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Environment that causes diseases: article review

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ABSTRACT

Introduction: Environmentally induced diseases have become a global concern due to their significant impact on public health. The environment plays a significant role in increasing or decreasing the risk of disease through various factors, such as air, water, and soil pollution and exposure to hazardous chemicals. This review aims to analyze the literature on environmental factors that trigger diseases, including infectious diseases, chronic diseases, and mental health disorders, and to understand the mechanisms and impacts caused.

Research Methodology: This study used a systematic literature review of scientific articles, research reports, and other reliable sources published in the last two decades. Data were collected, analyzed, and grouped based on the type of environmental factors and their association with various diseases.

Result: Studies have shown that air pollution is a major cause of chronic respiratory diseases, such as asthma and chronic obstructive pulmonary disease (COPD), while water pollution and poor sanitation trigger outbreaks of infectious diseases such as diarrhea and cholera. Exposure to hazardous chemicals, such as pesticides and heavy metals, also contributes to increased risks of cancer and neurological disorders. In addition, environmental degradation, such as deforestation and climate change, exacerbate the spread of vector-borne diseases, such as malaria and dengue fever.

Conclusion: An unhealthy environment is key in triggering various diseases that endanger public health. Mitigation efforts, such as reducing pollution, improving water quality, and protecting ecosystems, are essential to minimize adverse health impacts. The study recommends increasing cross-sector collaboration and strengthening environmental policies to create an environment that supports public health.

Keywords: environment, environmental-based disease, disease.

INTRODUCTION

The environment plays a significant role in determining the health of a community, both directly and indirectly. Various environmental factors, such as air pollution, water pollution, climate change, and exposure to hazardous chemicals, have been identified as major causes of various diseases (Domingo-Relloso *et al.*, 2024). The impact of these factors is becoming more pronounced with population growth, rapid urbanization, and unsustainable human activities. The World Health Organization (WHO) reports that nearly 24% of all global diseases are linked to environmental factors, making it one of the major threats to human health in the 21st century (Ranasinghe *et al.*, 2024). Air pollution, for example, has become a major concern in developing and developed countries, with fine particulate matter (PM2.5 and PM10) linked to cardiovascular and respiratory diseases, including lung cancer. Meanwhile, water pollution and poor sanitation continue to be major causes of deaths from diarrheal diseases, especially in areas with inadequate infrastructure. In addition, climate change has led to an increase in the spread of vector-borne diseases, such as malaria and dengue fever, due to changes in rainfall and temperature patterns (Vahedi *et al.*, 2023).

Other environmental factors, such as exposure to industrial chemicals, pesticides, and heavy metals, are also known to increase the risk of hormonal, neurological, and cancer disorders (Yang Liu *et al.*, 2024). Rapid urbanization often creates unhealthy environmental conditions, such as dense settlements without adequate sanitation facilities, exacerbating disease risk. Studying environmental triggers for disease is crucial to understanding the relationship between environmental factors and disease burden (Ludwig *et al.*, 2024). This research provides a basis for developing policies and mitigation strategies to create a healthier and more sustainable environment. The environment is very important in influencing human health, both directly and indirectly. In this modern era, environmental changes triggered by human activities have increased various health risks (Jin, Yin, and Gu, 2025).

Air pollution from vehicles, industry, and burning fossil fuels continues to be a major threat, causing millions of respiratory diseases such as asthma, bronchitis, and chronic obstructive pulmonary disease (COPD) (Yeo *et al.*, 2023). In addition, climate change is exacerbating the spread of vector-borne diseases such as malaria, dengue fever, and Lyme disease due to changes in weather patterns and ecosystems (Islam, Tran, and Kubo, 2024). Poor water quality is also a significant problem, especially in developing countries. Water contamination with pathogens, industrial waste, and toxic chemicals, such as heavy metals, has increased the incidence of diseases such as diarrhea, cholera, and cancer. On the other hand, rapid urbanization and lack of adequate sanitation infrastructure exacerbate exposure to unhealthy environmental conditions (Wardi *et al.*, 2024).

Another factor of concern is exposure to hazardous chemicals, including pesticides, microplastics, and endocrine-disrupting chemicals found in various consumer products. These exposures can lead to hormone disruption, cancer, and other chronic diseases (Urbauer *et al.*, 2024). Recent studies have also shown a link between environmental degradation and increased mental health disorders, such as stress, anxiety, and depression, caused by climate uncertainty and environmental degradation (Zhou *et al.*, 2025). With increasing global awareness of the impacts of the environment on health, it is important to explore these relationships more deeply to identify effective solutions. A multidisciplinary and cross-sectoral approach is needed to address this issue, including stricter environmental management policies, strengthening public health systems, and increasing public awareness of environmental protection.

RESEARCH METHODOLOGY

The article or literature review research method systematically analyzes, synthesizes, and evaluates relevant literature in a particular field. This method aims to understand a topic's current state, identify research gaps, and formulate new insights based on existing data. Here are the main steps in the article review method:

Identify Research Topics. The first step is to determine the focus and purpose of the review. Researchers need to formulate clear research questions to limit the scope of the literature to be reviewed. Literature Search: Researchers collect relevant articles, journals, books, and other sources using academic databases such as PubMed, Scopus, Web of Science, or Google Scholar. Specific and relevant keywords are used to ensure comprehensive coverage of the literature. Literature Selection. After the literature has been collected, a screening process is conducted to select the most relevant sources. Usually, the selection is made based on the abstract, keywords, and predetermined inclusion-exclusion criteria, such as year of publication, language, or type of research. Analysis and Categorization: The selected literature is analyzed in depth. Important data, such as research objectives, methods, results, and conclusions, are identified and organized. Literature can be categorized based on theme, methodological approach, or research results to facilitate analysis.

Synthesis of Findings: Findings from various pieces of literature are arranged into a systematic narrative. Researchers identify patterns, relationships, contradictions, or gaps in the reviewed research. Writing the Study Results, Researchers compile the study results in a clear and structured format. It usually includes an introduction, main discussion, and conclusions. These results often provide a broader picture of the current research state and recommendations for further research. Literature Critique and Evaluation: The review also critically evaluates the strengths, weaknesses, and validity of the research analyzed to provide an objective perspective. The article review method comprehensively views a topic without conducting primary research. However, the quality of the review is highly dependent on the thoroughness and systematicity of the literature analysis process. This makes it an important method to support evidence-based decision-making in various fields, including health, the environment, and public policy.

RESULT

The literature review results on environmental causes of disease show that environmental factors play a complex role in increasing the risk of various diseases. The following are the main findings supported by the discussion based on the current literature:

Air Pollution and Respiratory Diseases

The analysis results show that air pollution remains a major contributor to chronic respiratory diseases, such as asthma, chronic obstructive pulmonary disease (COPD), and lung cancer. Data from the World Health Organization (WHO) in 2023 showed that 99% of the world's population is exposed to air that exceeds safe limits. Fine particulate matter (PM2.5) produced by vehicles, fossil fuel combustion, and industry directly impact increasing morbidity and mortality. Further discussion highlights the importance of transitioning to clean energy to reduce air pollution.

Water Pollution and Infectious Diseases

Water pollution, especially in developing countries, is a major cause of diseases such as diarrhea, cholera, and hepatitis A. Studies show that contamination with microplastics and heavy metals such as lead and mercury are also emerging concerns. Regulatory changes and improvements in sanitation infrastructure are urgently needed to address these issues.

Climate Change and Vector-Borne Diseases

Climate change, including rising global temperatures and changing rainfall patterns, has expanded the range of diseases such as malaria, dengue fever, and Lyme disease. A 2024 study found that tropical and subtropical countries are at the highest risk from increasing populations of mosquitoes that vector the diseases. Nature-based solutions, such as ecosystem restoration and vector monitoring, are recommended as mitigation measures.

Exposure to Hazardous Chemicals and Chronic Diseases

Recent studies have shown that synthetic chemicals, such as pesticides, phthalates, and bisphenol A (BPA), have cumulative impacts on human health. Long-term exposure to these chemicals has been linked to endocrine disruption, cancer, and metabolic diseases.

Strengthening regulations and promoting environmentally friendly products are key to reducing these risks.

Mental Health and the Environment

Environmental degradation, such as deforestation and pollution, has been linked to increased mental health disorders. Climate change also impacts economic and social uncertainty, which can lead to stress, anxiety, and depression. Recent research recommends integrative approaches, including nature-based therapies, to address these issues.

DISCUSSION

These findings suggest that environmental factors impact physical illness and mental well-being. To mitigate these impacts, a cross-sectoral approach involving health, environment, and policy is essential. The study underscores the need for global collaboration to reduce environmental risk factors through sustainable policies, public education, and technological innovation (Fink *et al.*, 2024). By integrating these findings into public planning and policy, it is hoped that the risk of environmentally-related illness can be minimized while improving the overall quality of life for communities (Kamal *et al.*, 2024). This statement effectively summarizes the key insights from the discussion on the interplay between environmental factors, health, and policy. It highlights the challenge's multifaceted nature, emphasizing that environmental degradation's consequences go beyond physical ailments to encompass mental health concerns (Yinghao Liu *et al.*, 2024). The recommendation for a cross-sectoral approach is particularly crucial, as it aligns with the contemporary understanding that tackling environmental health issues requires collaboration across disciplines and levels of governance (Zhou *et al.*, 2024).

Moreover, the emphasis on global collaboration reflects the interconnected nature of environmental challenges, such as climate change and pollution, which transcend national borders. Integrating sustainable policies, promoting public awareness, and leveraging technological advancements are practical steps that align with current trends in public health and environmental science (Polovitskaya *et al.*, 2024). Incorporating these strategies into public planning and policy addresses the immediate health risks and fosters long-term resilience, ultimately enhancing the quality of life for communities worldwide. This perspective is both actionable and visionary, providing a roadmap for mitigating environmental health risks while fostering sustainability (Thomas *et al.*, 2024).

This statement underscores environmental factors' dual impact on physical and mental health (H. Liu *et al.*, 2024). While the physical effects of environmental degradation, such as respiratory illnesses from air pollution or waterborne diseases from contamination, are well-documented, there is growing recognition of its influence on mental well-being(Duan *et al.*, 2024). Stress, anxiety, and depression are often linked to factors like climate change-induced displacement, exposure to natural disasters, and living in polluted or degraded environments. Acknowledging this connection is vital for developing comprehensive health strategies (Naknaen *et al.*, 2024). Addressing environmental issues mitigates physical health risks and promotes mental resilience, emphasizing the need for holistic approaches in public health and environmental policies (Singh *et al.*, 2024). This statement underscores environmental factors' dual impact on physical and mental health. Environmental stressors, such as pollution, climate change, and habitat degradation, can exacerbate physical ailments like respiratory diseases and cardiovascular conditions while simultaneously affecting mental well-being by inducing stress, anxiety, and depression (Chuchird *et al.*, 2024). The interconnected nature of physical and mental health emphasizes the need for holistic approaches to environmental health interventions. Addressing these challenges requires mitigating environmental hazards and recognizing and managing their psychological impacts. This highlights the importance of integrating mental health considerations into environmental health policies and initiatives for comprehensive well-being (Stahlmann et al., 2024).

The next environmental factor is disease vectors. Disease vectors are difficult to overcome because of their high survival ability after adapting to the environment (Lalrinfela *et al.*, 2024). The rapid proliferation of vectors is also caused by changes in the physical environment, such as industry, housing development, mining, uneven distribution of clean water supply systems using pipes, unfulfilled drainage system requirements in residential and urban areas, poor waste processing methods, and an increase of more than 60 percent in air humidity so that it becomes an optimal environment for the development of disease vectors (Ramudingana *et al.*, 2024). The work environment can harm health through injuries, exposure to chemicals and biological agents, and noise. In the manufacturing industry, work accidents, noise, and chemicals are the main causes of disease (Wu *et al.*, 2024). In agriculture, pesticides, organic dust, heavy physical work, and work accidents due to inadequate work equipment fac, ilities, and infrastructure, as well as parasitic and infectious diseases when working in places with low cleanliness levels (Suprapto *et al.*, 2024). Work that uses excessive physical strength can not only cause injury but also cause muscle and skeletal damage. Environments with high temperatures, floods and droughts, and forest fires occur along with worsening climate change and ecosystem degradation (Pham *et al.*, 2023).

CONCLUSION

The environment can cause various diseases, including air pollution, poor water quality, chemicals, microplastics, noise, high temperatures, floods and droughts, forest fires, and disease vectors. Efforts to prevent various diseases caused by poor environmental quality can be made by increasing access to clean water and sanitation, stopping the behavior of defecating carelessly, reducing air pollution in the environment, and reducing smoke from both cigarettes and households. Full support from the entire community and government intervention through policies are needed to improve environmental quality to prevent the emergence of various diseases.

Conflict of Interest

No conflict of interest

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