

The Effect of Soil on Human Health

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Abstract

Regardless of whether those effects are positive or negative, direct or indirect, soil has a significant impact on human health. Our food supply and medicines like antibiotics come from soil, which is a significant source of nutrients. However, imbalances in nutrient levels and the presence of human pathogens in the soil's biological community can harm health. Additionally, there are numerous locations where soil contains toxic levels of various elements or chemical compounds due to either natural conditions or human activities. In recent years, more attention has been paid to the soil of urban environments, which also poses a number of health-related issues. Issues pertaining to soil and human health may be investigated using interdisciplinary and transdisciplinary methods within the framework of concepts like soil security.

Keywords: Human health; Human pathogens

Introduction

To fully address soil and human health issues, experts from a variety of scientific, medical, and social science fields will need to contribute. Over the past century, we have learned a lot about the connections between soil and human health, but there is still a lot we don't know about the complicated interactions between them. As a result, there is still a significant gap in knowledge in this crucial field.

Human health and well-being are profoundly impacted by soil. This effect may be direct or indirect, positive or negative, and based on the soil's condition and the interactions of interest. Natural soil, which typically has little anthropogenic contamination, and soils in agro ecosystems, urban areas, mines, oil and gas extraction areas, landfills, and other locations where anthropogenic contamination is more likely are examples of soils that have an impact on human health. Although everyone's health is affected in some way by soil, those in occupations that involve close contact with soil, such as farming, construction, or mining, are more likely to experience health issues. This is due to the fact that soil can transmit harmful substances through food, providing many of the nutrients we require. Some soil dusts can travel thousands of miles and affect people far away from where they came from. Despite recent advances and ongoing research into the role that soil plays in human health, few people probably consider the impact that soil has on their health. The relationship between soil and human health will be briefly and broadly discussed in this paper. We encourage the reader to find additional information on many of these topics in other publications that are related to this one. Other excellent papers have recently been published on this subject.

In the Bible's book of Numbers, which was written in 1400 BC, Moses tells the people to "see what the land is like...how is the soil...fertile or poor?" (Probably the first recorded depiction of the relationship between human health and soil) 18–20 in Numbers 13). Hippocrates published a list of things that should be taken into consideration as part of a proper medical evaluation in 400 BCE, and Columella wrote in 60 BCE about hidden diseases from marshes; promoting the idea that soil is important to human health in each instance. However, widespread acceptance of the idea that soil could affect human health did not begin until the early 1900s [1-5].

Discussion

McCarrison (1921) came to the conclusion that the nutrient content

of food crops and, consequently, the health of those who consumed them are both influenced by the fertility of the soil. In at least three of its chapters in the late 1930s, the USDA Yearbook of Agriculture (USDA, 1938) discussed the significance of soil as the source of many of the essential elements required for human health. In 1940, the USDA established the Plant, Soil, and Nutrition Research Unit (PSNRU) at Cornell University, which continues to conduct research on the relationship between soil and human health. In the 1940s, people like Sir Albert Howard (1940), Lady Eve Balfour (1943), and J. I. Rodale (1945) offered their thoughts on the connections between soil and human health. One common theme was the effect of soil fertility on the nutrient content of foods grown in a particular soil. In the 1950s, it became clear that soil could provide humans with toxic amounts of certain elements (USDA, 1957). In 1959, André Voisin published a substantial study that was probably the most in-depth on the topic up to that point on the potential connections between soil and human health. Since these initial realizations, research into the connection between soil and human health has grown, and a few of the areas of study will be summarized below. We recommend Brevik & Sauer (2015) for a more in-depth analysis of the history of the soil-human health field.

People commonly come into contact with soil in three ways: i) ingestion, (ii) respiration, and (iii) skin absorption or penetration. Geophagy refers to the act of intentionally ingesting food, but it can also happen accidentally, such as when children touch each other's mouths or eat raw fruits or vegetables without washing them thoroughly. Children are particularly susceptible to soil ingestion and expecting mothers. According to Henry & Cring (2013), ingestion of soil has the potential to supply essential nutrients, but it can also result in exposure to pathogens, organic chemicals, heavy metals, or large amounts of them. Soil particles are inhaled during respiration.

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Received: 07-Jan-2023, Manuscript No. EPCC-23-87595; **Editor assigned:** 09-Jan-2023, PreQC No. EPCC-23-87595 (PQ); **Reviewed:** 23-Jan-2023, QC No. EPCC-23-87595; **Revised:** 24-Jan-2023, Manuscript No. EPCC-23-87595 (R); **Published:** 31-Jan-2023, DOI: 10.4172/2573-458X.1000318

Citation: Onigo O (2023) The Effect of Soil on Human Health. Environ Pollut Climate Change 7: 318.

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Coccidioidomycosis, among other serious issues, has been linked to inhalation, chronic bronchitis, acute inflammation of the bronchial passages, emphysema, and fibrotic changes as a result of breathing soil-derived dust, and mesothelioma caused by inhaling soil-derived dust containing naturally occurring asbestos minerals. According to Brevik (2013), skin absorption or penetration can expose an individual to pathogens and soil chemicals. Additionally, it may cause podocniosis, also known as endemic non-filarial elephantiasis, a non-infectious disease that frequently affects barefoot subsistence farmers. This is because the lymph system is obstructed by prolonged contact with volcanically derived clay in the soil. Wearing shoes is a simple way to prevent it, and the condition no longer exists in countries where it used to be common, like France, Ireland, and Scotland.

Soil can have a number of negative effects on human health. Chemical elements and substances that can be harmful to ingest or breathe in can contaminate the soil either naturally or through human activities. Even elements that are necessary for life can cause human toxicity if they are present in sufficient quantities [6-10].

Conclusions

Humans have an optimal concentration range for any essential element; concentrations below this range cause deficiency, while concentrations above the optimal range cause toxicity. As a result, depending on the soil concentrations of these elements and the degree of exposure, the level of any essential element in humans can be toxic, adequate, or deficient. Morbidity and even death can result from both deficiency and toxicity. There are numerous examples, reports, and research publications on the risk of soil toxicity and human health, though some have received more attention than others. Lead and mercury, for example, are examples of elements that can be found in

soil and are not known to be beneficial to human health. However, even at very low concentrations, they can cause problems with toxicity. In this section, we provide a brief synopsis of several aspects of interest and others on soil's elemental supply are cited for the reader's perusal.

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