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EDITORIAL

Environment and child health

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The world we know, which concerns us, which interests us, the world we call “reality”, is the vast network of interacting entities, which manifest themselves to each other, interacting, and of which we are part. It is this network with which we are dealing with.¹

Currently, the understanding of the role of the environment in human health is indisputable. *Homo sapiens* is just one of the species that inhabit our planet, but their health depends on planetary health.² This is a new transdisciplinary field of study. Its creation reflects the growing concern regarding the collapse of the ecological balance, as, as a result of the action of living beings and/or the environment modification, the negative consequences on human health are disastrous. This approach allows us to visualize the relationships between living beings and the environment and the influence of the collapse of the ecological balance on the health of living beings.

This leads to a new way of facing problems related to human health. A new paradigm is enforced in relation to the training of professionals working in the health area. The still hegemonic biomedical model and the biopsychosocial model no longer fully grasp the complexity of the health/disease phenomenon.

Regarding child and adolescent health, there is an urgent need to change the focus regarding professional training, and for this purpose, it is necessary to understand that the paradigms that guide health education no longer meet the great challenges of our time. Understanding the genesis of diseases has been a task in which Medicine has been engaged for centuries, successfully in many cases. But it is increasingly clearer that chronic diseases have a complex natural history, a multi-causal explanation that highlights the weight of environmental factors, and that many acute problems

result from the collapse of the ecological balance, with the Covid-19 pandemic that the world is currently experiencing is an example of this collapse.

Since the mid-twentieth century, the contribution is given by Ludwig von Bertalanffy,³ when conceiving the General Theory of Systems, and by Conrad H. Waddington,⁴ when introducing the concept of the epigenetic landscape, changed the way one thinks about the interaction between nature and environment. There is no dissociation, but an interweaving. A new paradigmatic vision was necessary and, in a way, it overlapped the classic models that have a reductionist bias – the biomedical model and the biopsychosocial model. This new approach that aims to understand how different factors act throughout life gained meaning with the development of a new branch of science dealing with the Developmental Origins of Health and Disease (DOHaD) from the 1980s onwards.⁵ Currently, we cannot understand the great challenges posed in relation to human health without appreciating the theoretical-conceptual bases that help us to visualize the role of different factors at different times in the course of life and how they are integrated with the processes that determine health and disease.

The bioecological theories propose models that help us understand how factors related to different spheres of life are interconnected and how they affect the health/disease process. Bronfenbrenner's⁶ bioecological theory of human development sheds light on the complexity underlying the explanations of different human health problems. Models inspired by this theory, such as the one by Harrison et al., proposed to explain childhood obesity, have been used with heuristic intent and have helped researchers from different areas with the design of studies that analyze complex phenomena.⁷

The main objective of Pediatrics is to enable every child to reach their potential for growth and development. But for pediatricians and health professionals who work with

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children and adolescents to exercise their roles, it is necessary for them to broaden their views and understand the complexity involved in the process. The valuing of clinical training based on the pathogenic paradigm leads professionals to a view centered on understanding the disease, thus losing the perspective that many of the health problems we face are the result of maladjustment to the environment or a collapse of the ecological balance.

In this supplement of *Jornal de Pediatria*, researchers from different fields of activity take a look at the impact of the environment, in a broad sense, on the health of children and adolescents. The world is in the midst of the COVID-19 pandemic, a zoonosis that, like others, results from an environmental imbalance. Viola & Nunes summarize the evidence of the effects of the pandemic on child health with an emphasis on psychological and emotional aspects, and the consequences on sleep quality.⁸

Urrutia-Pereira et al. analyze the impacts of climate change and air pollution in relation to allergic diseases, which contributes to the understanding of why the prevalence of these diseases has increased worldwide.⁹ Veras et al. report the effects of air pollution since the gestational period and the consequences for the fetus and the newborn and warn about the importance of facing the problem that affects urban centers around our planet.¹⁰

Environment-related problems affect different organic systems, and the observed changes are explained by epigenetic mechanisms. An increasing number of researchers worldwide have sought to understand the effects of these interactions. Magalhães-Barbosa et al. review the role of toxic stress in child development, effects that can manifest throughout the individual's life and even affect the future generations.¹¹ Scattolin et al. focus on the relationship between environmental imbalance and child mental, behavioral and neurodevelopmental disorders. They draw attention to the fact that early negative experiences lead to a deregulation of the immune-neuroendocrine circuitry, which results in brain alterations during periods of high plasticity.¹²

Sarni et al. take an ecological look at one of the most distressing problems affecting the child population – obesity.¹³ They draw attention to the fact that air pollution, exposure to chemicals that interfere with the metabolism, excessive consumption of ultra-processed foods, changes in the intestinal microbiota and sedentary lifestyle are associated with increased obesity, insulin resistance, type 2 diabetes and changes in lipid metabolism.

The view of the environmental impact on health is expanded by Predieri et al., who provide a comprehensive review of the impact of endocrine disruptors on human health and draw our attention to the way these compounds are disseminated in the environment. Epidemiological studies suggest impacts on fetal growth, thyroid function, glucose metabolism, obesity, puberty and fertility through epigenetic mechanisms.¹⁴

Environmental changes affect the integrity of the human microbiome, as reported by Chong-Neto et al., by pointing out that lifestyles and exposure to pollutants modify not only the host but its microbiome, resulting in an immunological imbalance that contributes to the installation of an inflammatory condition that affects different organs and systems.¹⁵ “The non-equitable way in which many families or social groups live, determined by social and economic

inequalities, produce unequal health outcomes, particularly in children”, as stated by Magalhães et al., when reviewing the impact of social inequalities on child health.¹⁶

As examples, Back et al. review how the lifestyle, sharing inappropriate environments in the first years of life affect the cardiovascular health of adults¹⁷ and Mocelin et al. analyze the effects on the respiratory tract in adult life.¹⁸

The reading of this supplement, due to the scope of the assessed topics, helps everyone interested in preserving human health to appreciate the bioecological approach to health, which explains how many of the problems analyzed here result from the interaction between different systems over time. As in the famous phrase by English poet William Wordsworth that states “*The child is the father of Man*”, everyone who deals with the health of children and adolescents cannot lose the perspective that *the future of human life is written in the first years of life*.

Conflicts of interest

The authors declare no conflicts of interest.

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