

## THE ROLE OF NURSES IN ADDRESSING HEALTH EFFECTS OF CLIMATE CHANGE AND WILDFIRES

### ROLA PIELĘGNIAREK W PRZECIWDZIAŁANIU SKUTKOM ZDROWOTNYM ZMIAN KLIMATYCZNYCH I POŻARÓW LASÓW

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A. Study design/planning  
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#### Summary

The present study reviews existing evidence regarding the role of nursing in responses to climate change and wildfires caused by climate change, with the aim of enhancing nurses' awareness about these issues. A total of 21 studies published between 2014 to 2021 and written in English or Turkish were included in the review. Analysis focused on the role of nursing in lessening negative impacts from climate change and wildfires. There is evidence to suggest that nurses can significantly assist with the prevention and alleviation of the effects of climate change and wildfires. Based on these findings, it is recommended that nurses take an active role in reducing likely risks and responding effectively when needed. The importance of flexible and proactive health systems that can predict needs during emergencies is also highlighted. Nurses should lead the way in designing national and international policies on emergencies and disasters, making suggestions, and contributing to national emergency response plans, management of human resources, and the continuity of basic care services.

**Keywords:** wildfires, climate change, nurses, nursing, health

#### Streszczenie

W niniejszym opracowaniu dokonano przeglądu istniejących dowodów dotyczących roli pielęgniarstwa w odpowiedzi na zmiany klimatu i pożary lasów spowodowane, w celu zwiększenia świadomości pielęgniarek na temat tych zagadnień. Do przeglądu włączono łącznie 21 badań opublikowanych w latach 2014-2021 i napisanych w języku angielskim lub tureckim. Analiza skupiła się na roli pielęgniarstwa w zmniejszeniu negatywnego wpływu zmian klimatu i pożarów lasów. Istnieją dowody sugerujące, że pielęgniarki mogą znacząco pomóc w zapobieganiu i łagodzeniu skutków zmian klimatycznych i pożarów lasów. W oparciu o te wyniki zaleca się pielęgniarkom podjęcie aktywnej roli w zmniejszaniu prawdopodobnego ryzyka i skutecznym reagowaniu w razie potrzeby, a także podkreśla się znaczenie elastycznych i proaktywnych systemów opieki zdrowotnej, które mogą przewidzieć potrzeby w sytuacjach kryzysowych. Pielęgniarki powinny odgrywać wiodącą rolę w tworzeniu krajowej i międzynarodowej polityki dotyczącej sytuacji kryzysowych i katastrof, zgłaszać sugestie i wносить wkład do krajowych planów reagowania kryzysowego, zarządzania zasobami ludzkimi i ciągłości podstawowych usług opieki.

**Słowa kluczowe:** pożary lasów, zmiany klimatyczne, pielęgniarki, pielęgniarstwo, zdrowie

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## Introduction

Global climate change is having an ongoing negative impact on access to clean air, healthy drinking water, and adequate food, and is disrupting the social and environmental determinants of health [1]. Research indicates that the world has warmed by approximately 0.85°C over the last 130 years [2], with the resulting hot and dry conditions dehydrating ecosystems and increasing the size and frequency of wildfires [3].

In recent years an unprecedented number of wildfires have occurred across the world. Unusually violent fires have been seen in the North Pole, Amazonia, and Central Asia, whilst Australia recently fought with some of the worst wildfires in recorded history [4]. The US states of California, Oregon, and Washington all reported an increase in large-scale forest fires in 2020 [5], and in September 2020, the organization Unerthed reported that fires in Pantanal, Brazil, the world's largest wetland, reached the highest level since 1998. In the Attica region of Greece, forest fires forced people to flock to beaches and coastal areas [6]. Likewise, wildfires affected a large area of the Mediterranean coastline of Turkey, devastating giant pine forests and agricultural lands [7].

Experts continue to warn that strong winds, low humidity, and scorching heat are accelerating the spread of wildfires, that these weather events are becoming more prevalent due to ongoing climate change, and that this is set to continue at an ever-growing rate in coming years [8]. Studies indicate that extreme heat does not only make wildfires more violent, but also extends the duration of 'fire seasons', the periods when regions are most likely to be confronted with large, intense fires [9]. In addition to the immediate environmental destruction caused by wildfires, they are also known to release massive amounts of carbon dioxide, carbon monoxide, and fine particulate matter into the atmosphere. The ensuing air pollution gives rise to multiple public health concerns including respiratory and cardiovascular problems [10].

Particulate matter, smoke, and ashes released by wildfires create particular health risks for babies, young children, pregnant women, older adults, cardiac patients, and individuals who have or previously had respiratory tract diseases or COVID-19 [11]. Smoke and ashes caused by fires give rise to pulmonary inflammation, bronchitis, asthma, and other lung diseases, as well as causing burns and damage to eyes, nose, and lungs, and a decrease in lung functioning more generally. It is also documented that the mercury released into the air through forest fires can cause hearing and walking disorders, muscle weakness, and visual impairment [12].

Recent studies report that climate change and the forest fires caused by climate change are now unavoidable. A report by the Canadian Federation of Nurses Unions indicated that, in 2019, Canada warmed twice as fast as the global rate and the effects of climate change were felt more clearly in Canada due to it having a larger cryosphere (i.e. areas of frozen water) than other countries. The report also emphasized the importance of nurses in responding to the health consequences of climate change [13].

## Aim of the work

This study sets out to investigate the role that nursing might play in identifying and preventing the likely risks of climate change to population health, responding to these risks, and providing care following climate-related disasters. The aim of the study is to review existing literature regarding the role of nurses in responses to health emergencies related to climate change in order to enhance nurses' awareness about climate change and wildfires.

## Methods

Research articles written in English and Turkish that were published between 2014 and 2021 inclusive, were reviewed. Then the factors related to how nurses have been involved with responses to climate change and wildfires were analyzed. The following databases were searched: TÜBİTAK ULAKBİM DergiPark, PubMed, MEDLINE, and Google Scholar using the search terms "wildfire and nursing" and "climate change and nursing". The search identified 71 provisionally relevant studies. These were evaluated further, with 21 studies, which were directly related to nursing, eventually being accepted into the review.

## Studies regarding climate change and nursing

The majority of studies examining the role of nursing in responses to climate change aimed to enhance awareness about climate change and address responsibilities on the topic of climate change [14]. Focusing on studies carried out in the USA and Canada, it was found that studies typically investigated the roles assumed by nurses to alleviate the negative effects of climate change and mobilize health facilities and local communities [14,15]. In one ethnographic study conducted in Canada, it was found that nurses generally believed that the

relationship between climate change and health practices was more of a personal concern than a professional one, even if they had access to relevant information [14]. In a study carried out in the USA, the focus was on political developments in the role of nursing in climate and health advocacy and policy in the 21<sup>st</sup> century [16].

In a cross-sectional study carried out in Rwanda about climate change awareness, it was shown that nurses and midwives had limited knowledge about climate change and its potential health risks [17]. In studies conducted in China, Egypt, Iraq, Palestinian Territory, Saudi Arabia, and the UK, researchers examined nurses' knowledge and attitudes about climate change and their perceived roles in addressing the health-related effects of climate change [18-20].

Some studies looked at the roles that nurses played in the health and welfare of vulnerable communities with regard to enhancing understanding of the consequences of climate change. In these studies, the focus was on identifying differential diagnoses for sensitive groups and developing intervention plans [21].

Among studies conducted in Turkey, the most common target of research was raising awareness about climate change [22]. One study, which sampled nurses working in academia, enquired about the views nurses held about climate change. Results showed that these nurses had varying levels of understanding about climate change. While some took measures to address climate change in their own lives, they did not tend to stress any importance of the topic in an academic sense [23]. A summary of included studies on climate change and nursing is presented in Table 1.

**Table 1.** Summary of included studies examining climate change and nursing

Authors/ Year	Country	Methods	Conclusions
Zummo L, et al., 2020 [1]	USA	Mixed Methods	Due to the issue of climate change becoming politicized, educators should take into account politicized contexts while providing education on climate change.
Dowdy A], 2020 [4]	Australia	Research Article	Long-range forecasts provided to fire brigades several months in advance to produce smoother forecasts will enable them to improve climate adaptation efforts and reduce disaster risk.
Liu Y, et al., 2020 [5]	USA	Research Article	Exposure to wildfire smoke has been estimated to result in increased cardiovascular disease mortality.
Mallongi A, et al., 2020 [8]	Indonesia	Literature Review	Using forest mapping, which is prepared to reduce negative effects of fires and protect forest areas, the amount of carbon dioxide in the atmosphere will be reduced by 39.07 metric tons.
Magazzino C, et al., 2020 [11]	Italy	Research Article	Using the cutting technique in Artificial Neural Networks (ANNs), authors found that levels and threshold values identified by the ANNs are higher than the limits imposed by the European Parliament.
Bach Pages A, et al., 2020 [12]	Spain	Systematic Review	Articles correlating a forest variable with the most studied health variables could not be identified, suggesting the need for more accurate descriptions of forest variables within human health studies.
Kalogirou MR, et al., 2020 [14]	Canada	Ethnography	Participants had varying levels of knowledge about climate change, but did not evaluate this situation in the context of nursing.
Kulig JC, et al., 2014 [15]	Canada	Literature Review	It will be beneficial for nurses who are experts in their fields to use their leadership skills in attempts to reduce the impact of a disaster and to improve post-disaster social recovery.
Nicholas PK, et al., 2021 [16]	USA	Systematic Review	Nurses should follow policy decisions to enhance their advocacy role in responses to climate change.
Nsengiyumva R, et al., 2020 [17]	Rwanda	Cross-sectional Study	The awareness of nurses and midwives about climate change was found to be low. Climate change should be underlined in nursing education and in-service training.
Xiao J, et al., 2016 [18]	China	Cross-sectional Study	Training about climate change in Chinese educational institutions is weak.
Felicilda-Reynaldo RFD, et al., 2018 [19]	Arabia and Palestine	Cross-sectional Study	Health effects of climate change should be included in nursing education in Arab countries.
Neal-Boylan L, et al., 2019 [20]	UK	Systematic Review	Many universities have established sustainability-based curriculum plans.

Nicholas PK, Breakey S, 2017 [21]	USA	Literature Review	Recognizing the effects of climate change will highlight the role of nursing in climate change adaptation efforts.
Ay F, Yalçın Erik N, 2020 [22]	Turkey	Cross-sectional Study	Students studying in the social sciences have low awareness of the effects of climate change.
Dündar T, et al., 2020 [23]	Turkey	Cross-sectional Study	Academic nurses did not emphasize the precautions they took in their own lives with climate change during their nursing education.

### Studies regarding wildfires and nurses

Inspection of the literature regarding wildfires and nursing revealed a limited number of studies. The findings obtained from these studies indicated that the frequency of wildfires has steadily increased in recent years, and that this trend is likely to continue [17]. With the anticipation that fires connected with climate change will exacerbate health concerns in the near future, the focus of these studies was on the obligation of nursing to assist with the production and implementation of applicable policies that help to prevent wildfires and prepare health services to cope with patients suffering from smoke inhalation [24].

Included studies typically referred to the experiences that nurses had had in the regions where they worked, and illustrated that wildfires personally and professionally affected nurses working in rural areas. As such, the studies highlighted that the roles of nurses with regard to wildfire prevention, preparation, intervention, and recovery should be clearly defined [25]. Furthermore, a study carried out in the aftermath of wildfires in Canada demonstrated that not only nurses living in rural areas but all nurses should form part of a highly disciplined team that assumes responsibility for action taken during and after wildfires [15].

In a study that analyzed how nursing could contribute to research about the effect of wildfires on health, it was suggested that the level of contribution could be increased, especially in the area of alleviating the health impact of wildfires. In the same study, researchers emphasized that nursing was a privileged area of specialization that had the opportunity to protect public health [26]. Another study concurred that nurses had multiple opportunities to protect public health. Based on findings from this study it was asserted that nurses provided with theoretical knowledge about communication, multiple thinking, leadership, and organization would have sufficient capacity to help alleviate the effects of wildfires [17]. It was also stated that nurses should have a common perspective and should aim to work in harmony at all stages of managing emergencies and providing health services. According to these studies, nurses should use available resources effectively while assisting with initiatives aimed at the recovery of society through care of vulnerable groups [15,27].

One study showed that the negative effects of wildfires could be alleviated if sufficient prevention, intervention, and recovery steps were taken in a sustainable and timely manner [28]. Hanes defines three steps as follows: the promotion and development of nurses' professional roles, the creation of a professional education curriculum about the health effects of wildfires, and the identification of public health needs. In the same study, nurses' roles were described as ensuring that individuals, families, and society are prepared for wildfires via training programs about necessary measures to protect health during fires. The responsibility of nurses who undertake duties in the recovery stage is stated as vital for helping society return to functional levels [27]. A summary of findings from studies examining wildfires and nursing is shown in Table 2.

**Table 2.** Summary of included studies examining wildfires and nurses

Authors/ Year	Country	Methods	Conclusions
Kizer KW, 2020 [24]	USA	Literature Review	Smoke entrained by wildfires and hot weather in general can adversely affect the health of remote populations, particularly disadvantaged groups.
Álvarez-Nieto C, et al., 2017 [25]	Spain	Narrative Review	Nursing education on environmental sustainability should include training competencies at the individual and social level.
Marko T, et al., 2020 [26]	USA	Scoping Review	Nursing has the opportunity to protect public health by planning wildfire research.
Hanes PF, 2016 [27]	USA	Review	Wildfires and their effects on health have not been examined in the context of nursing, and nurses' role in reducing the effects of wildfires is important.
Abedi Gheslghi H, et al., 2021 [28]	Iran	Research Article	The results show that the forest fire susceptibility modeling, using resources used in fire extinguishing in regions with similar conditions is important in terms of sustainability.

## Conclusions

The studies reviewed here confirm the serious global problems caused by climate change and wildfires caused by climate change, though do not enable us to consider longer-term effects. A joined-up international response is needed to address these problems. We can conclude that leaders in the field of nursing must continue to develop evidence-based strategies that can improve nurses' knowledge of climate change and wildfires so that they can better protect the health of those affected and inform patients about ongoing risks related to the climate crisis. Nurses should be involved with implementing early warning systems and procedures for emergency and disaster response. This may include publishing recommendations and contributing to national emergency response plans. Nurses can take leadership in areas such as encouraging the promotion of better air quality and reinforcing human resources for disaster management. They can also assist in evaluating health needs following infrastructure damage, assuring the continuity of basic healthcare services such as immunization and maternal care, creating and managing aid materials and equipment, and designing proactive action plans for disasters that have a higher likelihood of occurring in the region. This review highlights research conducted across different countries on the topic of climate change. For the future it is recommended that researchers conduct more comprehensive studies, sampling from multiple countries, which focus on the potential role of nursing in ameliorating the impact of climate change and wildfires.

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