

RESEARCH ARTICLE

Environmental Sustainability and the Climate Crisis: A Qualitative Study on Institutional Preparedness and Individual Awareness

Merve Kişi¹, Selin Kalender², Ayşe Nurselin Ok²

Abstract

¹ Asst. Prof. Dr, Süleyman Demirel University, Faculty of Economics and Administrative Sciences,, Isparta/Türkiye

ROR ID: <https://ror.org/04fjte88>

ORCID:

[0000-0001-9226-8490](https://orcid.org/0000-0001-9226-8490)

E-Mail:

merveuysal@sdu.edu.tr

² Asst. Prof. Dr, University of Health Sciences, Gülhane Faculty of Health Sciences, Ankara/Türkiye

ROR ID: <https://ror.org/03k7bde87>

ORCID:

[0000-0002-4377-9339](https://orcid.org/0000-0002-4377-9339)

E-Mail:

selin.kalender@sbu.edu.tr

² Post Graduate, Süleyman Demirel University, Isparta/Türkiye

ROR ID: <https://ror.org/04fjte88>

ORCID:

[0009-0007-8543-1764](https://orcid.org/0009-0007-8543-1764)

E-Mail:

ayse.nurselin@outlook.com

Corresponding Author:
Selin Kalender

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Climate change and environmental sustainability are increasingly recognized as critical issues within healthcare systems. However, there is limited understanding of how healthcare professionals perceive and experience these challenges in their daily practice. This study aims to explore healthcare professionals' perceptions, experiences, and attitudes toward environmental sustainability and climate change within public hospitals. Designed as a descriptive phenomenological study, the research was based on Giorgi's phenomenological approach. Data were collected through semi-structured, in-depth interviews with 10 healthcare professionals (physicians, nurses, and technicians) working in public hospitals. The interview form was developed by the researchers through a comprehensive literature review and expert validation. Interviews were audio-recorded and analyzed in five stages using Giorgi's descriptive phenomenological method: holistic reading, identification of meaning units, transformation into psychological expressions, construction of the essential structure, and thematic coding. The findings revealed common themes related to environmental awareness, institutional practices, perceived barriers, and proposed solutions for climate-resilient healthcare. Participants' statements converged around themes such as environmental sustainability awareness, institutional practices, encountered barriers, and proposed solutions. Understanding healthcare professionals' lived experiences provides a foundation for promoting climate-resilient healthcare practices. The findings can inform institutional policies, training programs, and future research aimed at strengthening environmental sustainability in healthcare settings.

Keywords: Environmental sustainability, climate change, healthcare professionals, phenomenology, qualitative research

Öz

İklim değişikliği ve çevresel sürdürülebilirlik, sağlık sistemleri içinde giderek önem kazanmaktadır. Ancak sağlık çalışanlarının bu konudaki algı ve deneyimlerine yönelik bilgi sınırlıdır. Bu çalışma, kamu hastanelerinde görev yapan sağlık çalışanlarının çevresel sürdürülebilirlik ve iklim değişikliğine yönelik algılarını, deneyimlerini ve tutumlarını anlamayı amaçlamaktadır. Tanımlayıcı fenomenolojik desende yürütülen araştırma, Giorgi'nin (2005) fenomenolojik yaklaşımı temel alınarak yapılandırılmıştır. Veriler, yarı yapılandırılmış görüşme formu ile kamu hastanelerinde çalışan 10 sağlık çalışanı ile yapılan derinlemesine birebir görüşmelerle toplanmıştır. Görüşme formu literatür ve uzman görüşleri doğrultusunda hazırlanmış, ses kaydı ile toplanan veriler Giorgi'nin beş aşamalı analiz yöntemi kullanılarak çözümlenmiştir: bütüncül okuma, anlam birimlerinin belirlenmesi, psikolojik yönelimli dönüştürme, temel yapının oluşturulması ve tematik kodlama. Katılımcıların ifadeleri, çevresel farkındalık, kurumsal uygulamalar, karşılaşılan engeller ve çözüm önerileri gibi temalarda bütünleşmiştir. Sağlık çalışanları, iklimsel sürdürülebilirlik açısından bireysel farkındalıkların artırılması, kurumsal destek mekanizmalarının geliştirilmesi ve sürdürülebilir uygulamaların teşvik edilmesi gerektiğini vurgulamıştır. Sağlık çalışanlarının yaşantısal deneyimlerinin anlaşılması, iklim dirençli sağlık hizmetleri uygulamalarını desteklemek açısından önemlidir. Bulgular, kurumsal politikalar, eğitim programları ve gelecekteki araştırmalar için yol gösterici olabilir.

Anahtar Kelimeler: Çevresel sürdürülebilirlik, iklim değişikliği, sağlık çalışanları, fenomenoloji, nitel araştırma.

Introduction

Climate change is recognized not only as an environmental threat but also as one of the greatest risks to public health. Moreover, the view that the climate is increasingly changing and that human activities play a decisive role in this change is widely accepted among scientists (Intergovernmental Panel on Climate Change [IPCC], 2013). Although the health sector is dedicated to protecting life and well-being, it also significantly contributes to climate change through its carbon footprint, resource consumption, waste generation, and energy use, creating an urgent need for sustainable practices in healthcare (Greenwald et al., 2023; Karliner & Boyd, 2019; Watts et al., 2023). Within this framework, the World Health Organization [WHO] (2023) emphasizes the global threat of climate change to health, highlighting how its consequences—such as extreme heat, water and air pollution, food security risks, and the spread of infectious diseases—directly affect both individual health and health systems. In this process, health professionals directly experience the negative consequences of climate change and serve at the front-line in combating its effects (Amoadu et al., 2023; Luque-Alcaraz et al., 2024).

Understanding the perceptions and experiences of health professionals—who are key actors in the health sector—regarding environmental sustainability is of critical importance. Their central role in both managing the health consequences of climate change and implementing sustainable practices in health institutions highlights the need for such investigations. This study is guided by the central research question: *“How do health professionals perceive the impacts of climate change on health and the environment?”* Accordingly, the aim of this research is to explore the perceptions and experiences of health professionals regarding environmental sustainability and climate change within the framework of a descriptive phenomenological approach.

Health Systems and the Role of Health Professionals in the Context of the Climate Crisis

Climate change can alter human lives in positive, negative, or neutral ways (Ebi & Semenza, 2008:

501). These changes affect human health both directly and indirectly. Environmental factors such as heat waves, air pollution, waterborne diseases, and food security risks pose significant threats, especially for older adults and individuals with chronic illnesses, leading to an increase in allergic reactions as well as respiratory, cardiovascular, neurological, and psychological disorders (Agache et al., 2023; Cianconi et al., 2020; Kinay et al., 2019; Trombley et al., 2017; World Health Organization [WHO], 2023). At the same time, health institutions are increasingly striving to reduce the environmental impacts of the climate crisis and to enhance their sustainable performance in line with the demands of stakeholders such as government agencies, service users, competitors, and health professionals (Martins et al., 2021). Indeed, the growing awareness of the adverse effects of the climate crisis and the rising number of initiatives underscore the necessity of strengthening the resilience and adaptive capacity of health systems. In this regard, the WHO (2023), in its report *Operational Framework for Climate-Resilient Health Systems*, proposes a strategic roadmap that includes strengthening infrastructure, establishing early warning systems, developing environmental monitoring mechanisms, and training health professionals to build climate-resilient health systems. Similarly, Ansah and colleagues (2024) examined the preparedness of health systems for climate change on a global scale, emphasizing that structural deficiencies, resource constraints, and managerial shortcomings pose particularly severe risks in low- and middle-income countries.

Climate change creates adverse impacts on human health, health-related emergencies, migration flows, health security, and health systems, further complicating existing health problems and paving the way for new health risks to emerge (Irmak & Serin, 2023: 747). The damage caused by the climate crisis is not limited to health but also deepens socioeconomic inequalities. The disproportionate effects on vulnerable groups—such as older adults, migrants, and low-income individuals—must be evaluated within the framework of climate justice, emphasizing principles of fairness and equity (Kaya, 2017). In this context, strengthening health

systems against climate change is critically important not only for disaster management and preparedness but also for ensuring sustainability, equity, and access to health services. Community-based adaptation is crucial in addressing the negative health impacts of climate change (Ebi & Semenza, 2008). They argue that communities can build resilience against climate-related health risks through social capital, and that this process should be supported by stakeholder engagement, storytelling techniques, and multi-stakeholder collaborations.

Healthcare professionals do more than provide medical services. Empowered by their professional authority, they are highly trusted individuals in society and play important roles in advocacy and knowledge dissemination on climate change. In this respect, healthcare professionals have the potential to communicate information on environmental risks to the public and to contribute to policy-making processes in this field (Charles et al., 2021). Moreover, enhancing the knowledge and awareness of healthcare professionals is considered a key determinant in developing effective strategies to address the climate crisis (Luque-Alcaraz et al., 2024; Maibach et al., 2015). However, efforts to intervene in the health impacts of climate change have not been sufficiently effective due to institutional fragmentation, lack of coordination, and low stakeholder participation within the health sector (Boyer et al., 2020). Therefore, it is important to investigate through qualitative research how healthcare professionals are involved in environmental sustainability practices, and how developers fail to develop—their capacity to cope with the climate crisis.

Methods

This study, which aimed to explore healthcare professionals' perceptions and experiences regarding environmental sustainability and climate change, was designed as a qualitative descriptive phenomenological study. Guided by Giorgi's (2005) descriptive phenomenological approach, the study focused on understanding individuals' subjective experiences of environmental sustainability and

followed a systematic process of analysis to capture the "essence" of these experiences. In this approach, researchers seek to interpret participants lived experiences in their own words while scientifically identifying the essence of the phenomenon.

In line with the aim of the study, a semi-structured interview form was used to collect data. The form was developed by researchers based on a review of literature. In constructing the interview guide, key concepts such as environmental sustainability, climate change, impacts on healthcare services, and institutional practices were considered. In addition, reports of the WHO (2023) on climate-resilient health systems and current academic publications on environmental sustainability in the health sector were examined to shape the interview questions.

The questions in the interview form were prepared in an open-ended format, allowing healthcare professional participants to freely express their experiences. While some questions addressed demographic information (e.g., age, years of service in the current institution, and unit of work), others were organized under thematic categories such as individual awareness and attitudes, institutional practices, observations, encountered barriers, and suggestions. The questions were formulated in a neutral, non-directive manner, and probing follow-up questions were added to the main questions to enable in-depth data collection.

The draft form was evaluated for content validity by two academics specializing in qualitative research, and necessary revisions were made in line with their feedback. For pilot testing, preliminary interviews were conducted with two healthcare professionals to assess the clarity, sequencing, and duration of the questions. Following these assessments, the final version of the interview form was produced and subsequently used in the data collection process.

Ethical Considerations

This study was conducted with the approval of the Ethics Committee, dated 31 July 2025 and numbered 175/7. Informed consent was obtained from all participants, who voluntarily agreed to take

part in the research. Participants' identities were kept confidential, the data were used solely for scientific purposes, and principles of voluntary participation, confidentiality, and privacy were strictly adhered to throughout all stages of the study.

Participants

The study was conducted included healthcare professionals working in hospitals across various regions of Turkey. A total of 10 healthcare professionals from various branches and occupational groups (e.g., physicians, nurses, technicians) working in public hospitals participated in the study. Participants were selected through purposive sampling, ensuring diversity in professional roles, gender, and work units. Data collection was carried out between 1 August and 7 August 2025, in accordance with the principle of saturation; the process was concluded once data repetition was observed.

Data was collected through in-depth, face-to-face individual interviews using a semi-structured interview guide. With the permission of the participants, all interviews were audio-recorded, and each session lasted approximately 30 to 45 minutes. Both written and verbally informed consent was obtained prior to participation. Of the 10 participants who agreed to take part and met the inclusion criteria, 6 were women and 4 were men. Demographic characteristics of the participants are presented in Table 1.

Table 1. Participant Information

Participant	Gender	Age	Experience	Profession
P1	Female	26	4 years	Physician
P2	Male	29	5 years	Nurse
P3	Female	42	20 years	Nurse
P4	Female	25	3 years	Nurse
P5	Female	31	9 years	Emergency Radiology Technician
P6	Male	28	5 years	Radiology Technician
P7	Male	35	6 years	Radiology Technician
P8	Male	45	22 years	Radiology Technician
P9	Female	30	11 years	Physician
P10	Female	31	4 years	Physician

Data Analysis

The data in this study were analyzed using Giorgi's (2012: 5–6) five-step descriptive phenomenological analysis method. The analysis process consisted of the following stages:

1. **Holistic Reading:** The researcher read the interview transcripts multiple times to gain a comprehensive perspective on the data. The purpose of this step was to develop familiarity with the overall meaning of participants' experiences.
2. **Identification of Meaning Units:** The transcripts were carefully reviewed from beginning to end, and points where shifts in meaning occurred were marked. The data were then divided into meaning units. These units were identified not on a theoretical basis but rather on experiential and contextual grounds, considering the transformation points that captured the researcher's attention.
3. **Transformation into Psychologically Oriented Descriptions:** Each meaning unit was rephrased in a way that remained faithful to the participants' expressions while reflecting the psychological dimension of the phenomenon. In this way, the psychological meaning underlying the experience was revealed based on participants' narratives.
4. **Constitution of the Essential Structure:** Through the restructured expressions, the technique of imaginative variation was applied to identify the invariant dimensions of the experience. The aim of this step was to uncover the shared and essential core of the phenomenon across different participant accounts.
5. **Coding and Thematic Structuring:** In the final stage, the data were recorded in line with the essential structure, common patterns were identified, and the findings were integrated under meaningful themes. The resulting themes were presented in a way that elucidated the essence of the phenomenon.

Throughout the analysis, the researchers adhered to the principle of phenomenological reduction, taking care not to introduce their own preconceptions into the process. Each analytical step was conducted with methodological rigor, and the themes were structured and supported directly by participants' statements.

Results

Table 2. Themes and Sub-Themes

Themes	Sub-Themes
Impacts of Climate Change on Health and the Environment	Effects of environmental pollution on health Health risks of seasonal and climatic changes Climate-related infectious and chronic diseases
Reflections of Climate Change on the Health System	Increased demand, inequality, and rising costs in healthcare services Impacts on infrastructure and workforce Resource scarcity and inefficiency
Institutional Barriers and Needs	Lack of education, knowledge, and awareness Insufficient managerial support and incentives Deficiencies in institutional sustainability practices
Examples of Practices and Opportunities	Waste management, recycling, and carbon reduction Renewable energy and technological transformation
Individual Awareness, Attitudes, and Participation	Individual environmental responsibilities
Political and Systemic Approaches	Government policies and environmental governance in healthcare Digitalization, information dissemination, and communication

In this study, the perceptions, experiences, and practices of healthcare professionals regarding environmental sustainability and climate change were examined through thematic analysis. Based on the coding process, the findings were organized into six main themes, considering common patterns and thematic coherence. These themes are:

1. Impacts of climate change on health and the environment
2. Reflections on climate change on the health system
3. Institutional barriers and needs
4. Examples of practices and opportunities

5. Individual awareness, attitudes, and participation
6. Political and systemic approaches

Impacts of Climate Change on Health and the Environment

Climate change affects individuals' health both directly and indirectly through various environmental factors. These effects manifest as health problems caused by air, water, and soil pollution; risks associated with seasonal and climatic changes; and the rising incidence of climate-related infectious and chronic diseases. Most healthcare professionals in this study evaluated the impacts of climate change on human health as severe and multidimensional. They particularly emphasized that air pollution, contamination of water and soil resources, food safety risks, and seasonal variations contribute to diverse health problems. In addition, participants shared clinical observations regarding the increasing prevalence of infectious diseases, respiratory disorders, psychological effects, and environmentally driven chronic conditions. Some of their statements are as follows:

"I think people are not fully aware, but the number of infectious diseases is increasing every day. Over the next 20–30 years, as water scarcity worsens, we will feel this even more." (P1, physician)

"...for example, we see that cancer rates are increasing significantly. It also worsens conditions like COPD and respiratory infections. I think this is due to climate change and the contamination of the food we eat." (P2, nurse)

"Climate change may increase diseases; for example, rising temperatures linked to pollution are associated with more flu and respiratory infections." (P9, physician)

"The more we harm the environment, the more it affects us negatively in return. This inevitably deteriorates human health... It also has psychological effects. For example, when the weather is cloudy, some people experience negative moods, while sunny and lively weather creates a positive effect." (P5, emergency radiology technician)

Reflections of Climate Change on the Health System

Healthcare professionals emphasized that climate change affects not only the environment but also health systems directly. Participants reported that these effects are reflected in concrete outcomes such as an increase in patient admissions to healthcare facilities, a deepening of health inequalities, and rising healthcare costs. They also noted experiencing difficulties in effectively managing interventions related to the climate crisis due to factors such as increased workload and inefficient resource utilization. Some participant statements are as follows:

"As individual illnesses increase, the healthcare system is also affected. Because there is a greater need for healthcare services. To meet this need, more resources are used, which leads to waste, creating a cycle that negatively affects both people and the environment." (P2, nurse)

"We are reaching different levels of intensity in healthcare. Normally, there used to be seasonal declines or increases. Now, this is unpredictable. It feels like we are constantly overloaded." (P7, radiology technician)

"...when climate change affects food and agriculture, it leads to poverty and deprivation. Over time, this can cause nutrient imbalances and hormonal disorders in people who lack access to sufficient food." (P9, physician)

"This is important as climate change affects individual health, health infrastructure and service delivery, while also increasing costs and creating a serious economic burden for countries." (P3, nurse)

Institutional Barriers and Needs

Healthcare professionals indicated that their institutions' efforts toward achieving environmental sustainability were inadequate. Among the most frequently cited institutional issues were a lack of knowledge and awareness, the absence of regular training on environmental topics, insufficient managerial support, and the lack of effective monitoring and incentive mechanisms. Some participants

also emphasized that the lack of institutional support for their individual efforts negatively impacted their motivation. Sample participant statements are presented below:

"...as I mentioned, we only have waste management training once a year. Is that enough? Well, in terms of training, yes. But in terms of implementation, I'm not sure. Maybe a few more posters or brochures could help." (P10, physician)

"Protecting the environment requires efficient use of resources, reducing waste, and reducing carbon emissions. However, careless human behavior is hindering this process. Furthermore, I haven't received any training or resources on this topic." (P4, nurse)

"I don't have much information. I try to use what I know to do better — especially in my personal life. I try to do good things, like using public transportation more. I also pay more attention to recycling. But while I can integrate these habits into my personal life, I can't seem to integrate them into my work life." (P5, emergency radiology technician)

"I haven't received any training or resources to increase my level of knowledge and awareness." (P6, radiology technician)

"I only know what I hear from places like social media or television." (P8, radiology technician)

Examples of Practices and Opportunities

Healthcare professionals emphasized that while various practices aimed at recycling, waste segregation, and energy conservation exist in their institutions, these practices are often limited in scale and not part of a systematic environmental sustainability policy. Participants also highlighted the significant potential for advancing environmental sustainability, stressing that institutional support and structured strategies are necessary to effectively implement this potential. Below are sample statements from participants:

"In my institution, the process is a bit different since we work in a hospital. We have to separate medical waste, so waste management is quite good. They do it because it's mandatory for hospitals. In addition, we also have separate bins

for battery waste, so I think they are doing their best... For example, there's also been a shift from paper filing systems to more electronic formats." (P10, physician)

"In our hospital, there used to be a very good initiative at the beginning under the name of recycling. They showed that they valued recycling, especially in terms of waste segregation." (P2, nurse)

"Well, in our institution, all the waste is already segregated. Of course, this is not something unique to my institution; many hospitals already do waste segregation. All the chemical substances that could harm the environment are separated and disposed of properly. But of course, this isn't something that can be handled solely within our institution." (P4, nurse)

Individual Awareness, Attitudes, and Participation

Most healthcare professionals expressed that they feel a sense of personal responsibility toward environmental sustainability. In this context, everyday practices such as recycling, reducing paper consumption, and adopting environmental sustainability practices were frequently highlighted. Several participants emphasized their efforts to translate their environmental awareness into tangible actions. However, despite high levels of individual awareness, some healthcare professionals reported feelings of inadequacy and isolation due to the lack of organizational support. Below are selected participant statements reflecting this theme:

"I try to pay attention to environmental cleanliness, waste management—all of it, as much as I can... I also try to encourage those around me to be mindful of these issues. But there's only so much I can do. I'd say I have some personal awareness on this matter." (P10, physician)

"Well, I can give many examples, like not throwing even a single piece of trash on the ground, installing filters on factory chimneys, using solar energy more often... I think we need to pay attention to all of these. Even something as simple as not throwing waste into the sea can make a huge difference." (P6, radiology technician)

"Protecting the environment requires collective responsibility; while individual efforts are valuable, meaningful progress can only be achieved when more people take part" (P9, physician)

"Individual behaviors are building blocks of society; positive actions improve the environment and inspire others, while negative ones contribute to its degradation. We become role models for others." (P3, nurse)

Political and Systemic Approaches

Healthcare professionals emphasized that the health system's current level of preparedness for the climate crisis is insufficient, highlighting the need for environmental sustainability to be prioritized more prominently at the level of state policies. Participants also pointed to the lack of informational tools and initiatives to raise awareness among healthcare workers, gaps in digitalization and systemic governance, and the need for increased scientific research in this area. These findings indicate the necessity of multi-level interventions to transition toward environmental sustainability and planetary health. Some illustrative participant statements include:

"As far as I know, apart from the existing ones, no additional policies have been implemented. Perhaps a complete shift from paper to electronic systems could be a positive step. There could also be changes to ventilation systems." (P10, physician)

"Employees need to be more informed, encouraged, and educated on this issue. There should be more planning, practices, and events related to reducing the carbon footprint. Brochures should be available, and the tools we use in hospitals should be designed in a way that supports practical and sustainable solutions." (P2, nurse)

"Every professional group working in the institution, from nurses to physicians to emergency technicians, should receive regular training." (P3, nurse)

"Hospitals could switch to renewable energy sources. For example, they could produce their

own energy and implement more comprehensive recycling practices.” (P5, emergency radiology technician)

“Installing solar panels could be a good step forward.” (P6, radiology technician)

“Air conditioning systems are used excessively in hospitals. I think this fluctuation in temperature negatively affects the environment. Technology should be utilized to minimize this environmental impact, and its importance should be emphasized. Additionally, there should be more training on waste segregation and the negative impacts of climate change on human health. Brochures summarizing these issues and survey results should be distributed frequently. For example, until now, no one has ever provided me with such information. These efforts could be improved.” (P9, physician)

“There are many projects like the Zero Waste initiative. I think the public should be made more aware of these efforts.” (P7, radiology technician)

Discussion

As the profound impact of climate change on health becomes increasingly evident, the intersection of healthcare and environmental sustainability has gained significant importance (Allarakhia, 2022; Luque-Alcaraz et al., 2024). In this study, healthcare professionals’ experiences and awareness regarding environmental sustainability and climate change were explored using a qualitative approach. The analysis, supported by subthemes, yielded six overarching themes: (1) the effects of climate change on health and the environment, (2) its implications for the health system, (3) institutional barriers and needs, (4) examples of practices and opportunities, (5) individual awareness, attitudes, and participation, and (6) political and systemic approaches.

Healthcare professionals described the effects of climate change on human health as a serious and escalating threat. They highlighted factors such as air and water pollution, food safety risks, and seasonal changes, along with the rising prevalence of health problems including respiratory diseases, infections, and cancer in recent years. This awareness

aligns with findings in the literature identifying healthcare professionals as trusted sources of information (Kreslake et al., 2017; Maibach et al., 2015). These findings reflect a strong awareness of the health impacts of deteriorating environmental conditions caused by climate change. International reports also highlight similar risks, addressing air and water pollution (Environmental Protection Agency [EPA], 2025a; European Environment Agency [EEA], 2022; WHO, 2023). Recent research highlights the impacts on infectious diseases and health inequalities (Agache et al., 2023; Rocque et al., 2021). Individuals with chronic conditions are particularly vulnerable to heatwaves, poor air quality, and water- and food-borne health problems associated with climate change. For instance, heatwaves can diminish the physiological responses to medications in older adults, while rising temperatures can increase susceptibility in individuals with weakened immune systems (EPA, 2025b). In a study by Kotcher et al. (2021), 93% of healthcare professionals reported that they believed climate change would cause moderate or severe harm to future generations, 81% to society, 77% to their patients, and 66% to themselves. Many participants in the present study also noted the increasing risks of displacement, hunger, heat-related illnesses, water- and food-borne infectious diseases, and disruptions to healthcare services. In addition, the psychological impacts of climate change were underscored, with participants referencing emotions such as anxiety, stress, helplessness, and fear—commonly described in the literature as “eco-anxiety” or “climate anxiety,” a stress response linked to environmental changes (Clayton et al., 2017; Marazziti et al., 2021; Vergunst & Berry, 2022). These findings align with previous research, suggesting that healthcare professionals’ concerns about the negative health impacts of climate change extend beyond personal observations and reflect a broader, evidence-based awareness.

Healthcare professionals emphasized that climate change significantly impacts not only individual health but also the broader healthcare system. These findings align with existing literature demonstrating that climate change places significant pressure on healthcare systems by increasing inequalities in access to care and increasing service

costs. Such pressures highlight the importance of health system resilience and preparedness. Increased workloads and inefficient use of resources were also noted as factors that negatively affect staff capacity to respond effectively to these challenges. Consistent with these findings, the literature highlights that climate change exerts substantial pressure on the service capacity of healthcare institutions, threatening the resilience of health systems (Ansah et al., 2024; MacNeil et al., 2021; Romanello et al., 2021). This underscores the need for health systems to be resilient to crises (Patz et al., 2014; Watts et al., 2023; WHO, 2023). Climate variability and extreme weather events exacerbate the frequency and severity of natural disasters, leading to increased demand for healthcare services and amplifying systemic pressures. Such environmental disasters can disrupt communication and operational processes, cause power outages, and indirectly result in income and productivity losses, which in turn escalate healthcare and social service costs (Mboera et al., 2012: 10). Moreover, climate change threatens population health while deepening social inequalities, with low-income and vulnerable populations disproportionately affected by these adverse impacts (Romanello et al., 2021). The WHO (2023: 8) emphasizes the urgency of preparing health systems for climate-related risks by adapting infrastructure, technology, and supply chains, and by enhancing the overall performance of health services. Addressing these challenges requires reinforcing health system preparedness and building institutional capacities that integrate the realities of climate change's impacts on both communities and healthcare delivery.

Participants also highlighted institutional barriers that hinder the effective implementation of environmental sustainability initiatives within healthcare organizations. Commonly reported issues included limited access to reliable information, low awareness levels, insufficient environmental training, inadequate managerial support, and weak enforcement and incentive mechanisms. Literature supports these observations, indicating that the absence of knowledge, awareness, and institutional backing serves as a critical barrier to the adoption of sustainable practices among healthcare professionals. For example, Aljabre et

al. (2002) reported that healthcare workers often lack awareness of the harmful environmental and health impacts of institutional waste and that existing training programs, administrative support, and control mechanisms are inadequate. Importantly, education and training initiatives addressing climate change not only enhance healthcare professionals' knowledge but also help mitigate the ecological grief and anxiety that often accompany environmental crises (Cunsolo et al., 2020). Equipping healthcare professionals with the necessary knowledge, skills, and attitudes to effectively advocate for environmental sustainability is critical. In this context, integrating themes such as environmental sustainability and planetary health into medical and health education curricula is widely recommended (Salas et al., 2020; Shaw et al., 2021). Indeed, Koşan et al. (2023) found that while medical students' general knowledge of the health impacts of climate change is high, they are not sufficiently aware of its impact on certain health problems, such as sexual dysfunction/infertility, cataracts/conjunctivitis, and post-traumatic stress disorder. Besides this, as highlighted by Howard et al. (2023: 2175), effective leadership within healthcare organizations plays a pivotal role in the success of sustainability initiatives. Leaders can foster a culture of continuous engagement by motivating staff and ensuring that sustainable practices are maintained. To institutionalize environmental sustainability effectively, specific organizational conditions must be established. The literature consistently points to the need for robust policies and leadership frameworks to drive and sustain environmental sustainability practices within healthcare institutions (Leal Filho et al., 2019; Lenzen et al., 2020; Salas et al., 2020).

According to the findings, healthcare professionals reported that environmental initiatives such as waste segregation and recycling were present in their workplaces; however, these efforts were often implemented on a limited scale and managed in a non-systematic manner. This reflects that environmental practices within institutions have yet to be embedded within a structured strategic framework. Globally, the healthcare sector accounts for approximately 4.6% of total greenhouse gas emissions (Watts et al., 2023). Indeed,

Karliner and Boyd (2019: 10), in their report on the climate footprint of the healthcare sector, highlight this reality by stating, *"If the global healthcare sector were a country, it would be the fifth-largest emitter of greenhouse gases on the planet."* The same report further emphasizes that awareness of the healthcare sector's significant contribution to greenhouse gas emissions remains strikingly low, both among healthcare stakeholders and within climate communities. This highlights the necessity of transforming health systems in alignment with the goals of the Paris Agreement, reinforcing the importance of integrating sustainability into healthcare operations. Both the report and participants' perspectives revealed that certain healthcare institutions have initiated practices such as recycling, waste management, carbon reduction strategies, and energy-saving initiatives. However, the findings underscore the need for these initiatives to be scaled up institutionally and supported through sustainable, policy-driven frameworks to achieve meaningful impact. Some participants also noted that their institutions have started leveraging digitalization and technological solutions as part of sustainability efforts. In line with these observations, the literature documents that health facilities have successfully reduced carbon emissions and lowered energy costs by adopting energy efficiency measures and renewable energy strategies (Pichler et al., 2019; Watts et al., 2023). Furthermore, advancements such as digital health records, online communication platforms, and energy-efficient infrastructure are recognized as effective strategies for reducing the environmental footprint of the healthcare sector.

Healthcare professionals reported a certain level of awareness regarding recycling, the use of public transportation, energy conservation, and environmental sustainability practices at the individual level. However, they also emphasized that these personal efforts lack organizational support, thereby limiting their overall impact. Existing studies highlight that individual environmental behaviors play a critical role in sustainability initiatives, but when these behaviors are not reinforced by institutional strategies, individuals' motivation tends to decline (Hausner et al., 2023: 7; Whitmarsh et al., 2013: 11). Building collective transformation

requires individual awareness as a fundamental starting point. Therefore, the development of behavioral change strategies that actively encourage healthcare professionals' engagement in the process is essential. In this regard, participants' perspectives provide important insights into the preparedness of health systems in addressing environmental sustainability. Debbik (2024) similarly found that while healthcare professionals are aware of environmental sustainability, there are significant gaps in practical implementation. Given their pivotal role in institutional transformation, equipping healthcare professionals with sufficient education and training is crucial for the effective implementation of low-carbon healthcare solutions (Mirow et al., 2024). In this context, enhancing the resilience of health systems to the climate crisis will require training healthcare personnel on environmental sustainability and climate-related crisis management, developing guiding policies, and strengthening digital infrastructures.

One of the key themes highlighted by healthcare professionals was the insufficiency of policy and systemic approaches to environmental sustainability. Participants emphasized that, in terms of the health system's preparedness for the climate crisis, current policies remain inadequate and that this issue should be prioritized at the state level. Although there have been some initiatives in digitalization, gaps in implementation, limited informational tools, and the lack of comprehensive strategies to reduce carbon footprints suggest that the impacts of the climate crisis on the healthcare sector are not being taken seriously enough. Participants' views reveal that Turkey's health system still faces structural and policy-level deficiencies in terms of environmental sustainability. Elements such as the absence of robust digital infrastructures, limited mechanisms for raising awareness, and the inability to scale up sustainable practices point to the system's vulnerability to climate-related threats. These findings align with the WHO's (2023) ten-component framework for climate-resilient health systems, which aims to enhance the resilience of health systems to climate change, protect public health, reduce greenhouse gas (GHG) emissions, and optimize resource use. Within this framework, the training of the health workforce,

effective governance, and the establishment of strong information systems are emphasized as critical areas. Among the recommendations of the participants were practices such as the use of solar energy, zero-waste projects, and waste segregation training—initiatives that could contribute both to individual awareness and to institutional transformation. These suggestions are consistent with Baytaş and Aydın's (2022: 352) study, which underscores the role of renewable energy use in enhancing the sustainability of healthcare services and addressing global environmental challenges. These global findings are consistent with pioneering studies in the Turkish context that demonstrate healthcare professionals' awareness and the policy actions needed to address climate-health issues. In the Turkish context, Yılmaz Altun (2025) examined physicians' awareness of climate change and health risks through a self-developed survey. While the study only covered a single professional group and was limited in its representativeness, it demonstrates that awareness of the climate-health relationship is beginning to be addressed in national research. Addressing the health impacts of climate change in Turkey requires policy-based actions and requires national authorities to pursue concrete strategies (Olgun and Kantarlı, 2020).

Conclusion

This study explored healthcare professionals' awareness, perceptions, and experiences regarding climate change and environmental sustainability. The findings indicate that healthcare workers are aware of the multifaceted impacts of climate change on both the physical and psychological health of individuals, as well as on the healthcare system itself. However, gaps in knowledge, insufficient training, weak incentive mechanisms, and inadequate digital infrastructure emerged as key factors limiting their participation in sustainability-driven practices. The observed disconnect between individual awareness and systemic support highlights the need to establish a comprehensive institutional framework for environmental sustainability within healthcare organizations. Participants emphasized that strengthening environmental sustainability policies and enhancing the

preparedness of Turkey's healthcare system are of critical importance. Although healthcare workers demonstrated high levels of individual awareness and consciousness, the study revealed that healthcare institutions often lack sufficient guidelines, strategies, and monitoring mechanisms to promote sustainability. For example, initiatives such as the "zero-waste" policy have not been effectively integrated into healthcare institutions, and healthcare workers reported insufficient training or information about such initiatives. Strengthening institutional support for individual efforts is therefore a critical step toward reducing the sector's carbon footprint. In this context, the individual efforts of healthcare workers must be supported by strong institutional policies, management, and systems.

Considering the study's findings, medical curricula and in-service training programs should be updated to include content focused on environmental sustainability (Salas et al., 2020; Shaw et al., 2021). Strategies and monitoring mechanisms that promote sustainability within healthcare institutions should be revisited to ensure that practices such as recycling, carbon reduction, and energy conservation are systematically implemented and aligned with organizational objectives (Karliner & Boyd, 2019). The use of digital record systems, energy-efficient infrastructures, and technological communication tools should be prioritized to help reduce hospitals' carbon footprints (Pichler et al., 2019). Additionally, national health policies should include regulatory frameworks that incentivize and guide the transition to environmentally friendly health systems (WHO, 2023). Finally, healthcare managers should embrace environmental sustainability goals, actively motivate their staff, and adopt leadership models that incorporate employee perspectives into decision-making processes (Howard et al., 2023). Individual environmentally friendly behaviors should also be recognized and rewarded at the institutional level.

While some studies in Turkey have examined healthcare workers' awareness of climate change and its health impacts (e.g., Koşan et al., 2023; Altun, 2025; Olgun & Kantarlı, 2020), there is a need to increase the generalizability of the findings with

larger and more diverse samples. Integrating validated measurement tools in future research could increase the power of measurement. Furthermore, including diverse stakeholders such as healthcare administrators, patients, policymakers, and environmental experts in the research groups will provide more in-depth comparative insights into institutional preparedness and individual awareness.

Declarations

Funding: No funding was received for conducting this study.

Conflicts of Interest: The authors declare no conflict of interest.

Ethical Approval: This study was approved by the Ethics Committee on 31 July 2025 (Approval No.: 175/7). The research adhered to institutional and national ethical standards.

Informed Consent: Written and verbal informed consent was obtained from all participants prior to the interviews. Participation was voluntary, anonymity and confidentiality were ensured, and audio recordings were used solely for scientific purposes.

Data Availability: Due to privacy and confidentiality considerations, raw interview recordings and full transcripts are not publicly available. De-identified excerpts and analysis materials can be obtained from the corresponding author upon reasonable request.

AI Disclosure: No artificial intelligence-based tools or applications were used in the conception, analysis, writing, or figure preparation of this study. All content was produced by the authors in accordance with scientific research methods and academic ethical principles.

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References

- Agache, I., Laculiceanu, A., Spanu, D., & Grigorescu, D. (2023). The concept of one health for allergic diseases and asthma. *Allergy, asthma & immunology research*, 15(3), 290–302. <https://doi.org/10.4168/aaair.2023.15.3.290>
- Aljabre, S. H., Hoffmann, F., Almorzog, B. S., Mikiling, L., Alabdulatif, M., & Al-Quorain, A. A. (2002). Hospital generated waste: An assessment of the awareness of hospital staff. *Journal of Family and Community Medicine*, 9(1), 47-50.
- Allarakhia, M. (2022). Engaging healthcare providers and patients on climate action through physical, emotional and social wellness. *The International Journal of Whole Person Care*, 9(1), 8–9. <https://doi.org/10.26443/ijwpc.v9i1.319>
- Altun, Ö. Y. (2025). İklim değişikliği ve sağlık farkındalığı: Artvin’de çalışan hekimler örneği. *Veche*, 4(1), 1-15.
- Amoadu, M., Ansah, E. W., Sarfo, J. O., & Hormenu, T. (2023). Impact of climate change and heat stress on workers’ health and productivity: a scoping review. *The Journal of Climate Change and Health*, 12, 100249.
- Ansah, E. W., Amoadu, M., Obeng, P., & Sarfo, J. O. (2024). Health systems response to climate change adaptation: a scoping review of global evidence. *BMC public health*, 24(1), 2015.
- Baytaş, V., & Aydın, G. Ç. (2022). Sağlık kurumlarında çevreye duyarlı politikalar: Yeşil hastane örnekleri. *Ekonomi Maliye İşletme Dergisi*, 5(2), 336-356.
- Boyer, C. J., Bowen, K., Murray, V., Hadley, J., Hilly, J. J., Hess, J. J., & Ebi, K. L. (2020). Using implementation science for health adaptation: Opportunities for pacific island countries: Analysis highlights examples from Pacific Island countries where implementation science can be used to enhance the capacity of health systems to prepare for and recover from climate-related exposures. *Health affairs*, 39(12), 2160-2167.
- Charles, J., Lois, A. N., Mukhopadhyay, C., Maibach, E., & Patz, J. A. (2021). Health professionals as advocates for climate solutions: A case study from Wisconsin. *The Journal of Climate Change and Health*, 4, 100052.

- Cianconi, P., Betrò, S., & Janiri, L. (2020). The impact of climate change on mental health: a systematic descriptive review. *Frontiers in psychiatry*, 11, 490206.
- Clayton, S., Manning, C. M., Krygsmann, K., & Speiser, M. (2017). Mental health and our changing climate: Health and Guidance. Washington, D.C.: American Psychological Association, and ecoAmerica.
- Cunsolo, A., Harper, S. L., Minor, K., Hayes, K., Williams, K. G., & Howard, C. (2020). Ecological grief and anxiety: the start of a healthy response to climate change?. *The Lancet Planetary Health*, 4(7), e261-e263.
- Debbik, K. S. Sağlık yönetiminde sürdürülebilirlik: Sağlık çalışanları arasında sürdürülebilirlik ve atık yönetimi algısı üzerine bir araştırma. *Quantrade Journal of Complex Systems in Social Sciences*, 6(1), 63-73.
- Ebi, K. L., & Semenza, J. C. (2008). Community-based adaptation to the health impacts of climate change. *American journal of preventive medicine*, 35(5), 501-507.
- Environmental Protection Agency. (2025a). *Climate Change Impacts on Health*. <https://www.epa.gov/climateimpacts/climate-change-impacts-health>
- Environmental Protection Agency. (2025b). *Climate Change and the Health of People with Chronic Medical Conditions*. <https://www.epa.gov/climateimpacts/climate-change-and-health-people-chronic-medical-conditions>
- European Environment Agency. (2022). *Soil pollution and health*. <https://www.eea.europa.eu/publications/zero-pollution/health/soil-pollution>
- Giorgi, A. (2005). The phenomenological movement and research in the human sciences. *Nursing Science Quarterly*, 18(1), 75-82. doi:10.1177/0894318404272112
- Giorgi, A. (2012). The descriptive phenomenological psychological method. *Journal of Phenomenological Psychology*, 43(1), 3-12. doi:10.1163/156916212x632934
- Greenwald L, Blanchard O, Hayden C and Sheeld P (2023) Climate and health education: A critical review at one medical school. *Front. Public Health* 10:1092359. doi: 10.3389/fpubh.2022.1092359
- Hausner, B., Horvath, D., Karner, S., Omann, I., Riemenschneider, M., Reckien, D., Susani, A., Wagner, L., Wanner, J., Warmuth, H. (2023) Key approaches of low-carbon lifestyle changes (LOCALISED Deliverable 6.1)
- Howard, C., Moineau, G., Poitras, J., Redvers, N., Mahmood, J., Eissa, M., ... & Guzman, C. A. F. (2023). Seeding a planetary health education revolution: institutional sign-on challenge. *The Lancet*, 402(10418), 2173-2176.
- Intergovernmental Panel on Climate Change. (2013). *Climate change 2013 – The Physical Science Basis*. Retrieved from <http://www.ipcc.ch/report/ar5/wg1/#.Utexh7EV-M8> on 8 February 2014.
- Irmak, Y., & Mersinlioğlu Serin, G. (2023). İklim değişikliği ile mücadelede önemli bir katalizör: Sağlık faktörü. *Süleyman Demirel Üniversitesi Vizyoner Dergisi*, 14(38), 739-751. <https://doi.org/10.21076/vizyoner.113-6570>
- Karliner, J., Slotterback, S., & Boyd, R. *Health care climate footprint report*. Arup. 2019. *Climate-smart health care series website*.
- Kaya, Y. (2017). Paris anlaşmasını iklim adaleti perspektifinden değerlendirmek. *Uluslararası İlişkiler Dergisi*, 14(54), 87-106.
- Kinay, P., Morse, A. P., Villanueva, E. V., Morrissey, K., & Staddon, P. L. (2019). Direct and indirect health impacts of climate change on the vulnerable elderly population in East China. *Environmental Reviews*, 27(3), 295-303.
- Kotcher, J., Maibach, E., Miller, J., Campbell, E., Alqodmani, L., Maiero, M., & Wyns, A. (2021). Views of health professionals on climate change and health: a multinational survey study. *The Lancet Planetary Health*, 5(5), e316-e323.
- Koşan, Z., Yavuz, E., Yılmaz, S., & Yerli, E. B. (2023). Tıp fakültesi öğrencilerinin küresel iklim değişikliği ve sağlık etkilerine yönelik farkındalık düzeyleri. *İklim ve Sağlık Dergisi / Climate and Health and Health Journal Climatehealth 2023*; 3(2):46-62.
- Kreslake, J. M., Sarfaty, M., Roser-Renouf, C., Leiserowitz, A. A., & Maibach, E. W. (2018). The critical roles of health professionals in climate change prevention and preparedness. *American Journal of Public Health*, 108(S2), S68-S69.
- Leal Filho, W., Shiel, C., Paço, A., Mifsud, M., Ávila, L. V., Brandli, L. L., ... & Caeiro, S. (2019). Sustainable development goals and sustainability teaching at universities: falling

- behind or getting ahead of the pack?. *Journal of Cleaner Production*, 232, 285-294.
- Lenzen, M., Malik, A., Li, M., Fry, J., Weisz, H., Pichler, P. P., ... & Pencheon, D. (2020). The environmental footprint of health care: a global assessment. *The Lancet Planetary Health*, 4(7), e271-e279.
- Luque-Alcaraz, O.M., Aparicio-Martínez, P., Gomera, A. et al. The environmental awareness of nurses as environmentally sustainable health care leaders: a mixed method analysis. *BMC Nurse*, 23, 229 (2024). <https://doi.org/10.1186/s12912-024-01895-z>
- MacNeill, A. J., McGain, F., & Sherman, J. D. (2021). Planetary health care: a framework for sustainable health systems. *The Lancet Planetary Health*, 5(2), e66-e68.
- Maibach, E. W., Kreslake, J. M., Roser-Renouf, C., Rosenthal, S., Feinberg, G., & Leiserowitz, A. A. (2015). Do Americans understand that global warming is harmful to human health? Evidence from a national survey. *Annals of global health*, 81(3), 396-409.
- Marazziti, D., Cianconi, P., Mucci, F., Foresi, L., Chiarantini, I., & Della Vecchia, A. (2021). Climate change, environment pollution, COVID-19 pandemic and mental health. *Science of the total environment*, 773, 145182.
- Martins, J. M., Aftab, H., Mata, M. N., Majeed, M. U., Aslam, S., Correia, A. B., & Mata, P. N. (2021). Assessing the impact of green hiring on sustainable performance: mediating role of green performance management and compensation. *International Journal of Environmental Research and Public Health*, 18(11), 5654.
- Mboera, L. E., Mayala, B. K., Kweka, E. J., & Mazigo, H. D. (2012). Impact of climate change on human health and health systems in Tanzania: a review. *Tanzania Journal of Health Research*, 13(5). <https://doi.org/10.4314/thrb.v13i5.10>
- Mirow, J., Venne, J., & Brand, A. (2024). Green health: how to decarbonise global healthcare systems. *Sustainable Earth Reviews*, 7(1), 28.
- Olgun, E., & Kantarlı, S. (2020). İklim değişikliğinin sağlık üzerine etkileri. *Doğanın Sesi*, (5), 13-23.
- Patz, J. A., Frumkin, H., Holloway, T., Vimont, D. J., & Haines, A. (2014). Climate change: challenges and opportunities for global health. *Jama*, 312(15), 1565-1580.
- Pichler, P. P., Jaccard, I. S., Weisz, U., & Weisz, H. (2019). International comparison of health care carbon footprints. *Environmental research letters*, 14(6), 064004.
- Rocque, R. J., Beaudoin, C., Ndjaboue, R., Cameron, L., Poirier-Bergeron, L., Poulin-Rheault, R. A., Fallon, C., Tricco, A. C., & Wittman, H. O. (2021). Health effects of climate change: an overview of systematic reviews. *BMJ open*, 11(6), e046333. <https://doi.org/10.1136/bmjopen-2020-046333>
- Romanello, M., McGushin, A., Di Napoli, C., Drummond, P., Hughes, N., Jamart, L., ... & Hamilton, I. (2021). The 2021 report of the Lancet Countdown on health and climate change: code red for a healthy future. *The Lancet*, 398(10311), 1619-1662.
- Salas, R. N., Maibach, E., Pencheon, D., Watts, N., & Frumkin, H. (2020). A pathway to net zero emissions for healthcare. *Bmj*, 371.
- Shaw, E., Walpole, S., McLean, M., Alvarez-Nieto, C., Barna, S., Bazin, K., ... & Woollard, R. (2021). AMEE Consensus Statement: Planetary health and education for sustainable healthcare. *Medical teacher*, 43(3), 272-286.
- Trombley, J., Chalupka, S., & Anderko, L. (2017). Climate change and mental health. *AJN The American Journal of Nursing*, 117(4), 44-52.
- Vergunst, F., & Berry, H. L. (2022). Climate change and children's mental health: a developmental perspective. *Clinical Psychological Science*, 10(4), 767-785.
- Watts, N., Amann, M., Arnell, N., Ayeb-Karlsson, S., Belesova, K., Boykoff, M., ... & Montgomery, H. (2019). The 2019 report of The Lancet Countdown on health and climate change: ensuring that the health of a child born today is not defined by a changing climate. *The Lancet*, 394(10211), 1836-1878.
- Whitmarsh, L., O'Neill, S., & Lorenzoni, I. (2013). Public engagement with climate change: what do we know and where do we go from here?. *International Journal of Media & Cultural Politics*, 9(1), 7-25.
- World Health Organization. (2023). *Operational framework for building climate resilient and low carbon health systems*.