

21st century well-child care

A PUERICULTURA DO SÉCULO XXI

ANA MARIA DE ULHÔA ESCOBAR¹, SANDRA JOSEFINA FERRAZ ELLERO GRISI^{2*}

¹Associate Professor, Department of Pediatrics, Faculdade de Medicina, Universidade de São Paulo (FMUSP), São Paulo, SP, Brazil

²Full Professor, Department of Pediatrics, FMUSP São Paulo, SP, Brazil

<http://dx.doi.org/10.1590/1806-9282.62.06.479>

*sandra.grisi@hc.fm.usp.br

Pediatrics is the medical specialty devoted to the comprehensive care of human growth and development. The idea of “assisting the human being that is growing and developing” distinguishes it from all other areas of medicine. Within such a broad context, the role of preventive pediatrics is guiding pediatrics, given that its aim is the growth and healthy development of children and adolescents. The current trend of basing health care on the full appreciation of each person, taking into account their specific characteristics and all of the circumstances around them, especially applies to preventive pediatrics and has caused the revision of concepts and practices.¹

In France, preventive pediatrics was proposed as a standard of conduct directed at child health in 1865 in social programs, and it was only from the late 19th century that it became part of medical language. Its origin in France came from the idea of standardizing the care of children in relation to the extreme conditions of promiscuity in which the population of the most popular neighborhoods lived. It should be taken into account that, at that time, industrialization promoted an intense flow of migration from the countryside to the cities, causing unplanned urbanization and a precarious social environment, exposing urban workers to epidemics and outbreaks of infectious diseases. The poor health conditions of the population led to immediate consequences on absenteeism and productivity at work, a fact that created social tension. The high infant mortality rate resulting from this scenario was the key factor driving the proposition of protocols to standardize childcare. Thus, the first publications on preventive pediatrics were addressed to mothers. The “modern” working family of the late 19th century became nuclear, and the mother took the central role in the responsibility for childcare and became the main element for transmission of knowledge and values. According to Aries, the “the myth of motherhood is born with the advent of modern family”.²

In parallel, in the same period, Pasteur’s discoveries in the field of microbiology provided important elements for the history of medicine. For the first time, Pasteur es-

tablished a causal relationship between microorganisms and diseases. This knowledge formed the basis for the theoretical framework of the concept of etiology of diseases, with prevention techniques arising as a logical consequence and immediately being incorporated into childcare. At the same time, child nutrition also started to be seen as fundamental for a healthy life, significantly highlighting the importance of breast milk for babies. Thus, preventive pediatrics became a set of rules on nutritional, anti-infectious and sanitary practices regarding the health of children, essentially addressed to mothers.³

Preventive pediatrics was introduced in Brazil in 1890 by Moncorvo Filho, a Brazilian doctor who had trained in France. It is important to emphasize that the ideas and movements originating in Europe at that time were quickly adopted in our country.⁴

With the organization of health care at Health Centers at the start of the 20th century, preventive pediatrics became part of the range of activities of these services, exercising control over children’s health on the one hand, and proposing health education rules on the other. It therefore began to incorporate the concepts of the so-called “hygiene area”, proposing hygiene in the realm of food and physical, mental and anti-infective environment.⁵

In the 1970s, in the wake of health reform, preventive pediatrics was revised and expanded. The Ministry of Health designed and proposed the Mother-Child Program, aimed at reducing the alarming mortality rates of mothers and children. To achieve the program’s goals, preventive pediatrics incorporated various health care activities and its conception was expanded to include comprehensive care of the child, adopting a routine of standardized checkups in the first 2 years of life and emphasizing nutritional aspects, growth, development, immunization, and care of the physical environment.^{6,7}

There is no doubt that these broader standards contributed significantly to the reduction of child mortality, as well as to the change in the morbidity profile in childhood, with a significant reduction in protein-energy malnutrition, gastroenteritis and various other infectious diseases.

Therefore, in the late 20th century we witnessed greater control of infectious and contagious diseases in childhood, in parallel with improved socioeconomic and cultural conditions in the country. This, coupled with the advancement of scientific knowledge and greater technological resources, caused a significant reduction in infant mortality and a change in the epidemiological profile. The therapeutic and pharmacological possibilities in the field of medicine were expanded. Pediatrics expanded its limits and pediatric specialties gained an important dimension in daily practice, given that the deepening of knowledge demands professionals that are prepared to explore all the diagnostic and therapeutic possibilities for chronic diseases, which went on to take an important role in pediatric epidemiology.

Simultaneously, preventive pediatrics expanded with the advancement of the knowledge provided by neuroscience about child development and new ways of understanding the origins of health and disease, all based on the growth process in human beings.

On the one hand, it is now known that the overall conditions during pregnancy and the first 2 years of life are determinants of brain structure. The stimuli transmitted to the brain by the sensory circuits in these periods differentiate and stimulate the function of neurons and brain circuits that will form the basis of children's capacity for future development and cognition. The myelination process and the formation of synapses composing a complex neuronal network will enable the child to acquire the neurological and psychomotor skills that will form their essential personal assets for acquiring the skills inherent in life, such as talking, reasoning, having the ability to learn and perform and to develop under the psycho-emotional aspect.^{8,9} Studies conducted in orphanages in Romania have shown abnormal brain development, proven by electroencephalogram (EEG) and low metabolic activity, related to negative experiences and lack of emotional bonds.¹⁰ More and more is being understood about the brain damage that persistent stressful experiences during the first year of life can induce. Toxic stress, through high cortisol levels, is related to lower connectivity between the amygdala (responsible for processing fear and emotions) and the prefrontal cortex. Stress in the early years of life is a risk factor for various psychological and physical problems, mood disorders and substance abuse, obesity, and cardiovascular diseases. Many studies have demonstrated that, for certain individuals, childhood experiences permanently alter the way the body and brain deal with stress.¹¹

On the other hand, it is currently understood that chronic diseases in adults, essentially those that make up metabolic syndrome such as obesity, diabetes, and cardiovascular disease, may have their origins in intrauterine life and early life.¹²⁻¹⁵ According to the thrifty phenotype hypothesis, proposed by Barker, when exposed to restriction of essential nutrients, a fetus may develop with a restricted body, adapted to an external life of scarcity. This can be an advantage, provided that the external environment remains poor in nutrients. However, if the external environment is plentiful and has no nutritional restrictions, this thrifty phenotype can be a disadvantage, making it unbalanced and more exposed to the chronic diseases of adulthood.¹⁶ Furthermore, the number of nephrons may be reduced due to intrauterine restrictions, as well as the morphological and functional changes resulting from exposure of the fetus and child to high levels of glucocorticoids in the first months of life.¹⁷ Current studies go further, blaming intrauterine damage and harm during childhood for adult illnesses, especially cardiovascular, endocrine, and lung diseases.

Furthermore, it is known that not only the quantity but also the quality of the mother's and child's nutrition in the early years may interfere in the path to health or risk of disease. Lipids are essential for the fetus' and child's growth and development. Cell membranes composed of a lipid bilayer essentially rich in long-chain polyunsaturated essential fatty acids made up of docosahexaenoic acid (DHA) and arachidonic acid (ARA) determine the degree of fluidity of fetal cell membranes. Greater fluidity of the membrane ensures the most efficient cellular homeostasis, which is an essentially important factor for the development of the central nervous system. Thus, DHA and ARA are essential for cellular homeostasis, for the development of the central nervous system (CNS), the metabolism, and the immune system, among others.^{18,19}

In the social field, the family and social structure also changed at the beginning of this century. Families traditionally composed of father, mother, and children have given way to new ties of parental affection and new nuclear compositions. Children grow and develop in various environments and have to learn to adapt to different ways of living very early. Day care centers, nurseries and schools become part of children's daily lives as soon as the mother's maternity leave ends. Emotional bonds are also formed with caregivers, expanding the emotional universe of childhood. However, if children are gaining more space in the emotional context, with greater and earlier socialization on the one hand, they are losing phys-

ical space in the contemporary world on the other. Violence and disorderly and chaotic urbanization, especially in big cities, limit the physical environment of children, confining them to enclosed spaces and limiting their open air activities, which are so important in a phase of discovery, growth, and development. It is necessary to seek alternatives together with the family for these situations.

There has been a true revolution in the way we see child growth and development as well as in the child's living environment, which has led to a new conception of preventive pediatrics: caring for the growth and development of human beings in an individualized manner within a new social reality, aimed at producing healthy and capable adults integrated into society.

Preventive pediatrics has expanded and deepened. It had to be revised. It begins at conception and continues until the end of adolescence. It is a period of human life characterized by intense and dramatic transformations that can lead to health or the risk of disease. Contemporary pediatricians must understand that the health of children and adolescents depends on the complex interaction between genetic makeup, the mother's health and mental condition, family habits, cultural norms and the socioeconomic environment, and must promote comprehensive health care together with the family, aimed at producing healthy adults that are able to make their own choices. Nowadays, preventive pediatrics is formulated at each consultation, and pediatricians must strengthen the longitudinal relationship and promote an alliance based on trust, in order to be able to access the reality of each child and family, and thereby make decisions or support those responsible for the best care for each child or adolescent within their circumstances. There is no longer any room for strict "hygiene" rules.

REFERENCES

- Hall D, Sowden D. Primary care for children in the 21st century. *BMJ*. 2005; 330(7489):430-1.
- Aries P. Le rôle nouveau de la mère et de l'enfant dans la famille moderne. *Population*. 1971; 26(2):226.
- Medeiros HRF. O passado e o presente da puericultura através da história do Instituto de Puericultura e Pediatria Martagão Gesteira. *Anais do XXVI Simpósio Nacional de História - ANPUH*. São Paulo, julho 2011.
- Moncorvo Filho CA. *Archivos de assistência à infância*; 1907.
- Alcantara P, Marcondes E. Puericultura. In: Alcantara P, Marcondes E. *Pediatria básica*. 3.ed. São Paulo: Sarvier; 1970. v.1.
- Novaes HMD. *Puericultura em questão [dissertação]*. São Paulo: Faculdade de Medicina, Universidade de São Paulo; 1979.
- Ministério da Saúde. *Assistência Integral à Saúde da Criança: Ações Básicas, Centro de Documentação do Ministério da Saúde 1984*. Brasília: Ministério da Saúde; 1984. (Série B: Textos Básicos de Saúde, 7).
- McCain MN, Mustard JF, Shanker S. Early years study 2 - Putting science into action. Toronto: Council for Early Child Development; 2007.
- Fox SE, Levitt P, Nelson CA 3rd. How the timing and quality of early experiences influence the development of brain architecture. *Child Dev*. 2010; 81(1):28-40.
- Nelson CA 3rd, Zeanah CH, Fox NA, Marshall PJ, Smyke AT, Guthrie D. Cognitive recovery in socially deprived young children: the Bucharest Early Intervention Project. *Science*. 2007; 318(5858):1937-40.
- Davidson RJ, Putnam KM, Larson CL. Dysfunction in the neural circuitry of emotion regulation - a possible prelude to violence. *Science*. 2000; 289(5479):591-4.
- McMillen IC, Robinson JS. Developmental origins of the metabolic syndrome: prediction, plasticity, and programming. *Physiol Rev*. 2005; 85(2):571-633.
- Barker DJ, Winter PD, Osmond C, Margetts B, Simmonds SJ. Weight in infancy and death from ischemic heart disease. *Lancet*. 1989; 2(8663):577-80.
- Barker DJ, Osmond C, Golding J, Kuh D, Wadsworth ME. Growth in utero, blood pressure in childhood and adult life, and mortality from cardiovascular disease. *BMJ*. 1989; 298(6673):564-7.
- Barker DJ, Osmond C, Forsén TJ, Kajantie E, Eriksson JG. Trajectories of growth among children who have coronary events as adults. *N Engl J Med*. 2005; 353(17):1802-9.
- Hales CN, Barker DJP. The thrifty phenotype hypothesis. *Br Med Bull*. 2001; 60:5-20.
- Nijland MJ, Nathanielsz PW. Developmental Programming of the kidney. In: Newnham JP, Ross MG, editors. *Early Life Origins of Human Health and Disease*. Basel: Karger; 2009. p.133-41.
- Innis SM. Dietary (n-3) fatty acids and brain development. *J Nutr*. 2007; 137(4):855-9.
- Prado EL, Dewey KG. Nutrition and brain development in early life. *Nutr Rev*. 2014; 72(4):267-84.