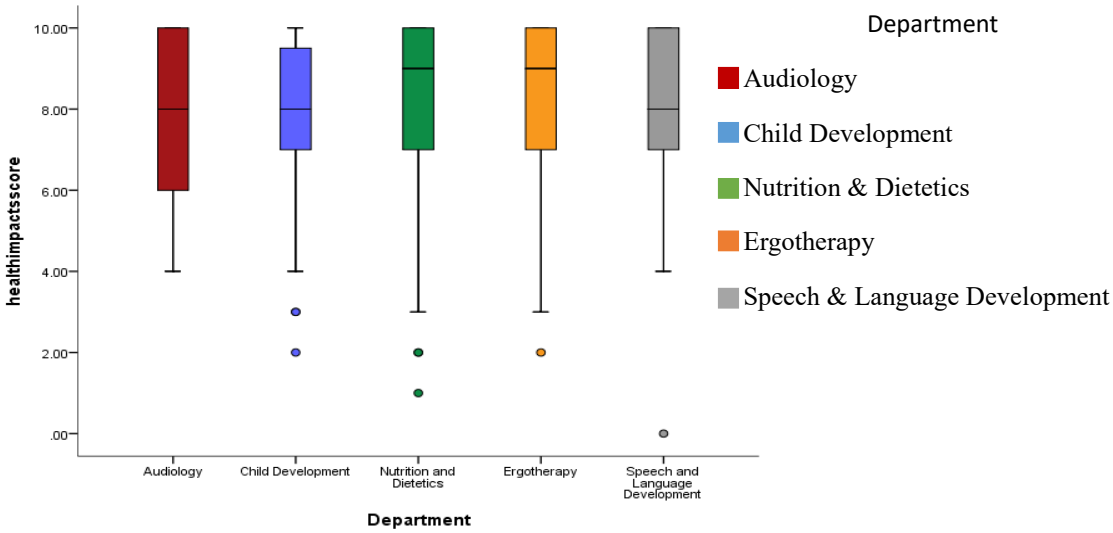

Figure 4.16. Impacts of climate change on health knowledge scores and departments of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.5.6. Impacts of Climate Change on Human Health Scores and Region of Origin

The Kruskal-Wallis H test showed that there was no statistically significant difference in impacts of climate change on health knowledge scores between the different regions of origin of fourth-year students: Central Anatolia (Md=9, n=149), Black Sea (Md=9, n=65), Eastern Anatolia (Md=9, n=25), Marmara (Md=8, n=54), Mediterranean (Md=9, n=50), Southern Anatolia (Md=9, n=51), Aegean (Md=7, n=17), Foreigner (Md=7, n=3) ($\chi^2(7)=10.033$, $p=0.187$) (Table 4.48).

Table 4.48. The distribution of impacts of climate change on health knowledge scores according to region of origin fourth-year student (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

	Mean Rank	Median	Statistic	df	p
Central Anatolia	216.69	9			
Black Sea	218.25	9			
Eastern Anatolia	222.20	9			
Marmara	189.72	8			
Mediterranean	203.74	9			
Southern Anatolia	208.58	9			
Aegean	145.35	7			
Foreigner	111.83	7			
			10.033	7	0.187

Kruskal Wallis

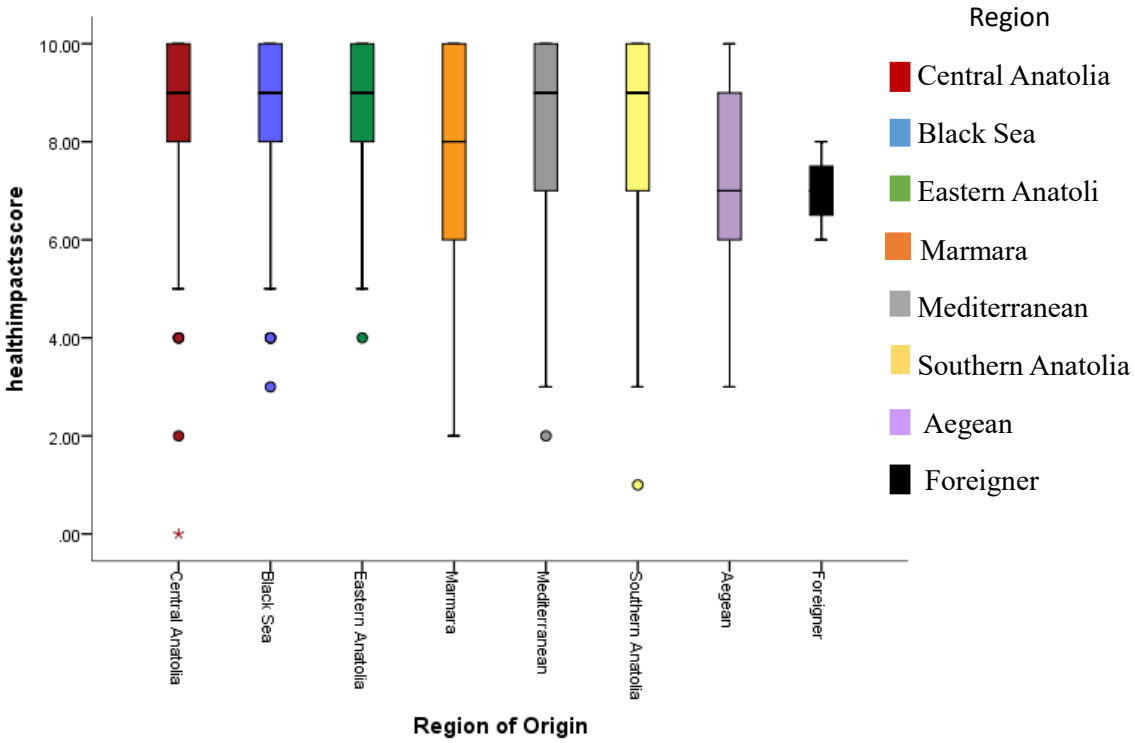

Figure 4.17. Impacts of climate change on health knowledge scores and region of origin of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.5.7. Impacts of Climate Change on Human Health Knowledge Scores and Receiving Climate Change Training

A Mann-Whitney U test showed that there was a statistically significant difference in impacts of climate change on health knowledge scores between students who had received climate change training/education (Md=10, n=11) and those who had not received any climate change training/education (Md=9, n=403) (U=3091.000, z=2.291 *p*=0.022) (Table 4.49).

Table 4.49. The distribution of impacts of climate change on health knowledge scores according to training/education of fourth-year students on health impacts of climate change (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Training/education on health impacts of climate change						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
11	10	403	9	3091.000	2.291	0.022

Mann-Whitney U Test Md: Median

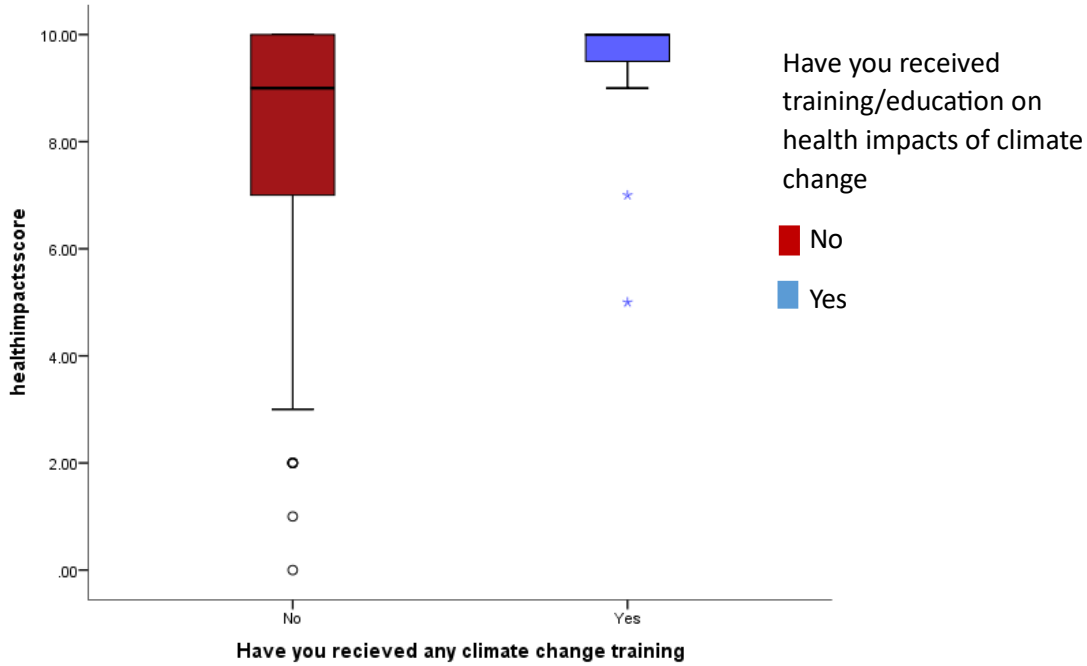

Figure 4.18. Impacts of climate change on health knowledge scores and climate change training/education of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

4.5.8. Nature and Causes of Climate Change Knowledge Scores and Sources of Climate Change İnformation

Impacts of climate change on human health knowledge scores and social media

A Mann-Whitney U test showed that there was no statistically significant difference in impacts of climate change on health knowledge scores between students using social media as a source of information about the health impacts of climate change (Md=9, n=352) and those who do not use social media as a source of information about health impacts of climate change (Md=9, n=62) (U=11196.000, z=0.335 p = 0.737) (Table 4.50).

Table 4.50. The distribution of impacts of climate change on health knowledge scores according to usage of social media by the fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Social media						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
352	9	62	9	11196.000	0.335	0.737

Mann-Whitney U Test Md: Median

Impacts of climate change on human health knowledge scores and school/college/university (curriculum)

According to the Mann-Whitney U test, there was a statistically significant difference in impacts of climate change on health knowledge scores between students using school/college/university (curriculum) as a source of information about the health impacts of climate change (Md=9, n=88) and those who do not use school/college/university (curriculum) as a source of information about health impacts of climate change (Md=8, n=326) (U=11173.500, z=-3.266, p=0.001.) (Table 4.51).

Table 4.51. The distribution of impacts of climate change on health knowledge scores according to usage of school/university/college (curriculum) by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

School/University/College (curriculum)						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
88	9	326	8	11173.500	-3.266	0.001

Mann-Whitney U Test Md: Median

Impacts of climate change on human health knowledge scores and government notification

A Mann-Whitney U test showed that there was a statistically significant difference in impacts of climate change on health knowledge scores between students using government notifications as a source of information about the health impacts of climate change (Md=9, n=43) and those who do not use government notifications as a source of information about health impacts of climate change (Md=8, n=371) **(**U=6536.000, p=0.047, z=-1.990) (Table 4.52).

Table 4.52. The distribution of impacts of climate change on health knowledge scores according to usage of government notifications by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Government notifications						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
43	9	371	8	6536.000	-1.990	0.047

Mann-Whitney U Test Md: Median

Impacts of climate change on human health knowledge scores and seminars, workshops and conferences

According to the Mann-Whitney U test, there was a statistically significant difference in impacts of climate change on health knowledge scores between students using seminars, workshops and conferences as a source of information about the health impacts of climate change (Md=9, n=46) and those who do not use seminars,

workshops and conferences as a source of information about health impacts of climate change (Md=8, n=368) (U=6678.500, p=0.017, z=-2.394) (Table 4.53)**.**

Table 4.53. The distribution of impacts of climate change on health knowledge scores according to usage of seminars, workshops and conferences by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Seminars, workshops and conferences						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
46	9	368	8	6678.500	-2.394	0.017

Mann-Whitney U Test Md: Median

Impacts of climate change on human health knowledge scores and national and international media

Results from the Mann-Whitney U test showed that there was no statistically significant difference in impacts of climate change on health knowledge scores between students using government notifications as a source of information about the health impacts of climate change (Md=8.5, n=114) and those who do not use government notifications as a source of information about health impacts of climate change (Md=9, n=300) (U=17348.000, p=0.815, z= 0.234) (Table 4.54).

Table 4.54. The distribution of impacts of climate change on health knowledge scores according to usage of national or international media (electronic and print) by fourth-year students as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

National or international media (electronic and print)						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
114	8.5	300	9	17348.000	0.234	0.815

Mann-Whitney U Test Md: Median

Impacts of climate change on human health knowledge scores and international organizations working with climate change

A Mann-Whitney U test showed that there was no statistically significant difference in impacts of climate change on health knowledge scores between students

using international organizations working with climate change on health as a source of information about the health impacts of climate change (Md=8.5, n=60) and those who do not use international organizations working with climate change as a source of information about health impacts of climate change (Md=9, n=354) (U=10539.000, p=0.923, z=-0.097) (Table 4.55).

Table 4.55. The distribution impacts of climate change on health knowledge scores according to usage of international organizations working for climate change as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

International organizations working for climate change						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
60	8.5	354	9	10539.000	-0.097	0.923

Mann-Whitney U Test Md: Median

Impacts of climate change on human health knowledge scores and research articles

A Mann-Whitney U test showed that there was no statistically significant difference in impacts of climate change on health knowledge scores between students using research articles related to climate change as a source of information about the health impacts of climate change (Md=8, n=49) and those who do not use research articles related to climate change as a source of information about health impacts of climate change (Md=9, n=365) (U=9793.000, p=0.267, z=1.110) (Table 4.56).

Table 4.56. The distribution of impacts of climate change on health knowledge scores according to usage of research articles as a source of information (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Research articles						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
49	8	365	9	9793.000	1.110	0.267

Mann-Whitney U Test Md: Median

Impacts of climate change on human health knowledge scores and other sources of information

A Mann-Whiney U test showed that there was no statistically significant difference in impacts of climate change on human health knowledge scores between students using other sources of information regarding the health impacts of climate change (Md=8, n=9) and those who do not use other sources of information regarding the health impacts of climate change (Md=9, n=405) (U=2134.500, z=0.902, p=0.367) (Table 4.57).

Table 4.57. The distribution of impacts of climate change on health knowledge scores according to usage of other sources of information by fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Other sources of information						
Yes		No		Mann-Whitney U Test		
n	Md	n	Md	Statistic	Z	p-value
9	8	405	9	2134.500	0.902	0.367

Mann-Whitney U Test Md: Median

Table 4.58. Barriers faced by fourth year students in obtaining information about the impacts of climate change on health according to departments (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Barrier	Department										Total (n=414)	
	Audiology (n=74)		Child Development (n=72)		Nutrition & Dietetics (n=107)		Ergotherapy (n=68)		Speech & Language Development (n=93)			
	n	%	n	%	n	%	n	%	n	%	n	%
Insufficient provision of climate change information/Lack of education	31	41.9	31	43.1	20	18.7	22	32.4	29	31.2	133	32.1
Information pollution	23	31.1	11	15.3	30	28.0	18	26.5	14	15.1	96	23.2
Lack of access to climate change information	17	23.0	13	18.1	14	13.1	12	17.6	12	12.9	68	16.4
Lack of awareness	6	8.1	11	15.3	12	11.2	16	23.5	22	23.7	67	16.2
Not taking climate change seriously	11	14.9	5	6.9	18	16.8	5	7.4	22	23.7	61	14.7
Insufficient research available on climate change	12	16.2	9	12.5	8	7.5	9	13.2	10	10.8	48	11.6
Lack of time	1	1.4	7	9.7	11	10.3	-	-	2	2.2	21	5.1
Withholding of true information	2	2.7	5	6.9	6	5.6	1	1.5	3	3.2	17	4.1
Economic crisis	-	-	3	4.2	1	0.9	1	1.5	1	1.1	6	1.4
Language barrier (foreign articles)	-	-	-	-	3	2.8	-	-	-	-	3	0.7

The most frequently mentioned barrier faced in obtaining information about the health impacts of climate change was the insufficient provision of climate change information or education (n=133, 32.1%). Information pollution (n=96, 23.2%) was the second most mentioned barrier followed by lack of access to climate change information (n=68, 16.4%). Lack of awareness about climate change (n=67, 16.2%) was the third most popular barrier to obtaining information about the health impacts of climate change. Participants also mentioned that not taking climate change seriously (n=61, 14.7%) and insufficient research on health impacts of climate change (n=48, 11.6%) as barriers to obtaining information on the health impacts of climate change. Other barriers included lack of time (n=21, 5.1%), withholding of climate change information by the government and relevant authorities (n=17, 4.1%), and the economic crisis (n=6, 1.4%). The least mentioned barrier to

obtaining information on the health impacts of climate change was the language barrier when reading climate change articles in foreign articles n=3, 0.7%) (Table 4.58).

Table 4.59. Distribution of some characteristics among fourth-year students regarding receiving information or education on health impacts of climate change according to departments (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Characteristic	Department										Total (n=414)	
	Audiology (n=74)		Child Development (n=72)		Nutrition & Dietetics (n=107)		Ergotherapy (n=68)		Speech & Language Development (n=93)			
	n	%	n	%	n	%	n	%	n	%	n	%
Faculty is doing enough to inform the students												
Yes	3	4.1	2	2.8	21	19.6	-	-	2	2.2	28	6.8
No	71	95.9	70	97.2	86	80.4	68	100.0	91	97.8	386	93.2
Preferred method of receiving information regarding health impacts of climate change												
Seminars	46	62.2	27	37.5	65	60.7	25	36.8	39	41.9	202	48.8
Small group discussions	29	39.2	19	26.4	11	10.3	16	23.5	24	25.8	99	23.9
Social media	11	14.9	23	31.9	15	14.0	27	39.7	11	11.8	87	21.0
Lectures	14	18.9	11	15.3	28	26.2	9	13.2	14	15.1	76	18.4
Internet	5	6.8	7	9.7	2	1.9	2	2.9	3	3.2	19	4.6
Research articles	2	2.7	3	4.2	3	2.8	3	4.4	2	2.2	13	3.1
News	-	-	1	1.4	-	-	2	2.9	2	2.2	5	1.2
Short videos	-	-	-	-	1	0.9	-	-	3	3.2	4	1.0
TV programmes	1	1.4	-	-	1	0.9	-	-	1	1.1	3	0.7
Zoom meetings	-	-	-	-	1	0.9	-	-	-	-	1	0.2
Magazines	-	-	-	-	-	-	-	-	1	1.1	1	0.2
Books	-	-	-	-	-	-	-	-	1	1.1	1	0.2
Conferences	-	-	-	-	-	-	-	-	1	1.1	1	0.2

Table 4.59. shows that 93.2% (n=386) of the participants felt that their departments were not doing enough to inform students about the health impacts of climate change. Only 6.8% (n=28) of the students stated that their departments were doing enough to inform them about the health impacts of climate change. All the participants in Ergotherapy department stated that their department was not doing enough to inform them about the health impacts of climate change.

The students' most preferred method of receiving information about the health impacts of climate change was seminars (n=202, 48.8%), followed by small group discussion (n=99, 23.9%). Social media was mentioned by 21.0% (n=87), while 18.4% (n=76) of the participants preferred lectures as a source of information. The other preferred sources of information were internet (n=19, 4.6%) and research articles (n=13, 3.1%). The least mentioned preferred sources of information about the health impacts of climate change were zoom meetings (n=1, 0.2%), magazines (n=1, 0.2%), books (n=1, 0.2%) and conferences (n=1, 0.2%) (Table 4.59).

In Audiology department, seminars (n=46, 62.2%) were the most preferred source of information about the health impacts of climate change followed by small group discussions (n=29, 39.2%). None of the participants in Audiology department preferred to use zoom meetings, short videos, magazines, news, books and conferences as a source of information. Similarly, the most preferred source of information about health impacts of climate change in Child Development department was seminars (n=27, 37.5%), however social media (n=23, 31.9%) was the second most preferred source of information in Child Development department and none of the participants mentioned TV programmes, magazines, zoom meetings, short videos, books and conferences as preferred sources of information. In Nutrition and Dietetics, 60.7% (n=65) of the participants preferred seminar as a source of information followed by lectures (n=28, 26.2%). Furthermore, none of the participants in this department mentioned magazines, news, books and conferences as a preferred source of information (Table 4.59).

According to Table 4.59, in contrast to all the other departments, participants in Ergotherapy department preferred social media as a source of information about the health impacts of climate change. Seminars (36.8%) were the second most preferred source of information. None of the participants from this department preferred to use TV programmes, Zoom meetings, short videos, Magazines, Books, and conferences as a source of information. Participants in Speech and Language department preferred Seminars (41.9%) followed by Small Group Discussions (25,8%) as a source of information about the health impacts of climate change. TV programmes were the only source of information not mentioned by participants in this department.

Table 4.59. (continued). Distribution of some characteristics among fourth-year students regarding receiving information or education on health impacts of climate change according to departments (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Characteristic	Department											
	Audiology (n=74)		Child Development (n=72)		Nutrition & Dietetics (n=107)		Ergotherapy (n=68)		Speech & Language Development (n=93)		Total (n=414)	
	n	%	n	%	n	%	n	%	n	%	n	%
Interest in receiving education/training on health impacts of climate change												
Yes	51	68.9	50	69.4	92	86.0	46	67.6	67	72.0	306	73.9
No	23	31.1	22	30.6	15	14.0	22	32.4	26	28.0	108	26.1

Table 4.59 reveals that 73.9% of the participants were interested in receiving education or training on the health impacts of climate change while the remaining 26.1% were not interested in receiving training or education on the health impacts of climate change. In Audiology department 68.9% (n=51) showed interest in receiving education or training while 31.1% (n=23) showed no interest. While 69.4% (n=50) of participants in Child Development were interested in training or education on the health impacts of climate change, 30.6% (n=22) were not interested. In Nutrition and Dietetics department 86.0% (n=92) of the participants stated that they were interested

in receiving training or education on health impacts of climate change 14.0% (n=15) stated that they were not interested. Of the participants in Ergotherapy, 67.6% (n=46) were interested in receiving education or training on the health impacts of climate change while 32.4% (22) showed no interest. Lastly, in Speech and Language Development department, 72.0% (n=67) of participants were interested in receiving training or education about the health impacts of climate change while the remaining 28% (n=26) had no interest.

4.6. Results Related to Multiple Linear Regression Model

Multilinear regression analysis at 95% confidence interval were used to test the statistical relationships between the three knowledge scores (nature of climate scores, effects of climate change scores, impacts of climate change on human health scores) and predictor variables. Variables were chosen if they were found statistically significant in this study ($p<0.05$), if they had a statistical significance of less or equal to 0.20 (≤ 0.20) and if these variables were found to be statistically significant in the literature. All of the assumptions for testing multilinear relationships were met.

Table 4.60. Multiple Linear Regression Analysis of climate change knowledge domains (Fourth-year students, Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Variable	Nature and causes of climate change scores			Effects of climate change scores			Health impacts of climate change scores		
	β	T	Sig	β	t	Sig	β	t	Sig
Age[1]									
22	0.233	1.484	0.139	0.24	0.127	0.899	0.309	1.286	0.199
23 and above	-0.178	-1.054	0.293	0.64	0.315	0.753	0.215	0.833	0.405
Gender									
Male[2]	-0.146	-0.680	0.497	0.050	0.194	0.846	-0.057	-0.176	0.861
Marital Status [3]									
Married	-0.825	-3.829	**0.000**	0.007	0.028	0.977	-0.193	-0.579	0.563

Table 4.60. (continued) Multiple Linear Regression Analysis of climate change knowledge domains (Fourth-year students, Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Variable	Nature and causes of climate change scores			Effects of climate change scores			Health impacts of climate change scores		
	β	T	Sig	β	t	Sig	β	t	Sig
Department [4]									
Child Development	-0.340	-1.575	0.116	-0.270	-1.035	0.301	-0.029	-0.086	0.932
Nutrition & Dietetics	0.351	1.783	0.075	0.155	0.650	0.516	0.279	0.921	0.357
Ergotherapy	0.171	0.781	0.435	-0.300	-1.131	0.259	0.130	0.386	0.700
Speech & Language Development	0.068	0.337	0.736	-0.093	-0.378	0.706	0.167	0.534	0.594
Region of Origin[5]									
Black Sea Region	0.364	1.184	0.059	0.167	0.711	0.478	-0.032	-0.108	0.914
Eastern Anatolia	-0.725	-2.601	**0.010**	-0.245	-0.715	0.475	0.131	0.305	0.760
Marmara	0.509	2.485	**0.013**	-0.132	-0.525	0.600	-0.642	-2.032	**0.043**
Mediterranean	-0.005	-0.025	0.980	-0.135	0.522	0.602	-0.349	-1.073	0.284
Southern Anatolia	-0.178	-0.850	0.396	-0.195	-0.760	0.448	-0.211	-0.653	0.514
Aegean	-0.276	-0.835	0.404	-0.313	-0.772	0.441	-1.250	-2.455	**0.015**
Foreigner	-0.805	-1.070	0.285	-0.725	-0.784	0.433	-1.309	-1.128	0.260
Recieving climate change training[6]	-0.625	1.558	0.120	0.782	-1.624	0.105	1.112	1.826	0.069
Source of Climate Change Information[7]									
Social media	-0.330	-1.827	0.068	0.133	0.612	0.541	0.073	0.266	0.791
School/college	-0.413	-2.628	**0.009**	-0.332	-1.754	0.080	-0.682	-2.866	**0.004**
Goverment Notifications	-0.302	-1.427	0.154	-0.342	-1.347	0.179	-0.616	-1.919	0.056
Seminars/workshops	-0.443	-2.160	**0.031**	-0.443	-1.798	0.073	-0.696	-2.236	**0.026**
National/International media	-0.092	-0.636	0.525	-0.218	-1.253	0.211	-0.021	-0.094	0.925
International Organizations	0.151	0.819	0.413	-0.320	-1.452	0.147	-0.177	-0.632	0.528
Research articles	0.311	1.554	0.121	0.069	0.286	0.775	0.506	1.666	0.096
Other sources of information	-0.612	-1.381	0.168	0.709	1.333	0.183	0.896	1.331	0.184

Dummy variable: [1] 21 and below as reference group, [2] Females as reference group, [3] Single as reference group, [4]Audiology department as reference group, [5] Central Anatolia region as reference group, [6]Recieving climate change training/education as reference, [7]Usage of the source as reference.

The analysis of nature and causes of climate change knowledge score showed that overall, the model explains 90% variation of nature and causes of climate change knowledge score: F (14, 399) =3.912, p= < 0.001, Adj R^2=0.090 and R^2=0.121. The analysis showed that the predictor variables; marital status, region of origin, using school/college/university (curriculum) and using seminars, workshops, and conferences as a source of climate change health impacts information had statistically significant relationships with the dependent variable. Marital status, originating from Eastern Anatolia, not using school/college/university (curriculum) and not using seminars/workshops/conferences as a source of information about health impacts of climate change predicts the nature and causes of climate change knowledge score in a statistically significant and negative direction. These results suggest that participants who were married, originating from Eastern Anatolia region compared to originating from Central Anatolia, not using school/college/university (curriculum) and those not using seminars/workshops/conferences showed lower levels of nature and causes of climate change knowledge scores. On the other hand, originating from Marmara region as opposed to originating from Central Anatolia region predicts the nature and causes of climate change knowledge score in a statistically significant and positive direction. This suggests that nature and cause of climate change scores were higher in participants who were from Marmara region compared to those who were from Central Anatolia region (Table 4.60).

The analysis of the effects of climate change knowledge score did not show any relationship between the predictor and dependent variable (Table 4.60).

The analysis of impacts of climate change on health knowledge score showed that overall, the model explains 4.6% variation of health impacts of climate change knowledge score: F (14, 399) =2.431, p=0.003, Adj R^2=0.046 and R^2=0.079. The analysis showed that the predictor variables; region of origin, using school/college/university (curriculum) and using seminars, workshops and conferences as a source of climate change health impact information had statistically significant relationships with the dependent variable. Originating from Marmara region, originating from Aegean region, not using school/college/university (curriculum) and not using seminars/workshops/conferences as a source of

information about health impacts of climate change predicts the health impacts of climate change knowledge score in a statistically significant and negative direction. These results suggest that participants who were from Marmara region as opposed to those originating from Central Anatolia showed lower levels of climate change health impact knowledge scores. Participants originating from Aegean region also showed lower climate change health impact knowledge scores compared to participants from Central Anatolia region. Additionally, participants not using school/college/university (curriculum) and those not using seminars/workshops/conferences showed lower levels of climate change health impact knowledge scores compared to participants who used school/college/university (curriculum) and seminars/workshops/conferences (Table 4.60).

4.7. Results Related to Correlation Between Climate Change Knowledge Scores and Health İmpacts of Climate Change Knowledge Scores

4.7.1. Correlation Between Nature and Causes of Climate Change Knowledge Scores and Health İmpacts of Climate Change Knowledge Scores

According to the Spearman correlation, it was found that there was a low positive statistically significant correlation between nature and causes of climate change knowledge scores and health impacts of climate change knowledge scores and it is statistically significant ($r_s=0.337$, $p<0.001$). (Table 4.61)

Table 4.61. Correlation between nature and causes of climate change knowledge scores and health impacts of climate change knowledge scores of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Variable		Nature and causes score	Health impacts score
Nature and causes score	Spearman's rho	1.000	0.337**
	Sig. (2-tailed)		0.000
	N	414	414
Health impacts score	Spearman's rho	0.337**	1.000
	Sig. (2-tailed)	0.000	
	N	414	414

** Correlation is significant at the 0.01 level (2-tailed).

4.7.2. Correlation Between Effects of Climate Change Knowledge Scores and Health İmpacts of Climate Change Knowledge Scores

Spearman correlation of effects of climate change knowledge scores and health impacts of climate change knowledge scores was found to be moderately positive and it is statistically significant (rs=0.578, p<0.001) (Table 4.62).

Table 4.62. Correlation between effects of climate change knowledge score and health impacts of climate change knowledge scores of fourth-year students (Hacettepe University Faculty of Health Sciences, Ankara, November-December 2023)

Variable		Effects score	Health impacts score
effects score	Spearman's rho	1.000	0.578**
	Sig. (2-tailed)		0.000
	N	414	414
Health impacts score	Spearman's rho	0.578**	1.000
	Sig. (2-tailed)	0.000	
	N	414	

** Correlation is significant at the 0.01 level (2-tailed).

5. DISCUSSION

Climate change is impacting the health of human beings all over the world, however, there is insufficient research on knowledge of the health impacts of climate change. This study aimed to assess the knowledge of Hacettepe University Faculty of Health Sciences fourth-year students on the health impacts of climate change.

Students had good knowledge of the nature and causes of climate change. Contradicting results were found in a study conducted in Eritrea where (69.0%) of students could correctly identify the causes of climate change and in China where students (60.0%) had poor knowledge on the causes of climate change (78,79). The findings from this study indicate that majority of the students knew the definition of climate change (96.1%). In contrast, studies conducted in Nepal (27.3%) and Ghana (37.2%) found that most of the students did not know the scientific definition of climate change (80,81). These results imply that students from our study may have some basic knowledge on climate change which can serve as a beginning point for more extensive education.

In our study, students identified the causes of climate change as industrialization (90.3%), deforestation (95.4%) and burning of fossil fuels (87.4%). Similarly, Gautam et al. found that when questioned about the causes of climate change, a great majority of the respondents correctly identified the anthropogenic causes like industrialization (77.3%), deforestation (69.1%), and release of greenhouse gases (67.3%) (80). This further demonstrates that students know more about the human causes of climate change than the natural causes of climate change.

Although students were knowledgeable in terms of the nature and causes of climate change surprisingly only 65.9% of the students knew that climate change can also be a result of natural processes such as active volcanoes. In contrast, results from a study conducted in Indonesia revealed that 51.2% of participants did not know that anthropogenic factors also contribute to climate change (82). This suggests that students in our study only think that climate change is exclusively a result of human causes and do not consider natural factors as possible causes of climate change.

Findings from this current study show that knowledge of nature and causes of climate change varies according to region and marital status. Participants who were married had lower levels of knowledge compared to single participants. However, in their study, Mahata et al. discovered that married participants portrayed a higher level of climate change knowledge than widowed participants (83). Our study attributes higher knowledge among single students to the fact that single students have less family obligations hence more time to learn or acquire knowledge on climate change compared to married students.

Students originating from Eastern Anatolia had lower levels of knowledge on the nature and causes of climate change compared to those originating from Central Anatolia while students from Marmara displayed higher levels of knowledge on the nature and causes of climate change compared to those who were from Central Anatolia. Similar results were found in studies in Ethiopia (84) and Multi Arab States (85) where climate change knowledge was influenced by participants' home region. This could be because different areas experience climate change differently and students who come from areas where the negative effects of climate change are already obvious may be knowledgeable about climate change. This also further proves that the known health effects of climate change are determined by previous experience. Broomell et al. support this statement arguing that personal experience is an important determinant of people's awareness of climate change and intention to engage in climate change action (86). This differences in knowledge may also be due to the differences of education capabilities among regions even in the same country. In Türkiye, from east to west, educational capabilities might be increasing and students living in the west might have more opportunity to learn about climate change.

There was no statistically significant difference in knowledge of nature and causes of climate change according to age and gender, however a study conducted by Gazzaz et al among undergraduate science and agriculture in Jordan students showed differences in knowledge of nature and causes of climate. In their study, they found that females had higher levels on knowledge of nature and causes of climate change (87).

Students from this study also had high levels of knowledge on the general effects of climate change. 96.1% of the students knew that climate change can cause increase in the frequency and intensity of extreme weather events like heat waves, drought, hurricanes, and heavy rains, as well as rise in water level in seas (89.1%) and an increase in temperatures of the Earth (93.0%). A study in a cohort of Italian students also discovered that over 80.0% of the sample correctly identified the main consequences of climate change as more frequently occurring climate-related natural disasters (81.8%), rising sea levels (89.4%) and increase in Earth's temperature (95.0%) (88). These results are not surprising as these climate change effects are already happening throughout the world and students may have witnessed or experienced them. For instance, in Türkiye, extended periods of heat waves were experienced in 2023.

Students in this study portrayed relatively lower scores on the impacts of climate change on human health than on nature and causes of climate change and general effects of climate change. These findings are in line with results from a study conducted in higher education students in Eritrea (78). These findings suggest that students have basic knowledge about the nature-causes and general effects of climate change but lack in-depth knowledge about the negative impacts of climate change on human health.

The most recognized health impacts of climate change were injuries (97.3%), infectious diseases (87.9%) and heat-related diseases (87.0%) in decreasing order. A survey on medical, public health and nursing students in China revealed similar results, where students displayed higher knowledge about heat related (92.8%) and cold related diseases (88.8%) as health impacts of climate change (79). The indirect health impacts of climate change such as allergies and air pollution-related respiratory illness (asthma) were the least mentioned as health impacts of climate change. Similar results were found in a study by Sambath et. Al where the participants were less likely to mention allergies as potential health implications of climate change (89). Similar to our study, where only 63.0% of the participants knew that climate change can be associated with an increase in cardiovascular diseases, results from a study by Sulistyawati et al. show that over fifty percent of the respondents (53.74%) did not

know that the increase in cardiovascular diseases could be due to climate change (82). This might be because indirect impacts of climate change on human health are less evident and students may not easily identify them.

Furthermore, participants recognized that climate change can affect humans' mental health and contribute to an increase in food and waterborne diseases. Sulistywati et al. also found results that correspond with those from our study (82). Unlike the findings of a study conducted by Yang et al. in China where mental health conditions and malnutrition were less likely to be mentioned as climate change health impacts (79), and in Ethiopia where very few students identified depression as a health impact of climate change (84) participants from this current study and those from a study in Nigeria by Nzeobi et al. had high levels of knowledge that mental health can be a result of climate change (32). This may be because students in Türkiye are aware of the impact which previous natural disasters had on people's mental health.

There was no difference in knowledge about the health impacts of climate change according to age, marital status, department and gender. A study conducted amongst health sciences students in Ethiopia (84) and Nepal (90) also found that there was no significant difference in levels of knowledge about the health impacts of climate change between male and female students. However, these findings contradict the study done in the USA by McCright who reported that females had a much better understanding of the impact of climate change than males (91). These differences could be attributed to the difference in study populations. Our study and the Ethiopian study were conducted among health science students whereas McCright's study was conducted among adults.

Region of origin had a significant influence on knowledge about the health impacts of climate change. Participants from Marmara and Aegean regions had lower levels of climate change health impacts knowledge scores compared to participants from Central Anatolia. A study conducted in Türkiye among nursing students also found that region of origin influenced knowledge on climate change health impacts (92). As stated before, previous experience may influence students' knowledge about the health impacts of climate change.

Majority of the students in this study (97.3%) had not received any education or training on the health impacts of climate change. Students who had received training or education on health impacts of climate change (2.7%) received this education or training from a selective course. Results from this study further revealed that students who had previously received training or education regarding health impacts of climate change portrayed higher levels of knowledge than students who had not received any training or education. This shows that education and training play a significant role in knowledge about health impacts of climate change. A study by Esringü et al. found that students' knowledge level on the nature and causes of climate change had significantly increased after receiving training (93). This affirms the role education and training play in increasing climate change knowledge. Information from the heads of departments in the five departments confirmed that climate change was not included in the health sciences curriculum. Review of the Ulusal Çekirdek Eğitim Programı (National Core Educational Program) which contains information about curriculum of different courses in Türkiye revealed that none of the health science courses (Audiology, Ergotherapy, Child Development, Nutrition and Dietetics ad Speech and Language Development) offered courses on climate change. There were also no courses or topics on climate change. In Speech and Language Development and Ergotherapy programs there were topics on interaction between environment and health, Child Development offered an optional course on environmental health while Nutrition and Dietetics and Audiology had no courses related to environment and health (94). This may be one of the reasons why students do not have sufficient knowledge of the impacts of climate change on human health. Therefore, there is a need to add topics about climate change and health in the health sciences curriculum.

Students mainly used social media (85.0%) as a source of information about health impacts of climate change, similarly, Ramya et al. found that social media (79.7%) was the most prominent source of information about climate change (95). However, findings from Ethiopia, India and Nepal showed that electronic mass media (radio and TV) were the most prominent sources of climate change information among students (84,32,80). Social media is a popular communication medium in Türkiye; thus, these findings are to be expected. Only 21.3% of the participants used school as a source of information. A study conducted in Türkiye among nursing students also

showed that university education is relatively very low as a source of information on climate change (92). These results are consistent with findings from our study which found that climate change was not included in the health science curriculum hence this may be the case in Tuna et al's study as well.

Students who used school as a source of information had higher levels of climate change knowledge in all three components (nature and causes of climate change, general effects of climate change, and health impacts of climate change) a statistically significant difference. These findings are supported by studies conducted in Nigeria, Nepal, and India (32,89,95). This demonstrates the necessity of providing climate change education in schools. Schools are the best places to teach health science students about climate change and equip them with the necessary skills to cope with the negative impacts of climate change in their communities.

Usage of seminars, workshops, and conferences was also positively associated with knowledge of the nature and causes of climate change and health impacts of climate change. A study in the USA highlighted the importance of workshops in disseminating knowledge of climate-based adaptation (96). These findings imply that in addition to school, health sciences students should be offered seminars, workshops and conferences focusing on health impacts of climate change to increase the students' knowledge.

When asked about barriers they face in obtaining information about the health impacts of climate change, the barriers most mentioned were lack of education on climate change health impacts (32.1%), information pollution (23.2%), lack of access to climate change information (16.2%) and lack of awareness (16.2%). These findings show that the school is not playing its role in educating health science students about climate change health impacts. Other barriers that were also identified in previous studies were lack of time (97,98), politicization of climate change (99) and not taking climate change seriously (82). Breakey et al. mentioned a lack of faculty or institutional commitment to climate change as a barrier to learning about climate change (98). This may also be a possible barrier amongst health science students in Hacettepe University because the faculty does not provide any climate change related education to them.

Most health science students (93.2%) felt that their faculties were not doing enough to teach them about the health impacts of climate change. These results align with Nigatu's findings where all psychiatric nursing and medical students felt that their departments were not concerned about climate change consequences (84). This is a cause for concern as health science departments are grooming future health professionals; therefore, the clear lack of involvement and action in health-related climate change sensitization will most likely result in students becoming health professionals who are not knowledgeable about climate change.

In terms of learning about the impacts of climate change on health, in the future, 73.9% of the students were interested in learning about the health impacts of climate change. This is a positive sign indicating that students are willing to receive climate change education. The students mainly preferred seminars (48.8%), small group discussions (23.9%) and social media (21.0%) as platforms to learn about health impacts of climate change in the future. However, in a study conducted by Pollard in USA, students mainly preferred (73.5%) conferences or visiting lectures, (57.3%) elective content in the veterinary medical curriculum and (50.7%) elective content through student clubs as sources of future education on health impacts of climate change (100). These preferences can be used as a starting point to design climate change educational programs for health science students.

There was a positive correlation between nature and causes of climate change knowledge scores and health impacts of climate change knowledge scores. Students who portrayed higher knowledge on nature and causes of climate change were likely to portray higher knowledge on health impacts of climate change. However, a study conducted in China found contradicting results where knowledge about the causes of climate change was not positively associated with knowledge of health impacts of climate change. This difference may be because students in our study portrayed higher levels of knowledge on nature and causes of climate change compared to students from China where only 58.0% of the students knew about the causes of climate change (79). Similarly, there was a moderate positive correlation between effects of climate change knowledge scores and health impacts of climate change knowledge scores. This shows that when students are knowledgeable about climate change, they are most likely to also have better knowledge about the health impacts of climate change, hence climate

change education for health science is very important and should be made a core obligatory subject in all health science departments.

5.1. Strengths of the Study

The findings of this study contribute to the body of knowledge about knowledge of health science students on the health impacts of climate change. The main strength of this research was the usage of a large sample size allowing the researchers to reach a huge number of students. The study also identified the barriers faced by students in obtaining information about climate change health impacts, which might be highly useful for policy recommendations. The preferred learning sources of climate change health impacts among health sciences students were also identified. This finding will aid in the selection and design of appropriate climate change communication platforms for university students. Finally, the study identified a lack of climate change topics as a gap in the curriculum of Hacettepe University health science students. Finally, these results can serve as a foundation for advocating for the inclusion of climate change topics in the health sciences curriculum.

5.2. Limitations of the Study

This study had a few limitations. The instrument used for data collection in this study was developed by the researchers using the limited literature review available on the subject. Although the Cronbach alpha values show us that to an extent the knowledge statements in the three different domains are reliable, the study tool's validity and reliability is subject to further scrutiny. Therefore, there is a critical need to develop a more comprehensive instrument to evaluate knowledge of health science students on the health impacts of climate change. Another limitation of this study is that the study only focused on knowledge, consequently, future studies should focus on health sciences students' awareness, beliefs, attitudes and perceptions of health impacts of climate change. Furthermore, because this study utilized a descriptive approach, the findings cannot be used to establish causal relationships. Additionally, this study was only conducted among fourth-year health sciences students of a faculty in Ankara, Turkiye, therefore caution should be exercised when attempting to generalize the findings of this study to other departments and countries.

6. CONCLUSION

The findings of this study reveal that although a high number of health science students at Hacettepe University were knowledgeable about the nature and causes of climate change (mean=8.8, median=9.0) and general effects of climate change (mean=8.7, median=9.0), they obtained relatively lower scores on knowledge of the health impacts of climate change (mean=8.1, median=9.0). The majority of students had not received any training or education on health impacts of climate change. Results from the study also showed that most of the students obtained information regarding climate change health impacts from social media compared to from school. The positive association between using school as a source of climate change information and level of knowledge about health impacts of climate change shows the importance of including topics about the interconnectedness of climate change and human health in the curriculum of health science students in the national core program for health sciences. The impacts of climate change on human health are devastating and health science students need to be knowledgeable well prepared and equipped to counter these impacts. The findings from this study will aid in the selection of appropriate climate change educational platforms for health science students and possibly curriculum and climate change policy reforms in the future.

6.1. Recommendations

The study revealed a lack of courses on climate change in the health sciences curriculum and a lack of departmental concern on the issue of climate change and human health. As a result, curriculum reforms should be made to incorporate appropriate climate change and health courses for health science students in-order to equip students and prepare them to deal with the harmful impacts of climate change on health. The National Core Educational Program (Ulusal çekirdek eğitimi program) should include topics about climate change and health in all departments of health sciences and these courses should be common and obligatory to ensure that every health science student learns about impacts of climate change on human health. Further research should be conducted at other universities offering health science courses throughout Turkiye to generate a larger database on the level of health sciences students' knowledge of climate change health impacts in Turkiye. Social media can

also be leveraged as a platform to educate students about health impacts of climate change as many young people use social media a lot nowadays. Reliable and credible climate change information should be shared on social media and government agencies should inform students about legitimate pages and sites where reliable information can be obtained. Informed and knowledgeable students are highly likely to engage in climate action resulting in adaptation and success of climate change initiatives therefore all schools should be encouraged to educate students about climate change starting from primary school level.

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8. APPENDIX

Appendix 1: Ethical Committee Approval

Tarih: 30/10/2023 08:15
Sayı: E-16969557-050.01.04-00003164722

00003164722

HACETTEPE ÜNİVERSİTESİ
SAĞLIK BİLİMLERİ ARAŞTIRMA ETİK KURULU

KURUL KARARI

OTURUM TARİHİ	OTURUM SAYISI	KARAR SAYISI
24.10.2023	2023/05	2023/05-19
Araştırma Numarası : SBA 23/260	**Değerlendirme Tarihi :** 24.10.2023	

Üniversitemiz Tıp Fakültesi Halk Sağlığı Anabilim Dalı öğretim üyelerinden Prof. Dr. Kerim Hakan ALTINTAŞ'ın sorumlu araştırmacı olduğu, Senikiwe Chanda KGATLHEGANG'ın yüksek lisans tezi olan, SBA 23/260 kayıt numaralı ***"Assessing Knowledge of Hacettepe Unıversity Faculty of Health Sciences Fourth Year Students on Health Impacts of Climate Change"*** başlıklı araştırma önerisi gerekçe, amaç, yaklaşım ve yöntemleri dikkate alınarak incelenmiş olup, idari izin alınmak kaydıyla 25 Ekim 2023 - 25 Ekim 2024 tarihleri arasında geçerli olmak üzere etik açıdan **uygun bulunmuştur.**

Çalışma tamamlandığında sonuçlarını içeren bir rapor örneğinin Etik Kurulumuza gönderilmesi gerekmektedir.

İZİNLİ Prof. Dr. Nüket PAKSOY ERBAYDAR Kurul Başkanı	Prof. Dr. Güzide Burça AYDIN Başkan Vekili	**İZİNLİ** Prof. Dr. Mehmet Özgür UYANIK Kurul Üyesi	Prof. Dr. Ayşe KİN İŞLER Kurul Üyesi
Prof. Dr. Burcu Balam DOĞU Kurul Üyesi	Prof. Dr. Tolga YILDIRIM Kurul Üyesi	Prof. Dr. İpek GÜRBÜZ Kurul Üyesi	Doç. Dr. Betül ÇELEBİ SALTIK Kurul Üyesi
Doç. Dr. Merve BATUK Kurul Üyesi	Doç. Dr. Gülten IŞIK KOÇ Kurul Üyesi	Dr. Öğr. Üyesi Melike Hacer ÖZKAN Kurul Üyesi	Dr. Öğr. Üyesi Müge DEMİR Kurul Üyesi
Dr. Öğr. Üyesi Burcu Ersöz ALAN Kurul Üyesi	Av. Buket ÇINAR Kurul Üyesi		

Appendix 2: Institutional Permission

Tarih: 08/11/2023 15:51
Sayı: E-72924032-000-00003189797

00003189797

T.C.
HACETTEPE ÜNİVERSİTESİ REKTÖRLÜĞÜ
Sağlık Bilimleri Enstitüsü Müdürlüğü

Sayı : E-72924032-000-00003189797 08/11/2023
Konu : Senikiwe Chanda KGATLHEGANG, Çalışma İzni

SAĞLIK BİLİMLERİ FAKÜLTESİ DEKANLIĞINA

İlgi : 08.11.2023 tarihli ve E-77558955-000-00003189690 sayılı yazınız.

Enstitümüz Halk Sağlığı Anabilim Dalı öğretim üyesi Prof. Dr. Kerim Hakan ALTINTAŞ' ın danışmanlığında Halk Sağlığı tezli yüksek lisans öğrencisi Senikiwe Chanda KGATLHEGANG' ın yardımcı araştırmacı olduğu Sağlık Bilimleri Araştırma Etik Kurulunun SBA23/260 sayılı kararı ve 03.11.2023 tarihli izni ile "Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi 4. Sınıf Öğrencilerinin İklim Değişikliğinin Sağlık Etkilerine İlişkin Bilgilerinin Değerlendirilmesi " konulu araştırmanın Fakültenize bağlı Beslenme ve Diyetetik, Çocuk Gelişimi, Dil ve Konuşma Terapisi, Ergoterapi ve Odyoloji bölümlerinde15 Kasım 2023 ve 15 Mart 2023 tarihleri arasında çalışmasını yürütebilmesi için gerekli izinlerin verilmesi hususunda gereğini bilgilerinize rica ederim.

Prof. Dr. Müge YEMİŞÇİ ÖZKAN
Enstitü Müdürü

Ekler: Anket-Etik İzin

Bu belge güvenli elektronik imza ile imzalanmıştır.

Belge Doğrulama Kodu: 0BB61B6D-7687-42C8-84F0-F806BA427C75 Belge Doğrulama Adresi: https://www.turkiye.gov.tr/hu-ebys

Adres: Hacettepe Üniversitesi Sağlık Bilimleri Enstitüsü Müdürlüğü 06100 Sıhhiye-ANKARA
E-posta:sbe@hacettepe.edu.tr İnternet Adresi: www.saglikbilimleri.hacettepe.edu.tr
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Kep:

Bilgi için: Naciye ÖZTÜRK
Bilgisayar İşletmeni
Telefon: 3051090

Tarih: 16/11/2023 16:35
Sayı: E-68552689-000-00003204322
00003204322

T.C.
HACETTEPE ÜNİVERSİTESİ REKTÖRLÜĞÜ
Sağlık Bilimleri Fakültesi Dekanlığı

Sayı : E-68552689-000-00003204322 16/11/2023
Konu : Senikiwe Chanda KGATLHEGANG, Çalışma İzni

SAĞLIK BİLİMLERİ ENSTİTÜSÜ MÜDÜRLÜĞÜNE

İlgi : 08.11.2023 tarihli ve E-72924032-000-00003189797 sayılı yazınız.

Enstitünüz Halk Sağlığı Anabilim Dalı öğretim üyesi Prof. Dr. Kerim Hakan ALTINTAŞ' ın danışmanlığında Halk Sağlığı tezli yüksek lisans öğrencisi Senikiwe Chanda KGATLHEGANG' ın yardımcı araştırmacı olduğu Sağlık Bilimleri Araştırma Etik Kurulunun SBA23/260 sayılı kararı ve 03.11.2023 tarihli izni ile "Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi 4. Sınıf Öğrencilerinin İklim Değişikliğinin Sağlık Etkilerine İlişkin Bilgilerinin Değerlendirilmesi" konulu araştırmanın yapılabilmesine ilişkin Bölüm yazıları ekte gönderilmiştir.

Bilgilerinizi ve gereğini rica ederim.

Prof. Dr. Esra AKI
Dekan V.

Ek: Bölüm yazıları

Adres: Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi Dekanlığı 06100 Sıhhiye-ANKARA
E-posta:sbf@hacettepe.edu.tr İnternet Adresi: www.sbf.hacettepe.edu.tr Elektronik Ağ: www.hacettepe.edu.tr
Telefon: 0(312) 305 20 51-0(312) 305 20 53 Faks:0(312) 305 20 54
Kep:
Bilgi için: Türkan DEMİREL BAYKAN
Bilgisayar İşletmeni
Telefon: 03123052051/132

Tarih: 09/11/2023 10:35
Sayı: E-99081126-000-00003190811

00003190811

T.C.
HACETTEPE ÜNİVERSİTESİ REKTÖRLÜĞÜ
Sağlık Bilimleri Fakültesi Dekanlığı
Beslenme ve Diyetetik Bölüm Başkanlığı

Sayı : E-99081126-000-00003190811 09/11/2023
Konu : Araştırma İzni Hk

SAĞLIK BİLİMLERİ FAKÜLTESİ DEKANLIĞINA

İlgi: 08.11.2023 tarihli ve E-68552689-000-00003190088 sayılı yazınız.

Sağlık Bilimleri Enstitüsü Halk Sağlığı Anabilim Dalı öğretim üyesi Prof. Dr. Kerim Hakan ALTINTAŞ' ın danışmanlığında Halk Sağlığı tezli yüksek lisans öğrencisi Senikiwe Chanda KGATLHEGANG' ın yardımcı araştırmacı olduğu "Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi 4. Sınıf Öğrencilerinin İklim Değişikliğinin Sağlık Etkilerine İlişkin Bilgilerinin Değerlendirilmesi " konulu çalışmanın Bölümümüzde yürütülmesi uygun görülmüştür.

Bilgilerinizi ve gereğini saygılarımla arz ederim.

Prof.Dr. Zehra BÜYÜKTUNCER DEMİREL
Bölüm Başkanı

Bu belge güvenli elektronik imza ile imzalanmıştır

Belge Doğrulama Kodu: DB500547-488D-455A-A131-5E146F31A9EB
Belge Doğrulama Adresi: https://www.turkiye.gov.tr/hu-ebys

Adres: Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi Beslenme ve Diyetetik Bölümü 06100 Sıhhiye / Ankara
E-posta:nutrdiet@hacettepe.edu.tr Elektronik Ağ: www.hacettepe.edu.tr
Telefon: 0(312) 305 10 94 - 0(312) 305 10 96 Faks:0(312) 309 13 10
Kep:

Bilgi için: Sırma KALENDEROĞLU
Memur
Telefon: 3051094

Tarih: 10/11/2023 14:50
Sayı: E-50267588-000-00003193125

00003193125

T.C.
HACETTEPE ÜNİVERSİTESİ REKTÖRLÜĞÜ
Sağlık Bilimleri Fakültesi Dekanlığı
Dil ve Konuşma Terapisi Bölüm Başkanlığı

Sayı : E-50267588-000-00003193125 10/11/2023
Konu : Senikiwe Chanda KGATLHEGANG'ın Çalışma İzni Hk

SAĞLIK BİLİMLERİ FAKÜLTESİ DEKANLIĞINA

İlgi : 08.11.2023 tarihli ve E-68552689-000-00003190088 sayılı yazınız.

Sağlık Bilimleri Enstitüsü Halk Sağlığı Ana Bilim Dalı Öğretim Üyesi Prof. Dr. Kerim Hakan ALTINTAŞ'ın danışmanlığında yüksek lisans öğrencisi Senikiwe Chanda KGATLHEGANG'ın yürüttüğü "Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi 4. Sınıf Öğrencilerinin İklim Değişikliğinin Sağlık Etkilerine İlişkin Bilgilerinin Değerlendirilmesi" konulu araştırma çalışmasının Bölümümüzde yürütülmesi Başkanlığımızca uygun bulunmuştur.

Bilgilerinize saygılarımla arz ederim.

Doç. Dr. Fatma ESEN AYDINLI
Bölüm Başkanı

Bu belge güvenli elektronik imza ile imzalanmıştır

Belge Doğrulama Kodu: 8DB62AE3-631A-4157-B702-E840C37F75D2 Belge Doğrulama Adresi: https://www.turkiye.gov.tr/hu-ebys

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E-posta:dilkonusmaterapisi@hacettepe.edu.tr Elektronik Ağ: www.hacettepe.edu.tr
Telefon: 0(312) 305 10 93 Faks:0(312) 305 10 93
Kep:

Bilgi için: Altan AKSU
Bilgisayar İşletmeni
Telefon: 0312 305 15 57

Tarih: 14/11/2023 12:40
Sayı: E-16522615-000-00003198045

00003198045

T.C.
HACETTEPE ÜNİVERSİTESİ REKTÖRLÜĞÜ
Sağlık Bilimleri Fakültesi Dekanlığı
Odyoloji Bölüm Başkanlığı

TÜRKİYE CUMHURİYETİ'NİN YÜZÜNCÜ YILI

Sayı : E-16522615-000-00003198045 14/11/2023
Konu : Senikiwe Chanda KGATLHEGANG, Çalışma İzni

SAĞLIK BİLİMLERİ FAKÜLTESİ DEKANLIĞINA

İlgi : 08.11.2023 tarihli ve E-68552689-000-00003190088 sayılı yazınız.

Sağlık Bilimleri Enstitüsü Halk Sağlığı Anabilim Dalı öğretim üyesi Prof. Dr. Kerim Hakan ALTINTAŞ' ın danışmanlığında Halk Sağlığı tezli yüksek lisans öğrencisi Senikiwe Chanda KGATLHEGANG' ın yardımcı araştırmacı olduğu Sağlık Bilimleri Araştırma Etik Kurulunun SBA23/260 sayılı kararı ve 03.11.2023 tarihli izni ile "Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi 4. Sınıf Öğrencilerinin İklim Değişikliğinin Sağlık Etkilerine İlişkin Bilgilerinin Değerlendirilmesi " konulu araştırmanın Bölümümüzde 15 Kasım 2023 ve 15 Mart 2023 tarihleri arasında çalışmasını yürütebilmesi uygun bulunmuştur.

Gereğini bilgilerinize saygılarımla arz ederim.

Dr. Öğr. Üyesi Filiz ASLAN
Bölüm Başkanı V.

Adres: Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi Odyoloji Bölümü 06100 Sıhhiye/ANKARA
E-posta:sbfodyoloji@hacettepe.edu.tr Elektronik Ağ: www.hacettepe.edu.tr
Telefon: 0(312) 305 16 67 Faks:0(312) 305 20 54
Kep:

Bilgi için: Fatma TAŞ
Memur
Telefon: 3051667

Tarih: 16/11/2023 15:50
Sayı: E-24015228-000-00003204204

T.C.
HACETTEPE ÜNİVERSİTESİ REKTÖRLÜĞÜ
Sağlık Bilimleri Fakültesi Dekanlığı
Çocuk Gelişimi Bölüm Başkanlığı

Sayı : E-24015228-000-00003204204 16/11/2023
Konu : Senikiwe Chanda KGATLHEGANG, Çalışma İzni

SAĞLIK BİLİMLERİ FAKÜLTESİ DEKANLIĞINA

İlgi : 08.11.2023 tarihli ve E-68552689-000-00003190088 sayılı yazınız.

Sağlık Bilimleri Enstitüsü Halk Sağlığı Anabilim Dalı öğretim üyesi Prof.Dr.Kerim Hakan ALTINTAŞ'ın danışmanlığında Halk Sağlığı tezli yüksek lisans öğrencisi Senikiwe Chanda KGATLHEGANG'ın yardımcı araştırmacı olduğu Sağlık Bilimleri Araştırma Etik Kurulunun SBA23/260 sayılı kararı ve 03.11.2023 tarihli izni ile Bölümümüz 4.sınıf öğrencilerine 15 Kasım 2023 ve 15 Mart 2023 tarihleri arasında "İklim Değişikliğinin Sağlık Etkilerine İlişkin Bilgilerinin değerlendirilmesi" konulu çalışmasını yürütmesi uygun bulunmuştur.

Bilgilerinizi ve gereğini saygılarımla arz ederim.

Prof. Dr. Özcan DOĞAN
Bölüm Başkan V.

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Konu : Senikiwe Chanda KGATLHEGANG, Çalışma İzni

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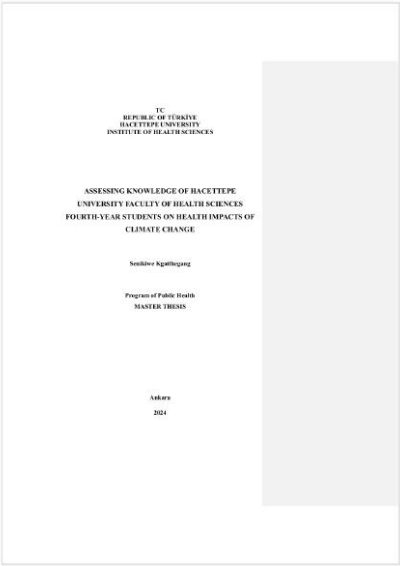

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INSTITUTE OF HEALTH SCIENCES

ASSESSING KNOWLEDGE OF HACETTEPE UNIVERSITY FACULTY OF HEALTH SCIENCES FOURTH-YEAR STUDENTS ON HEALTH IMPACTS OF CLIMATE CHANGE

Senikiwe Kgatlhegang

Program of Public Health
MASTER THESIS

Ankara
2024

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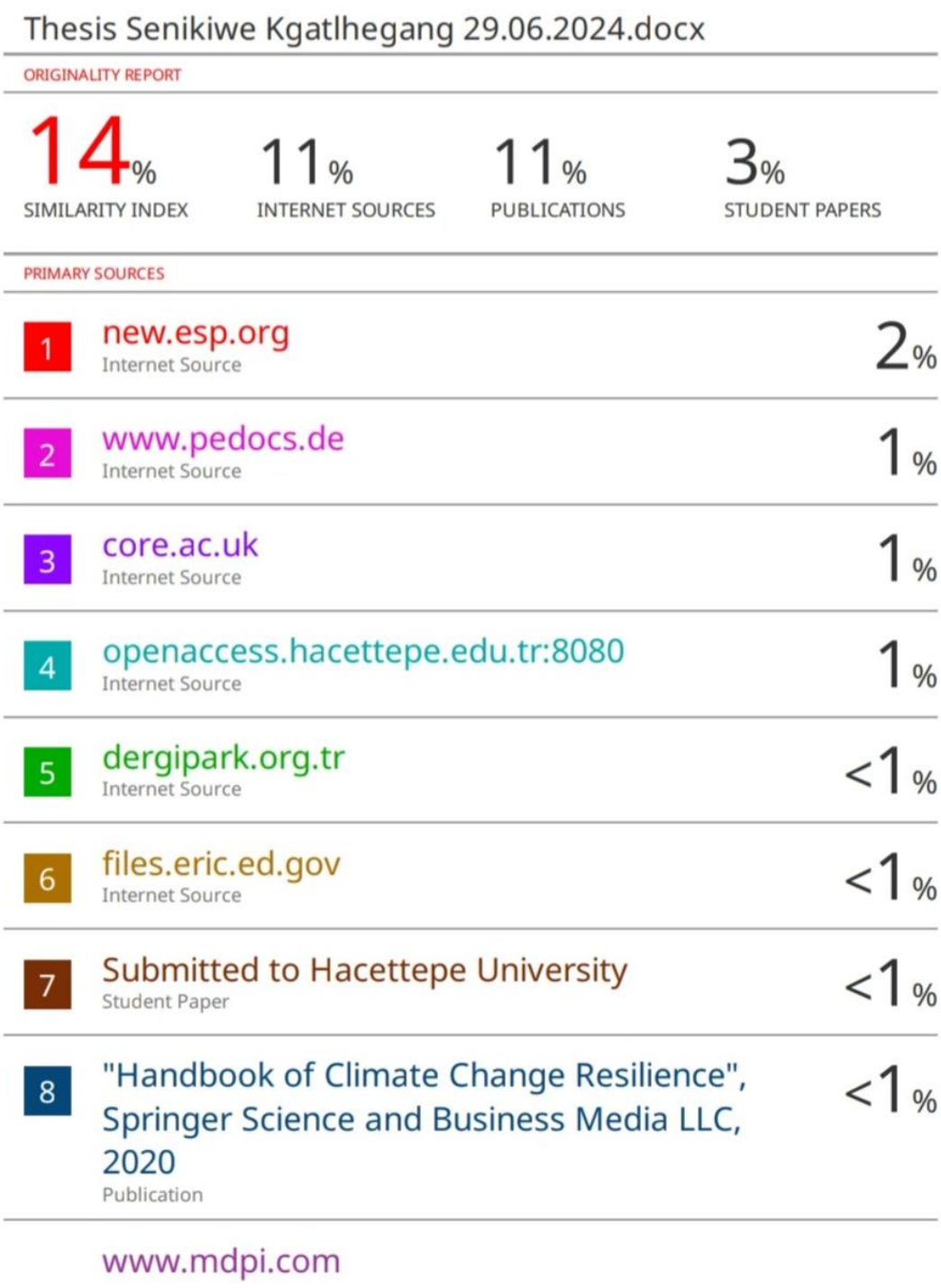

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Appendix 5: Questionnaire In Turkish And English

INFORMED CONSENT

Research on Assessing Knowledge of Hacettepe University Faculty of Health Sciences Fourth Year Students on Health Impacts of Climate Change

CONSENT FORM

Valuable Participant,

This research, titled ASSESSING KNOWLEDGE OF HACETTEPE UNİVERSİTY FACULTY OF HEALTH SCIENCES FOURTH YEAR STUDENTS ON HEALTH IMPACTS OF CLIMATE CHANGE is carried out by Senikiwe Chanda Kgatlhegang under the supervision of PROF. DR. KERİM HAKAN ALTINTAŞ in Hacettepe University, Department of Public Health. The main objective of this study is to assess the knowledge of Hacettepe Students on the health impacts of climate change. Therefore, it is important that you answer all questions sincerely.

Your participation in the research is on a voluntary basis. Do not write your identity information such as name, surname and student number in the questionnaire. Information obtained through this form will remain confidential and will only be used for research purposes (or "scientific purposes"). You can choose not to participate in the study, or if you do not want to fill out the questionnaire, you can end your participation at any time.

This questionnaire contains 41 questions that are related to climate change and its health impacts. You are requested to fill all the questions. If there is an option "other" among the answers to the question and your answer is not among the available options, then write your answer in the space in the other option. The time required to fill the questionnaire is approximately 20 minutes

If you have any questions about the study, you can contact the following person:

Researchers
Senikiwe Chanda Kgatlhegang

Please put an (X) in the relevant box for your acceptance to the study.

Yes ☐

No ☐

DATA COLLECTION FORM

Research on Assessing Knowledge of Hacettepe University Faculty of Health Sciences Fourth Year Students on Health Impacts of Climate Change

Form no: …….. Date: …….

CHAPTER 1: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1.In which year were you born?

---

2. What is your gender?

- Male
- Female

3. What is your marital status?

Married
Single

4.. In which department are you a student?

- Audiology
- Child Development
- Nutrition and Dietetics
- Occupational Therapy
- Speech and Language Therapy

5. Which region do you come from?

- Aegean Region
- Black Sea Region
- Central Anatolia Region
- Eastern Anatolia Region
- Marmara Region
- Mediterranean Region
- Southeastern Anatolia Region
- Foreigner (Please specify your country of origin:……)

CHAPTER 2: SOURCES OF INFORMATION REGARDING HEALTH IMPACTS OF CLIMATE CHANGE

6. Have you received any training/education regarding health impacts of climate change?

Yes ☐ Please indicate where you received the training/education from…..…….

No ☐

7. Where do you get information about health impacts of climate change? (More than one option may be chosen)

a. Government notifications
b. Seminars, workshops and conferences
c. School/college/university (curriculum)
d. National or International Media (electronic and print)
e. Social media (internet and other social networks)
f. International organizations working for climate change
g. Research articles
h. Other (Please specify:
……..)

CHAPTER 3: NATURE AND CAUSES OF CLIMATE CHANGE

For each statement below, choose the best answer by ticking in the appropriate box.

No	Statement	True	False	I don't know
8.	Climate change is the tangible, long-term change in weather variables that is associated with the increases in the concentrations of the greenhouse gases in the atmosphere			
9.	Climate change is only a result of natural activities			
10.	Manifestations of climate change differ from one climatic region to another			
11.	Environmental pollution resulting from industry is one of the main causes of climate change			
12.	Burning of fossil fuels such as oil and coal does not contribute to climate change			
13.	Climate change can also be a result of natural processes like active volcanoes			
14.	Effect of human activities on temperatures of the surface of the Earth is very high			
15.	Deforestation is not one of the causes of climate change			
16.	Agricultural activities such as animal and plant production do not contribute to climate change			
17.	The transportation sector does not contribute substantially to climate change			

CHAPTER 4: EFFECTS OF CLIMATE CHANGE

For each statement below, choose the best answer by ticking in the appropriate box.

No	Statement	True	False	Don't Know
18.	Climate change causes biodiversity loss			
19.	Climate change leads to increase in soil fertility			
20.	Rise in water level in seas is not a result of climate change			
21.	Climate change leads to decrease in incidence of contagious and infectious plant, animal, and human diseases			
22.	Decline in plant and animal food production, and, hence, deterioration of food security, may result from climate change			
23.	Climate change may cause in an increase in the frequency and intensity of extreme weather conditions such as heat waves, drought, hurricanes, and heavy rains			
24.	Climate change brings about increase in temperatures of the Earth			
25.	Shortage of water that is suitable for domestic use and for irrigation of plants and animals may result from climate change			
26.	Flooding is not one of the negative impacts of climate change			
27.	Forest fires are a result of climate change			

CHAPTER 5: IMPACTS OF CLIMATE CHANGE ON HUMAN HEALTH

For each statement below, choose the best answer by ticking in the appropriate box.

NO	Statement	True	False	Don't Know
28.	Climate change causes injuries due to severe storms, floods, droughts, fires			
29.	Air pollution-related respiratory illness (asthma, allergies) decrease due to climate change			
30.	Heat-related effects (heat stroke, dehydration) are not a result of climate change			
31.	Mental health issues (depression, anxiety, stress) can be an effect of climate change.			
32.	Vector-borne illnesses (West Nile virus, Dengue, Tick Borne Encephalitis, Lyme disease, Malaria) decrease due to climate change.			
33.	Increased allergic reactions due to exposure to plants or mold are a result of climate change			
34.	Climate change does not increase food and waterborne diseases such as diarrhea			
35.	Climate change increases the risk of Cardiovascular Disease related mortality			
36.	Climate change causes malnutrition as a result of food insecurity			
37.	Infectious diseases can decrease due to climate change			

CHAPTER 6: CHALLENGES AND DEMANDS FOR CLIMATE CHANGE EDUCATION AND TRAINING

38. What are the barriers you face in obtaining information about the impacts of climate change on health?.....
.....
.....
.....

39. Is your faculty doing enough to inform you about the health impacts of climate change?

Yes ☐ No ☐

40. What is your preferred methods to receive information on the impacts of climate change on health?

Seminars ☐ Small Group Discussions ☐

Lectures ☐

Others
(Specify)……
……..

41. Do you want to receive education/training on climate change and its health impacts?

Yes ☐ No ☐

Thank you for your response.

ONAM FORMU

“Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi dördüncü sınıf öğrencilerinin iklim değişikliğinin sağlık etkileri üzerindeki bilgilerinin değerlendirilmesi araştırması”

Değerli Katılımcılar,

Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi dördüncü sınıf öğrencilerinin iklim değişikliğinin sağlık etkileri üzerindeki bilgilerinin değerlendirilmesi başlıklı bu araştırma, Senikiwe Chanda Kgatlhegang tarafından Hacettepe Üniversitesi Halk Sağlığı Anabilim Dalı'nda Prof. Dr. Kerim Hakan Altıntaş danışmanlığında yürütülmektedir. Bu çalışmanın temel amacı, Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi dördüncü sınıf öğrencilerinin iklim değişikliğinin sağlığa etkileri hakkındaki bilgilerini değerlendirmektir. Bu nedenle, tüm soruları içtenlikle cevaplamanız önemlidir.

Araştırmaya katılmanız gönüllülük esasına dayanmaktadır. Ankete ad, soyad, öğrenci numarası gibi kimlik bilgilerinizi yazmayınız. Bu form aracılığı ile elde edilen bilgiler gizli kalacak ve yalnızca araştırma amaçları (veya "bilimsel amaçlar") için kullanılacaktır. Calışmaya katılmamayı seçebilir veya anketi doldurmak istemiyorsanız, katılmanızı istediğiniz zaman sonlandırabilirsiniz.

Bu anket, iklim değişikliğinin sağlığa etkileri hakkında bilgi ile ilgili 41 soru içermektedir. Tüm soruları doldurmanız rica olunur. Sorunun cevapları arasında "diğer" seçeneği varsa ve cevabınız mevcut seçenekler arasında yer almıyorsa cevabınızı diğer seçenekteki boşluğa yazınız. Anketi doldurmak için gereken süre yaklaşık 15 dakikadır.

Çalışma ile ilgili herhangi bir sorunuz olduğunda, aşağıdaki kişi ile iletişime geçebilirsiniz:

Senikiwe Chanda Kgatlhegang

Araştırmaya kabul etme durumunuz için ilgili kutucuğa (X) işareti koyunuz.

Evet ☐

Hayır ☐

VERİ TOPLAMA FORMU

"HACETTEPE ÜNİVERSİTESİ SAĞLIK BİLİMLERİ FAKÜLTESİ DÖRDÜNCÜ SINIF ÖĞRENCİLERİNİN İKLİM DEĞİŞİKLİĞİNİN SAĞLIK ETKİLERİ ÜZERİNDEKİ BİLGİLERİNİN DEĞERLENDİRİLMESİ ARAŞTIRMASI"

Form no: …….. Tarih: …….

1. BÖLÜM: SOSYO-DEMOGRAFİK ÖZELLİKLER

1. Hangi yılda doğdunuz?

---

2. Cinsiyetiniz nedir?
- Erkek
- Kadın

3. Medeni durumunuz nedir?
- Evli
- Bekar

4. Hangi bölümde okuyorsunuz?
- Odyoloji
- Çocuk Gelişimi
- Beslenme ve Diyetetik
- İş terapisi
- Konuşma ve Dil Terapisi

5. Hangi bölgeden geliyorsunuz?

- Ege Bölgesi
- Karadeniz bölgesi
- İç Anadolu Bölgesi
- Doğu Anadolu Bölgesi
- Marmara Bölgesi
- Akdeniz Bölgesi
- Güneydoğu Anadolu Bölgesi
- Yurt dışı (Lütfen menşe ülkenizi belirtiniz:……)

2. BÖLÜM: İKLİM DEĞİŞİKLİĞİNİN SAĞLIK ETKİLERİNE İLİŞKİN BİLGİ KAYNAKLARI

6. İklim değişikliğinin sağlık etkilerine ilişkin herhangi bir eğitim/öğretim aldınız mı?

Evet ☐ Eğitim aldığınız yeri/kuruluşu belirtiniz:

…….

Hayır ☐

7. İklim değişikliğinin sağlık üzerindeki etkileri hakkında nereden bilgi alıyorsunuz?

A. Hükümet bildirimleri

B. Seminerler, çalıştaylar ve konferanslar

C. Okul/kolej/üniversite (müfredat)

D. Ulusal veya Uluslararası Medya (elektronik ve basılı)

e. Sosyal medya (internet ve diğer sosyal ağlar)

F. İklim değişikliği için çalışan uluslararası kuruluşlar

G. Araştırma makaleleri

H. Diğer (Lütfen Belirtiniz:

……)

3. BÖLÜM: İKLİM DEĞİŞİKLİĞİNİN DOĞASI VE NEDENLERİ

Aşağıdaki her önerme için uygun kutuyu işaretleyerek en iyi cevabı seçiniz.

	Önerme	**Doğru**	**Yanlış**	**Bilmiyorum**
8.	İklim değişikliği, atmosferdeki sera gazı konsantrasyonlarındaki artışlarla ilişkili olarak hava değişkenlerinde görülen somut, uzun vadeli değişikliktir.			
9.	İklim değişikliği yalnızca doğal faaliyetlerin bir sonucudur.			
10.	İklim değişikliğinin belirtileri bir iklim bölgesinden diğerine farklılık gösteriyor			
11.	Sanayilerden kaynaklanan çevre kirliliği iklim değişikliğinin ana nedenlerinden biridir			
12.	Petrol ve kömür gibi fosil yakıtların yakılması iklim değişikliğine katkıda bulunmuyor			
13.	İklim değişikliği aktif volkanlar gibi doğal süreçlerin de bir sonucu olabilir			
14.	İnsan faaliyetlerinin Dünya yüzeyinin sıcaklıkları üzerindeki etkisi çok yüksektir			
15.	Ormansızlaşma iklim değişikliğinin nedenlerinden biri değil			
16.	Hayvan ve bitki üretimi gibi tarımsal faaliyetler iklim değişikliğine katkıda bulunmuyor			
17.	Ulaştırma sektörünün iklim değişikliğine katkısı yok			

BÖLÜM 4: İKLİM DEĞİŞİKLİĞİNİN ETKİLERİ

Aşağıdaki her önerme için uygun kutuyu işaretleyerek en iyi cevabı seçiniz.

	Önerme	**Doğru**	**Yanlış**	**Bilmiyorum**
18.	İklim değişikliği biyolojik çeşitlilik kaybına neden oluyor			
19.	İklim değişikliği toprak verimliliğinin artmasına neden oluyor			
20.	Denizlerdeki su seviyesindeki artış iklim değişikliğinin bir sonucu değildir			
21.	İklim değişikliği bulaşıcı hastalıkların görülme sıklığının azalmasına neden oluyor			
22.	Bitkisel ve hayvansal gıda üretimindeki azalma ve dolayısıyla gıda güvenliğinin bozulması iklim değişikliğinden kaynaklanmaktadır			
23.	İklim değişikliği, sıcak hava dalgaları, kuraklık, kasırgalar ve şiddetli yağışlar gibi aşırı hava koşullarının sıklığında ve şiddetinde artışa neden olabilir.			
24.	İklim değişikliği Dünya sıcaklıklarının artmasına neden oluyor			
25.	Evsel kullanıma ve sulamaya uygun su sıkıntısı iklim değişikliğinden kaynaklanmaktadır			
26.	Sel, iklim değişikliğinin olumsuz etkilerinden biri değildir			
27.	Orman yangınları iklim değişikliğinin bir sonucudur			

5. BÖLÜM: İKLİM DEĞİŞİKLİĞİNİN İNSAN SAĞLIĞINA ETKİLERİ

Aşağıdaki her önerme için uygun kutuyu işaretleyerek en iyi cevabı seçiniz.

	Önerme	**Doğru**	**Yanlış**	**Bilmiyorum**
28.	İklim değişikliği şiddetli fırtına, su baskını, kuraklık, yangın nedeniyle yaralanmalara neden oluyor			
29.	İklim değişikliği solunum yolu hastalıklarında (astım, alerji) azalmaya neden olur			
30.	Sıcaklığa bağlı etkiler (sıcak çarpması, dehidrasyon) iklim değişikliğinin bir sonucu değildir			
31.	Ruh sağlığı sorunları (depresyon, kaygı, stres) iklim değişikliğinin bir etkisi olabilir			
32.	İklim değişikliği nedeniyle vektör kaynaklı hastalıklar (Batı Nil virüsü, Dang humması, Kene Kaynaklı Ensefalit, Lyme hastalığı, Sıtma) azalıyor			
33.	Bitkilere veya küflere maruz kalma nedeniyle artan alerjik reaksiyonlar iklim değişikliğinin bir sonucudur			
34.	İklim değişikliği gıda ve su kaynaklı hastalıkları artırmıyor			
35.	Iklim değişikliği Kardiyovasküler hastalıklara bağlı ölüm riskini artırıyor			
36.	İklim değişikliği gıda güvensizliği nedeniyle yetersiz beslenmeye neden oluyor			
37.	İklim değişikliği nedeniyle bulaşıcı hastalıklar azalıyor			

BÖLÜM 6: İKLİM DEĞİŞİKLİĞİ EĞİTİM VE ÖĞRETİMLİ İLGİLİ ENGELLER VE TALEPLER

38. İklim değişikliğinin sağlık üzerindeki etkileri hakkında bilgi edinmenin önündeki engeller nelerdir?

……
……
……

39. Fakülteniz sizi iklim değişikliğinin sağlık üzerindeki etkileri konusunda yeterince bilgilendiriyor mu?

Evet ☐ Hayır ☐

40. İklim değişikliğinin sağlık üzerindeki etkilerine ilişkin bilgi almak için tercih ettiğiniz yöntem nedir??

Seminerler ☐

Dersler ☐

Küçük Grup Tartışmaları ☐

Diğerleri (belirtiniz)

…….

41. İklim değişikliğinin sağlık etkileri konusunda eğitim/öğretim almak istiyor musunuz?

Evet ☐ Hayır ☐

Cevaplarınız için teşekkür ederiz.

Appendix 6: Climate Change Information Sheet

CHAPTER 3: NATURE AND CAUSES OF CLIMATE CHANGE

For each statement below, choose the best answer by ticking in the appropriate box.

No	Statement	True	False	I don't know
8.	Climate change is the tangible, long-term change in weather variables that is associated with the increases in the concentrations of the greenhouse gases in the atmosphere	✓		
9.	Climate change is only a result of natural activities		✓	
10.	Manifestations of climate change differ from one climatic region to another	✓		
11.	Environmental pollution resulting from industry is one of the main causes of climate change	✓		
12.	Burning of fossil fuels such as oil and coal does not contribute to climate change		✓	
13.	Climate change can also be a result of natural processes like active volcanoes	✓		
14.	Effect of human activities on temperatures of the surface of the Earth is very high	✓		
15.	Deforestation is not one of the causes of climate change		✓	
16.	Agricultural activities such as animal and plant production do not contribute to climate change		✓	
17.	The transportation sector does not contribute substantially to climate change		✓	

CHAPTER 4: EFFECTS OF CLIMATE CHANGE

For each statement below, choose the best answer by ticking in the appropriate box.

No	Statement	True	False	Don't Know
18.	Climate change causes biodiversity loss	✓		
19.	Climate change leads to increase in soil fertility		✓	
20.	Rise in water level in seas is not a result of climate change		✓	
21.	Climate change leads to decrease in incidence of contagious and infectious plant, animal, and human diseases		✓	
22.	Decline in plant and animal food production, and, hence, deterioration of food security, may result from climate change	✓		
23.	Climate change may cause in an increase in the frequency and intensity of extreme weather conditions such as heat waves, drought, hurricanes, and heavy rains	✓		
24.	Climate change brings about increase in temperatures of the Earth	✓		
25.	Shortage of water that is suitable for domestic use and for irrigation of plants and animals may result from climate change	✓		
26.	Flooding is not one of the negative impacts of climate change		✓	
27.	Forest fires are a result of climate change	✓		

CHAPTER 5: IMPACTS OF CLIMATE CHANGE ON HUMAN HEALTH

For each statement below, choose the best answer by ticking in the appropriate box.

NO	Statement	True	False	Don't Know
28.	Climate change causes injuries due to severe storms, floods, droughts, fires	✓		
29.	Air pollution-related respiratory illness (asthma, allergies) decrease due to climate change		✓	
30.	Heat-related effects (heat stroke, dehydration) are not a result of climate change		✓	
31.	Mental health issues (depression, anxiety, stress) can be an effect of climate change.	✓		
32.	Vector-borne illnesses (West Nile virus, Dengue, Tick Borne Encephalitis, Lyme disease, Malaria) decrease due to climate change.		✓	
33.	Increased allergic reactions due to exposure to plants or mold are a result of climate change	✓		
34.	Climate change does not increase food and waterborne diseases such as diarrhea		✓	
35.	Climate change increases the risk of Cardiovascular Disease related mortality	✓		
36.	Climate change causes malnutrition as a result of food insecurity	✓		
37.	Infectious diseases can decrease due to climate change		✓	

İKLİM DEĞİŞİKLİĞİNİN BİLGİ FORMU

3. BÖLÜM: İKLİM DEĞİŞİKLİĞİNİN DOĞASI VE NEDENLERİ

Aşağıdaki her önerme için uygun kutuyu işaretleyerek en iyi cevabı seçiniz.

	Önerme	**Doğru**	**Yanlış**	**Bilmiyorum**
8.	İklim değişikliği, atmosferdeki sera gazı konsantrasyonlarındaki artışlarla ilişkili olarak hava değişkenlerinde görülen somut, uzun vadeli değişikliktir.	✓		
9.	İklim değişikliği yalnızca doğal faaliyetlerin bir sonucudur.		✓	
10.	İklim değişikliğinin belirtileri bir iklim bölgesinden diğerine farklılık gösteriyor	✓		
11.	Sanayilerden kaynaklanan çevre kirliliği iklim değişikliğinin ana nedenlerinden biridir	✓		
12.	Petrol ve kömür gibi fosil yakıtların yakılması iklim değişikliğine katkıda bulunmuyor		✓	
13.	İklim değişikliği aktif volkanlar gibi doğal süreçlerin de bir sonucu olabilir	✓		
14.	İnsan faaliyetlerinin Dünya yüzeyinin sıcaklıkları üzerindeki etkisi çok yüksektir	✓		
15.	Ormansızlaşma iklim değişikliğinin nedenlerinden biri değil		✓	
16.	Hayvan ve bitki üretimi gibi tarımsal faaliyetler iklim değişikliğine katkıda bulunmuyor		✓	
17.	Ulaştırma sektörünün iklim değişikliğine katkısı yok		✓	

BÖLÜM 4: İKLİM DEĞİŞİKLİĞİNİN ETKİLERİ

Aşağıdaki her önerme için uygun kutuyu işaretleyerek en iyi cevabı seçiniz.

	Önerme	Doğru	Yanlış	Bilmiyorum
18.	İklim değişikliği biyolojik çeşitlilik kaybına neden oluyor	✓		
19.	İklim değişikliği toprak verimliliğinin artmasına neden oluyor		✓	
20.	Denizlerdeki su seviyesindeki artış iklim değişikliğinin bir sonucu değildir		✓	
21.	İklim değişikliği bulaşıcı hastalıkların görülme sıklığının azalmasına neden oluyor		✓	
22.	Bitkisel ve hayvansal gıda üretimindeki azalma ve dolayısıyla gıda güvenliğinin bozulması iklim değişikliğinden kaynaklanmaktadır	✓		
23.	İklim değişikliği, sıcak hava dalgaları, kuraklık, kasırgalar ve şiddetli yağışlar gibi aşırı hava koşullarının sıklığında ve şiddetinde artışa neden olabilir.	✓		
24.	İklim değişikliği Dünya sıcaklıklarının artmasına neden oluyor	✓		
25.	Evsel kullanıma ve sulamaya uygun su sıkıntısı iklim değişikliğinden kaynaklanmaktadır	✓		
26.	Sel, iklim değişikliğinin olumsuz etkilerinden biri değildir		✓	
27.	Orman yangınları iklim değişikliğinin bir sonucudur	✓		

5. BÖLÜM: İKLİM DEĞİŞİKLİĞİNİN İNSAN SAĞLIĞINA ETKİLERİ

Aşağıdaki her önerme için uygun kutuyu işaretleyerek en iyi cevabı seçiniz.

	Önerme	**Doğru**	**Yanlış**	**Bilmiyorum**
28.	İklim değişikliği şiddetli fırtına, su baskını, kuraklık, yangın nedeniyle yaralanmalara neden oluyor	✓		
29.	İklim değişikliği solunum yolu hastalıklarında (astım, alerji) azalmaya neden olur		✓	
30.	Sıcaklığa bağlı etkiler (sıcak çarpması, dehidrasyon) iklim değişikliğinin bir sonucu değildir		✓	
31.	Ruh sağlığı sorunları (depresyon, kaygı, stres) iklim değişikliğinin bir etkisi olabilir	✓		
32.	İklim değişikliği nedeniyle vektör kaynaklı hastalıklar (Batı Nil virüsü, Dang humması, Kene Kaynaklı Ensefalit, Lyme hastalığı, Sıtma) azalıyor		✓	
33.	Bitkilere veya küflere maruz kalma nedeniyle artan alerjik reaksiyonlar iklim değişikliğinin bir sonucudur	✓		
34.	İklim değişikliği gıda ve su kaynaklı hastalıkları artırmıyor		✓	
35.	Iklim değişikliği Kardiyovasküler hastalıklardaki bağlı ölüm riskini artırıyor	✓		
36.	İklim değişikliği gıda güvensizliği nedeniyle yetersiz beslenmeye neden oluyor	✓		
37.	İklim değişikliği nedeniyle bulaşıcı hastalıklar azalıyor		✓	

9. CURRICULUM VITAE