Chapter 12
Environmental Aspects of Alzheimer’s and Parkinson’s Diseases Neuropathologies: A Focus on Heavy Metals and Pesticides

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ABSTRACT

This chapter presents a literature review on the effect of environmental changes factors exposure in the etiology of Alzheimer’s and Parkinson’s diseases. The use of pesticides is more intense and somehow erratic as it aims to face climate change consequences like drought and water scarcity. The rural population is getting to be more vulnerable to have these neurodegenerative diseases. However, intense food production and economic models mean also the use of heavy metals in many stages as well during the production and the consumption processes and practices. Evidence from experimental studies shows that such heavy metals may also be a factor for the occurrence of Parkinson’s and Alzheimer’s diseases. At least, the environmental lifestyle and, likely, genetic factors, individually and collectively, play a significant role in the etiology of the diseases.

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INTRODUCTION

In human history, adaptation to environmental challenges has been always a key criterion for development and survival in challenging periods. This adaptation implies natural and cognitive responses to the environmental challenges through science and technology improving human health and survival rates.

Since the industrial age, the quality of life as a concept has gained much importance in people’s life. In the last decades, health has been considered as one of the major standards to measure human well-being and life quality by the major international rating organizations. Therefore, human health is becoming a priority for the policymakers in the majority of national, regional and international organizations. Climate change is an example where this understanding is becoming urgent. Humans are obliged as never before to adapt to their changing environment, due to the raising concerns and scientific evidence of health issues caused directly or indirectly by climate change.

Although the human body has the capability to avoid many of the climate change negative effects, the costs remain obviously hazardous spreading worldwide to a great extent. For that reason, and from an ethical concern, it is crucial to mobilize the efforts in order to spare the risk of affection from future generations. This awareness may furthermore be fundamental for short-term protection and long-term alleviation of health consequences.

Food production is usually correlated with pesticides and synthetic fertilizers use. These products to increase crops yields to meet the population needs in these countries are usually a response to climate change consequences such as the lack of rainfall and drought. In such situations, farmers are also using sewage, which is harmful to population health.

Many countries in the world such the United States have seen an increased prevalence of neurological diseases and deficits (Steenland, MacNeil, Vega, & Levey, 2009). The onsets of diseases like Alzheimer (AD) and Parkinson (PD) disease is occurring at earlier ages across the population. Environmental factors are supposed to be responsible for both the onset and severity of these diseases. However, there is a gap in the understanding of this role, especially in relation to genetics, aging, and other factors. (Bronstein et al., 2009). Despite the fact that changes in neurological health are likely due to the aging of a large portion of the population, learning disabilities that affect children also are on the rise. There is also evidence that environmental factors may be involved including changes in climate that may exacerbate factors affecting the rates and severity (Altevogt, Hanson, & Leshner, 2008) of neurological conditions. Neurological conditions related to AD and PD generally carry high costs in terms of quality of life for both the patient and the caregiver and increases healthcare stresses on the financial charges and the workforce. The presence of these factors may affect an extended portion of a population and have significant impacts on productivity.

PARKINSON AND ALZHEIMER DISEASES AS NEURODEGENERATIVE DISORDERS: ETIOLOGY AND HISTORY

Health care improvements have contributed to people living longer leading to an increasing life expectancy in the last decades. However, the cases of AD and PD increased as well. Parkinson’s diseases are among the most common neurodegenerative disorder after AD, and overall incidence rates for all age groups have been reported to range from 1.5 to 22 per 100,000 person-years. Other reports estimate the prevalence range of PD from 167 to 5703 per 100,000 with preference in men (Wirdefeldt, Adami, Cole,