

Climate change and its impact on women's living

 Esra Özer

Department of Obstetrics and Gynecology Nursing, Faculty of Health Sciences, Ankara Medipol University, Ankara, Turkiye

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ABSTRACT

Climate change is one of the biggest global health threats to the world's population. Global warming can occur largely due to increased levels of greenhouse gases caused by human activities and conditions such as the burning of fossil fuels (carbon dioxide), livestock (methane from manure), industrial emissions, vehicle/factory exhaust and chlorofluorocarbon aerosols that trap extra heat in the Earth's atmosphere. The resulting extreme weather conditions lead to uncontrollable fires, air pollution, ecological changes and floods. The realization of ecological changes has major impacts on population displacement, family fragmentation, violence, water availability and quality, food security, public health and economic infrastructures. The consequences of ecological changes affect public safety and their ability to maintain health. Climate change also has direct impacts on human health and well-being. Particularly vulnerable populations are affected, including women, pregnant women, children, persons with disabilities and the elderly, who make up the majority of disadvantaged populations globally. In addition, when disasters occur, communities of different ethnic groups, low-income and disadvantaged individuals are more affected by climate change challenges. The climate crisis negatively alters the balance of risk for women's sexual and reproductive health and rights, as well as for newborn and child health. Obstetric nurses and midwives have a unique opportunity to raise awareness, educate and advocate for mitigation strategies to reverse climate change affecting patients and their families. The objective of this review is to examine the circumstances under which climate change may emerge as a significant public health, social justice, human rights, economic, and women's health challenge. The FIGO reports that the current climate crisis poses an imminent health risk to pregnant women, developing fetuses, and reproductive health, and calls for community-wide solutions, government policies, and global action.

Keywords: Climate change, ecological crisis, women's health

INTRODUCTION

According to the World Health Organisation (WHO), the definition of health is not only the absence of disease and disability, but also the complete physical, mental and social well-being of the individual.¹ Women's health covers the entire health status of women from birth to death. Investing in women's health means investing in the health of present and future generations. For this reason, it will be useful to know the global effects of climate change and its reflections on women's health.

The International Federation of Gynaecology and Obstetrics (FIGO) has called attention to the fact that the current climate crisis poses an imminent health risk to pregnant women, developing foetuses and reproductive health. In particular, the need for community-wide solutions to address and mitigate the drivers of climate change, including fossil fuel production, is emphasised. The need for government policies and global co-operation in this field is important in terms of being a partner in the solution.

According to the United Nations International Children's Emergency Fund (UNICEF), half of the world's children are at 'extremely high risk' of the impacts of climate change,

due to their exposure to multiple climate hazards and lack of access to basic health care and other services that can help. Children, families and communities must work to mitigate climate-related events and mitigate their impacts.² Children and adolescents are particularly at risk from climate change events because of their rapidly developing brains and bodies, vulnerability to disease, need for care and limited capacity to avoid threats and impacts. Children and adolescents are more likely to fear and worry about climate change than other age groups. UNICEF has recently developed a technical note on planning and preparedness to protect populations from heat stress.³

It can be said that the observation of global temperature, rainfall, fires, storms and vector-borne diseases have increased over the years.⁴ It is thought that the health impacts of climate change will worsen the effects of diseases such as coronavirus etc.⁵ The United Nations Intergovernmental Programme on Climate Change has adopted 2019 as a "code red" year for our planet, predicting a 3°C increase in average temperature by the end of this century. Climate conditions such as drought, heavy rainfall, rising sea levels, hurricanes, storms and high temperatures create a favourable environment for the spread

Corresponding Author: Esra Özer, esraozelllll@gmail.com



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of vector-borne diseases⁶ (Figure 1). The WHO reports that natural disasters have tripled since 1960, causing more than 60,000 deaths per year. WHO estimates that by 2030 this impact will increase to at least 250,000 deaths per year.⁷ While there are direct threats to global health, such as air pollution, water pollution, access to safe food and shelter, there are indirect effects that affect reproductive health, women's health and even future generations. It has been reported that mortality rates increase in regions where resources are inadequate.⁸

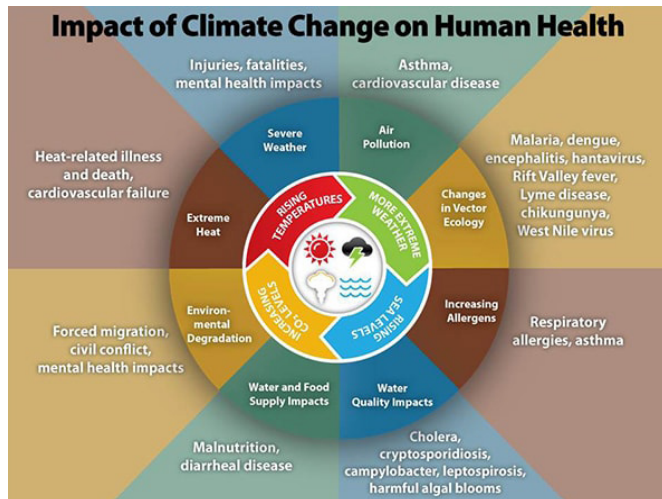


Figure 1. Impact of climate change on human health <https://www.cdc.gov/climateandhealth/effects/default.htm>, accessed May 07, 2024

The impacts of climate change threaten daily life and even survival, from food and shelter insecurity to reduced agricultural production and vector-borne diseases. These changes jeopardise the sustainability of health systems and vulnerable groups are more affected. Vulnerable groups, including children, women, pregnant women, the elderly and refugees, are disproportionately affected by climate change.⁴ Seventy per cent of the 1.3 billion people living below the poverty line in resource-poor countries are women, and climate change is making this group even more vulnerable. Globally, women are more adversely affected than men, and without appropriate adaptation, this inequality is projected to worsen in the coming years.⁹

CLIMATE CHANGE AND REPRODUCTIVE HEALTH CONSEQUENCES

Events related to climate change have direct and indirect effects on health. Direct impacts are temperature extremes, heat/cold waves, hurricanes, storms, floods and fires; indirect impacts are vector-borne diseases, infections, epidemics, water and food-borne diseases, air pollution and respiratory diseases, stratospheric ozone depletion and UV radiation, allergic diseases and field dust.¹⁰ Migration and internal conflicts can be the result of both direct and indirect climate events (Figure 2). Climate change is known to have a direct impact on fertility, prenatal outcomes, mental health, sexual health, reproductive rights and survival.¹⁰ Post-traumatic stress, suicides and adverse pregnancy outcomes in survivors have also been observed in the community in relation to disaster. In resource-poor countries, existing problems in access to adequate health services, including contraceptives,

preconception, pregnancy, labour and maternity care, will exacerbate outcomes in the event of a disaster.¹¹

In addition to direct impacts on populations following events such as climate change, disasters and migration, weather conditions also have short- and long-term impacts on human health. Research has shown that disasters and weather events cause major disruptions in the health system and affect health outcomes. Gynecologic cancer patients in need of basic services are the most vulnerable group to extreme weather events.^{12,13}



Figure 2. Infographic for health advocates and policymakers, giving an overview of the ways in which climate change increases health risks to pregnant women and their children <https://www.env-health.org/climate-change-puts-pregnant-women-at-greater-risk-new-infographic-by-figo-ucsf-and-heal>, accessed May 07, 2024

Air Pollution

Climate change and air pollution are closely intertwined. Fossil fuel consumption is one of the main causes of climate change and air pollution. Carbon dioxide, methane and nitrous oxide, the most common residual products of fossil fuel consumption, are the substances that have the greatest impact on climate change. Such air pollutants can exacerbate climate change by affecting the sunlight reflected by the atmosphere. Air pollution can damage vital organs, including the lungs, heart and placenta. In 2012, global deaths due to particulates from the use of fossil fuels were estimated at 10.2 million.¹⁴ Air pollution in Ukraine has been linked to 21 per cent of all diseases affecting women and children.¹⁵ Air pollution has been reported to be associated with hypertensive disorders in pregnant women and vulnerable groups.¹⁶

Exposure to air pollution has been reported to reduce pre-pregnancy fertility and prenatal live birth rates and to be associated with adverse obstetric outcomes such as preterm

birth and low birth weight.¹⁷⁻¹⁹ According to a study conducted in the USA, it was concluded that the proximity of residences to main roads increases the risk of infertility in couples undergoing IVF treatment.²⁰ According to another study, prenatal exposure to pollutants increased the risk of preterm labour and low birth weight babies.²¹ The closure of coal and oil power plants in California was found to have reduced air pollution over a ten-year period and resulted in a significant reduction in preterm births.²² Another consequence of global warming is forest fires. Forest fires have significant effects on air pollution and increase the risk of perinatal complications.^{23,24} Mendola et al.²³ suggested that regional variations in air pollution may have effects on consecutive pregnancies, with increased exposure to pollutants increasing adverse obstetric outcomes.

Heat

Climate change has increased the average global temperature by 1.2°C over more than a century. In different parts of the world, this increase has been as high as 3°C.⁶ These increases in temperature have caused negative impacts on ecosystems and life. In the USA, extreme heat causes more deaths than any other weather condition.²⁵ Even a small change in the average temperature can cause noticeable increases in temperature extremes. The hottest period on record has been the last seven years (from 2015 onwards) and the hottest year so far is 2020.²⁶ Above-average temperatures have the risk of increasing water scarcity and drought, thus decreasing crop production and increasing food shortages. Looking at reports of the 2021 heatwave in the Pacific Northwest, more than 600 deaths were reported in Oregon and Washington states.²⁷

In addition to the numerous impacts of extreme weather and natural disasters on maternal and child health (food insecurity, water pollution, increased risk of vector-borne diseases, psychological trauma due to displacement and violence against women, etc.), specific heat-related obstetric risks include preterm birth and low birth weight babies.²⁸⁻³⁰ A comprehensive review found a strong positive correlation between exposure to heat and air pollution during pregnancy and an increased risk of stillbirth, low birth weight and preterm birth.³¹ A critical period of maternal sensitisation to heat has not yet been firmly established. However, data suggest that exposure to heat early in the hot season is more harmful than later exposure due to lack of acclimatisation.³²

Fetal exposure to heat in utero is thought to cause a significant increase in the risk of prematurity, low birth weight and stillbirth, as well as fetal congenital anomalies such as conotruncal septal heart defects and cataracts.^{33,34} It is estimated that the incidence of foetal congenital heart defects due to heat exposure in some parts of the USA will increase by up to 60% by 2035.³⁴ According to a study, it was concluded that people who were exposed to temperatures of 32°C and above in utero and in the first year after birth had reduced annual earnings due to reduced cognitive ability in adulthood.³⁵

Heat exposure has also been associated with maternal health. Mothers exposed to excessive heat have been found to have an increased incidence of hypertension and detached placenta.³⁶

Extreme heat combined with pest problems and water scarcity potentially lead to reduced crop production. Food insecurity negatively affects women and children. Difficulty in accessing safe food increases the likelihood and extent of population migration, thus causing mental and physical stress to women.³⁷ High temperature, which we encounter as a reflection of climate change, also affects the health of children and adolescents. It has been reported that there is a strong correlation between heat stress caused by high temperature and mortality, especially in young children.³⁸⁻⁴⁰

Floods

Flooding is the accumulation of water on dry land in response to rising water levels in rivers, lakes and seas. River flooding can be caused by excessive snowmelt, heavy rainfall and coastal flooding. Climate change is leading to more intense rainfall, storm fronts and long-term sea level changes resulting from melting ice sheets. Sea level rise increases the likelihood of flooding during coastal storms, putting millions of people worldwide at risk. Climate change has led to more intense rainfall and long-term sea level changes resulting from melting ice sheets. This has caused rises in the oceans.⁴¹

Flooding is a hazard that can have serious mental and physical impacts on women's health. These impacts include exposure to polluted and severely toxic substances, prolonged exposure in flooded and unsanitary environments, severe stress, anxiety and depression, cultural norms that inhibit women's ability to recover from flooding, and food insecurity.^{42,43} The floods in Bangladesh, for example, had a disproportionate impact on women due to both cultural barriers and inadequate social services. According to the study, women in the village suffered from menstrual problems, urinary tract infections, pregnancy complications and malnutrition.⁴⁴ Hurricanes have been associated with an increased risk of major mood disorders in mothers, such as hypertensive disease, depression and post-traumatic stress disorder. It has also been shown to increase adverse neurodevelopmental outcomes such as preterm birth, low birth weight and mood disorders in children.^{11,45} According to a report by the Food and Agriculture Organisation, increased floods, droughts and forest fires as a result of worsening climate change are reported to be the biggest problem for low- and middle-income countries and have a detrimental impact on food security.⁴⁶ Climate crisis drivers such as floods, droughts and wildfires are projected to exacerbate food insecurity, worsen pregnancy and newborn outcomes, and pose even greater risks, particularly for women living in low- and middle-income countries, if left unaddressed.⁴⁷

Vector-borne Diseases

More than 1 million people die each year from vector-borne diseases such as malaria, dengue, schistosomiasis and congenital Zika.^{48,49} Temperature and precipitation affect the survival and development of these vectors. Indirect effects of climate change are related to pathogen exposures that evolve in response to changes in temperature, fluctuations in water levels and redistribution of normal or newly emerging species. Malaria kills 1 million people each year. Pregnant women are particularly vulnerable to vector-borne diseases. Malaria

infection during pregnancy has effects on both mother and foetus. These effects may include maternal and foetal anaemia, miscarriage, intrauterine death, preterm birth, intrauterine growth and development retardation, low birth weight baby.⁵⁰ Infection with the Zika virus during pregnancy results in serious birth defects, especially microcephaly.⁵¹ The increase in temperature as a result of climate change will increase the range of mosquitoes transmitting malaria and thus increase transmission. Previously stable vector distributions are changing due to climate change.⁵² Therefore, reducing the global incidence of vector-borne diseases is of global importance for maternal and newborn health. According to a review of food and waterborne infectious diseases, high temperatures are associated with infectious bacterial diseases and children are at higher risk than other age groups. One study concluded that for every 1 °C increase in temperature, the risk of transmission of certain bacterial pathogens (*Vibrio cholera*, *Salmonella*, *Escherichia coli*, etc.) increases, leading to an increase in gastrointestinal problems such as vomiting and diarrhea.⁵³ Children and adolescents consume more food and water per unit body weight than adults, making them more vulnerable to unsafe water and food sources.⁵⁴

CLIMATE CHANGE AND SEXUAL AND REPRODUCTIVE HEALTH RIGHTS

The important impact of climate change on human population is the observation of mass migration due to unfavourable climatic conditions. Temperature and drought adversely affect the quantity and quality of water. These conditions lead to a series of problems resulting in inadequate agriculture and thus mass migration of communities for survival. Women are the most vulnerable group to problems such as global temperatures, droughts, floods, insecure food and water due to their social status and family responsibilities. Women and girls are at high risk of sexual violence, abuse, abduction and intimate partner violence due to forced migration. Psychological problems such as stress, anxiety and depression are observed more frequently in this group. In this context, it can be concluded that climate change is not gender neutral as it increases social inequalities.⁵⁵

We see the effects of the climate crisis not only on women but also on foetuses in utero. Mothers affected by the climate crisis are exposed to climate stress factors and this situation poses significant risks for foetuses. These risks will affect the fetuses throughout their lives; fetuses will be born in utero with disadvantages due to climate-related negativities, and their susceptibility to diseases such as obesity, metabolic disorders, congenital defects, allergies, neurodevelopmental and psychological disorders will increase.^{4,56}

Another group affected by climate-induced changes is children and adolescents. Climate change and extreme weather events negatively affect the physical and mental health of children and adolescents. In a review of eight studies on children aged 3-18 years, it was reported that exposure to disasters leads to mental problems such as posttraumatic stress disorder (PTSD), depression, panic and anxiety.⁵⁷ The deterioration of air quality due to uncontrollable fires and air pollution causes adverse respiratory health outcomes among children

and adolescents or negatively affects existing health. Studies have shown that climate change-induced atmospheric particle changes and air pollution are associated with decreased lung function, childhood asthma and respiratory diseases.^{58,59}

In the coming years, as the emission rates of the planet increase and the world warms up, the effects of climate change are expected to be felt more. Climate change is predicted to be an existential problem for a large part of humanity. The adaptation of women's health professionals to the changing climate will have long-term effects and may alleviate the problems that may be observed in future generations.

CONCLUSION

The ongoing climate crisis presents a significant risk to women, pregnant mothers, unborn fetuses, and offspring who were exposed in utero to climate stressors. The effects of this exposure are magnified. Consequently, the adverse effects will reverberate across the human lifespan, with individuals born disadvantaged from in utero climate insults, burdened with predispositions to disease (e.g., obesity, metabolic disorders, congenital defects, allergies, neurodevelopmental and psychological impairments, etc.), and ill-adapted to further climate insults during their own lifetimes.⁵⁶

It is also evident that the health of women is disproportionately affected by the climate crisis, despite their minimal contribution to its genesis. While commendable, individual efforts to protect pregnant women and the developing fetus from the health hazards associated with air pollution, heat, and natural disasters are insufficient and beyond individual control due to the systematic sources of the climate change problem, of which the fossil fuel industry is a significant contributor. Pregnant women already face a multitude of personal restrictions, including dietary limitations, travel precautions, and personal care product choices. They are unable to control the outdoor air quality they encounter or the ambient local temperature. Therefore, it is recommended that climate policy interventions address sexual and reproductive health and human rights as a means of improving the lives of women and girls globally. In particular, it is proposed that governments and authoritative bodies that have identified policies that reduce fossil fuels be supported in their efforts to address climate change.⁶⁰

The climate crisis has been identified as a global emergency. In response, FIGO has recommended that healthcare providers assume a leading role in advocacy, research, policy development, and education efforts to address the climate crisis. In 2021, the editors of the world's leading medical, nursing, and public health journals, in a joint statement, described the rapidly warming climate as the "greatest threat" to global public health. They called on world leaders to take measures to avoid "catastrophic damage that will be irreversible".⁶¹

ETHICAL DECLARATIONS

Reviewer Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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