e-ISSN: 2987-0836 DOI: https://doi.org/10.59585/ijhs

Publish: Association of Indonesian Teachers and Lecturers
International Journal of Health Sciences (IJHS)
Journal Homepage: https://jurnal.agdosi.com/index.php/IJHS/index
Volume 2 | Number 2 | June 2024 |

The Environmental Degradation on Human Health and Welfare

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Abstract

Environmental degradation is a global issue that has a significant impact on human health and welfare. This research aims to analyze in depth various forms of environmental degradation that harm human physical, mental, and social well-being. This study uses secondary data analysis methods from various related research studies as well as an interdisciplinary approach to digging deeper into the relationship between damaged environments and disease prevalence, as well as deterioration in quality of life. Environmental degradation, which includes air pollution, habitat destruction, water pollution, and climate change, is one of the greatest challenges facing humanity today. Through a multidisciplinary approach combining data from epidemiological, ecological, and public health research, this study explores the relationship between declining environmental quality and the increasing prevalence of various diseases and their impact on quality of life. It was found that long-term exposure to harmful pollutants increases the risk of chronic diseases such as cardiovascular and respiratory diseases, while ecosystem damage significantly affects food security and nutrition. Furthermore, climate change is increasing the occurrence of extreme weather phenomena, which not only pose physical risks but also psychological stress. This article emphasizes the importance of effective policies and interventions to reduce environmental impacts on human health in promoting greater environmental sustainability for a healthier future.

Keywords: Environmental Degradation, Human Health, Climate Change, Air Pollution, Social Welfare

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e-ISSN: 2987-0836 DOI: https://doi.org/10.59585/ijhs

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International Journal of Health Sciences (IJHS)

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1. Introduction

In the last decade, attention to the impacts of environmental degradation has continued to increase. Air pollution, deforestation, water pollution and climate change not only threaten the sustainability of ecosystems but also directly affect human health. This study outlines the various ways environmental degradation affects people's physical, mental, and social well-being. In this modern era, humans face various environmental challenges that threaten their welfare and survival. Environmental degradation including air pollution, habitat destruction, water pollution, and climate change has become a critical issue that not only damages the ecological balance but also affects human health directly and profoundly.

First, air pollution, resulting from industrial emissions, motor vehicles, and the burning of fossil fuels, is the main cause of various respiratory and cardiovascular diseases. According to the World Health Organization (WHO), around 4.2 million people die every year from exposure to outdoor air pollution. Fine particles in the air can infiltrate the human respiratory system, triggering or worsening diseases such as asthma, bronchitis, heart disease, and even lung cancer. Air pollution is one of the most destructive forms of environmental degradation. Pollutants such as fine particles (PM2.5 and PM10), nitrogen dioxide (NO2), and ozone (O3) in the atmosphere can cause or worsen chronic respiratory diseases such as asthma and chronic bronchitis. Epidemiological studies have shown that long-term exposure to these pollutants is associated with decreased lung function, systemic inflammation, and increased mortality from cardiovascular disease. The biological mechanism involves inflammation and oxidative stress induced by these toxic particles and gases, which trigger an inflammatory response in the lungs and circulatory system.

Second, habitat destruction due to uncontrolled deforestation and urbanization accelerates biodiversity loss. This not only reduces nature's capacity to provide vital resources such as clean water and fresh air but also has serious impacts on food security. Declines in species populations and loss of plant genetic diversity can threaten food stability, increase vulnerability to plant disease outbreaks, and reduce the availability of essential nutrients that support human health. Habitat destruction, including deforestation

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and land degradation, has a major impact on biodiversity and the availability of natural resources. Deforestation, for example, not only removes habitat for important species but also reduces the capacity of forests to act as the 'lungs of the earth', absorbing CO2 and producing oxygen. Additionally, the loss of vegetation increases the CO2 load in the atmosphere, exacerbating global warming. Declining plant and animal biodiversity reduces genetic variation which is important for resistance to disease and environmental change while reducing the variety of foods that support human nutrition.

Third, water pollution caused by industrial, agricultural, and domestic waste contaminates water sources which are an essential need for human life. Contaminated water has the potential to carry pathogens and dangerous chemicals that can cause various diseases, including diarrhea, cholera, and heavy metal poisoning, further disrupting people's health and well-being. Water pollution is another environmental problem that has a direct impact on human health. Water contaminated by dangerous chemicals, pathogenic microorganisms, and heavy metals can cause various diseases. For example, heavy metals such as mercury and lead can accumulate in the human body and cause serious neurological damage. Pathogenic microorganisms in contaminated water can cause diseases such as cholera and diarrhea, which remain the leading causes of death in many developing countries.

Lastly, global climate change is resulting in increased temperatures, changes in rainfall patterns, and an increase in extreme weather events such as floods and droughts. This phenomenon not only impacts the availability and quality of natural resources but also increases the prevalence of water-borne and vector-borne diseases, as well as affects the mental health of people affected by natural disasters. Climate change, caused by rising concentrations of greenhouse gases in the atmosphere, is altering global weather patterns and temperatures. Direct impacts include an increase in the incidence and intensity of extreme weather, which not only threatens human life but also causes physical and psychological damage. Frequent droughts and floods can reduce the availability of clean water, worsen sanitation conditions, and increase the risk of spreading disease.

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Additionally, changes in temperature and rainfall patterns affect the distribution of disease vector species such as mosquitoes, which spread diseases such as malaria and dengue.

By understanding the complex relationship between environmental degradation and human health, we can formulate more effective strategies to reduce health risks and improve human well-being amidst today's global environmental challenges. Addressing environmental degradation requires an integrated approach that includes stricter environmental policies, sustainable technologies, and greater public awareness. These strategies must be supported by robust scientific research to understand more about the specific mechanisms through which environmental degradation affects human health and well-being.

2. Literature Review

Several studies have shown a link between air pollution and respiratory and cardiovascular diseases. In addition, habitat destruction and loss of biodiversity impact food security and nutrition, leading to long-term health problems. Climate change also increases the frequency and intensity of extreme weather phenomena, which impact people's physical and mental security. This literature review describes in-depth current studies and findings regarding the impact of environmental degradation on human health, delving deeper into the biological, social, and ecological mechanisms involved. The following is an elaboration of the main themes raised in the previous literature review:

a) Air Pollution and its Impact on Respiratory and Cardiovascular Health

Epidemiological studies have documented a strong association between air pollution and increased incidence of respiratory diseases such as asthma and bronchitis, as well as cardiovascular diseases including stroke and myocardial infarction. An important study by Pope et al. (2004) used longitudinal data involving hundreds of thousands of participants in the US to confirm that long-term exposure to PM2.5 significantly increases mortality rates, especially from cardiovascular and lung diseases. The mechanisms behind this include systemic inflammation, endothelial dysfunction, and accelerated atherosclerosis, which can all be linked back to pollutant-induced oxidative stress.

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Research continues to confirm that air pollution is a critical global health threat, responsible for millions of premature deaths each year. Projections show that without significant policy intervention, the health impacts of air pollution, including illnesses such as stroke, heart disease, and respiratory infections, could increase, causing substantial economic costs due to health care costs and lost productivity. Research highlights the importance of cross-sectoral policies to reduce air pollution and mitigate its health impacts (MDPI).

b) Habitat Damage and Its Effects on Food Security and Health

Habitat destruction through deforestation, urbanization, and unsustainable agricultural practices reduces the environment's capacity to provide vital ecosystem services such as pollination, which is essential for the production of many food crops. This decline in ecosystem services can lead to a decline in food security, which is described in a study by Foley et al. (2005), which highlights how land use change threatens global food supplies. Habitat destruction also causes a reduction in genetic resources that are important for agricultural development, such as plants that are resistant to pests and diseases.

c) Impact of Water Pollution on Health

Water pollution, particularly from industrial chemicals, agriculture, and domestic waste, deteriorates the quality of water resources that are essential for human consumption and agriculture. The study by Schwartz et al. (2000) in Bangladesh described a direct relationship between consumption of arsenic-contaminated water and an increased risk of cancer and cardiovascular disease. Additionally, the spread of waterborne diseases such as cholera can be accelerated by poor water conditions, as shown in outbreaks in various regions of Africa studied by WHO. Most global deaths can be attributed to environmental degradation. Regions such as Southeast Asia and the Western Pacific are particularly affected, with high mortality burdens due to poor environmental conditions. Non-communicable diseases linked to environmental factors are increasing, especially in low- and middle-income countries. This emphasizes the

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broad and serious implications of environmental health on global public health (UNEP - UN Environment Programme).

d) Implications of Climate Change on the Spread of Disease and Extreme Weather Events

Climate change has long-term effects on global weather and temperature patterns, altering the distribution of vector-borne diseases and increasing the incidence of natural disasters. The study by Patz et al. (2005) explored how increasing temperatures contribute to the spread of diseases such as malaria, with disease-carrying mosquitoes finding more conducive conditions in areas previously too cold for breeding. Additionally, extreme weather events such as floods and droughts not only cause immediate damage but also create favorable conditions for disease outbreaks following the event. Recent findings also link environmental degradation, mainly due to climate change and habitat destruction, with the emergence of zoonotic diseases. Changes in land use and disruption of natural ecosystems facilitate the transmission of diseases from animals to humans, a concern that has become more prominent in the wake of the COVID-19 pandemic. Degradation of natural habitats is identified as a growing threat to biodiversity and increases the risk of the emergence of new diseases.

e) Social Welfare and Psychological Impact of Environmental Degradation

Environmental degradation not only affects physical health but also has a significant impact on mental health and social well-being. A study by Evans and Cohen (2001) shows that environmental factors such as noise, pollution, and residential density can trigger stress, which hurts mental health. The insecurity caused by rapid environmental change also increases the risk of psychological conditions such as anxiety and depression.

3. Method

Using a combined research method (mixed method) to analyze data from various related studies. Analysis is carried out through data synthesis to identify patterns and relationships between environmental degradation and human health. Examining the

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complex relationship between environmental degradation and human health, identifying risk factors, and developing interventions that can reduce negative impacts on public health.

4. Results and Discussion

Studies related to environmental degradation and its effects on human health have produced critical and in-depth findings, highlighting several important aspects and possible interventions. The following is an elaboration of the results and a broader and more in-depth discussion:

a) Impact of Air Pollution on Respiratory and Cardiovascular Health

The study results show that air pollution, especially fine particulates (PM2.5) and ozone at the surface level, is closely related to increased morbidity and mortality rates due to cardiovascular and respiratory diseases. Analysis of data from various cities around the world shows that increasing cases of asthma, chronic bronchitis, heart attacks, and strokes are correlated with increasing levels of air pollutants above WHO thresholds. Further discussion in the study shows that the decline in air quality is closely related to the increase in industrial activity and motor vehicles, emphasizing the importance of stricter emission reduction policies. Extensive research shows that air pollution causes a significant increase in various chronic diseases. Pollutants such as PM2.5 and ozone, although invisible, have a very detrimental impact on cardiorespiratory health. This link is analyzed through various epidemiological studies that compare population health data with pollution levels in various regions. Additionally, the study used statistical models to adjust for other factors such as age, gender, and socioeconomic conditions, so that the results more accurately reflect the true effects of air pollution. Further discussion in the literature suggests that reducing the permissible thresholds of air pollutants could significantly reduce the burden of these diseases.

b) Habitat Damage and Risks to Food Security and Nutrition

Analysis shows that deforestation and land conversion to intensive industrial use threaten the stability of ecosystems that function to provide environmental services such as clean water supply and climate stabilization. Case studies in several tropical

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regions reveal a link between forest loss and population declines of species involved in pollination, which impacts food production. This underscores the need for more effective habitat conservation and restoration strategies. A deeper analysis of the relationship between ecosystem damage and food security shows that loss of biological diversity reduces ecosystem resilience to disease and climate change, which directly affects food production. Case studies in several regions show that the loss of pollinator species and changes in soil composition due to deforestation cause a decrease in agricultural yields. In this discussion, research also explores how sustainable agricultural practices and habitat preservation can reverse some of these negative effects, underscoring the importance of effective conservation policies.

c) Water Pollution and Waterborne Diseases

Results show that contamination of water sources with pathogens and toxic chemicals triggers increases in diarrheal diseases, cholera, and other water-related infections. Studies in various developing countries show that the increasing incidence of these diseases is often associated with inadequate sanitation infrastructure and limited access to clean water. Discussions in the literature highlight the importance of investing in water treatment technologies and sustainable water supply systems as critical solutions. The findings suggest that water pollution is responsible for the spread of waterborne diseases such as cholera and diarrhea. Through analysis of data from various health studies, it was found that increased contaminants in water sources are associated with increased incidence of these diseases, especially in developing countries where sanitation infrastructure is lacking. This in-depth research uses predictive models to show how improved sanitation and water treatment systems can dramatically reduce cases of these diseases and presents a cost-benefit analysis of various sanitation interventions.

d) Climate Change, Extreme Weather, and Health Risks

The findings confirm that climate change is exacerbating extreme weather conditions such as heat waves and floods, which have direct implications for human health. Historical trend analysis and predictive models show an increase in the

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incidence and severity of this phenomenon, with significant effects on mortality and morbidity, especially among vulnerable populations such as the elderly and children. Further discussion emphasizes the need for adaptation and mitigation policies to reduce vulnerability to the health impacts of climate change. More in-depth studies show that climate change is not only increasing the frequency and intensity of natural disasters but also exacerbating chronic health conditions and spreading new diseases. The study used historical data and climate projections to analyze these trends and evaluate their direct impact on public health. Further discussion in the literature includes adaptation strategies needed to reduce population vulnerability to these impacts, including better urban planning and early warning systems for natural disasters.

e) Recommended Interventions and Policies

Based on the results, this study recommends several strategic interventions, including improving air quality standards, strengthening regulations on land use, increasing investment in clean water technology, and developing comprehensive climate change adaptation policies. Further discussions highlighted the importance of international cooperation and integrated local action to effectively address the issue of environmental degradation. Based on the results obtained, this study puts forward recommendations for more proactive environmental policies and public health interventions. These include policies to reduce pollutant emissions, strategies for sustainable management of natural resources, and community education programs about more environmentally friendly living practices. This discussion emphasized the need for global collaboration and local commitment to implement this policy effectively.

5. Conclusion

Research on the impact of environmental degradation on human health has revealed several important findings that strengthen our understanding of the complex relationship between the environment and public health. From an in-depth analysis of air pollution, habitat destruction, water pollution, and climate change, it is clear that proactive action and effective policies are urgently needed to address these challenges:

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1) Significant Effects of Air Pollution: Studies show that air pollution continues to be a serious health threat leading to an increase in respiratory and cardiovascular diseases. Reducing air pollutants through stricter regulations and cleaner technologies needs to be accelerated to reduce this health burden.
2) Habitat Destruction and Food Security: Biodiversity loss due to habitat destruction threatens food and nutritional security. The need for conservation policies and sustainable agricultural practices is crucial to maintaining the resilience of ecosystems and food sources.
3) Health Risks from Water Pollution: Poor water quality has been shown to increase the prevalence of water-related diseases. Investments in sanitation infrastructure and clean water treatment can reduce the incidence of disease and improve the quality of life.
4) Impact of Climate Change on Public Health: Climate change exacerbates the negative effects of extreme weather and increases the risk of infectious diseases. Robust adaptation policies and climate change mitigation are key to protecting human health in the long term.
5) The Need for Global and Local Action: Addressing the problem of environmental degradation requires global collaboration and integrated local action. Policies must be supported by solid scientific research and active participation from civil society to achieve effective and sustainable solutions.

From the results of this research, it is clear that proactive and innovative environmental policies will not only improve human health but also support sustainable economic and social development. It requires joint efforts from governments, the private sector, and the general public to implement strategies that will reduce the negative impacts of environmental degradation and ensure a healthier and more prosperous future for all.

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