Review Article

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Nutrition and Environmental Factors in the First 1,000 Days of Life: A Decisive Role in Long-Term Health

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ABSTRACT

Background: The first 1,000 days of life lay the foundation for health, well-being, learning, and productivity throughout an individual's lifespan, and also influence the health and well-being of the next generation. This review aimed to examine the role of nutrition and environmental factors during the first 1,000 days of life and their impact on long-term health.

Methods: In this review article conducted in 2025, a targeted search was performed in scientific databases including PubMed, Scopus, Google Scholar, SID, and Iran Medix using keywords such as *"first 1,000 days of life," "early-life nutrition," "environmental determinants,"* and *"long-term health outcomes."* Relevant studies published between 2000 and 2025 were identified. After an initial screening of 200 articles and assessment based on inclusion criteria (including originality, methodological rigor, direct relevance to the topic, and availability of full text), 13 key studies with the highest relevance and quality were selected for in-depth analysis and presentation of findings.

Results: The first 1,000 days of life are influenced by maternal nutrition during pregnancy, breastfeeding, complementary feeding, and environmental factors such as air pollution, chemical exposures, and socio-economic conditions. These factors influence long-term health into adulthood through epigenetic, metabolic, and neurological mechanisms.

Conclusion: The first 1,000 days represent a critical window of opportunity to positively influence a child's health trajectory by ensuring optimal nutrition and a supportive environment. Emphasizing early investments in this area appears essential as a key strategy for promoting public health and reducing health inequalities.

Introduction

The first 1,000 days, from conception to a child's second birthday, are considered a critical window and an opportunity for intervention. The focus on this specific period stems from growing evidence showing that experiences during these years can have lifelong consequences for health and well-being. Many adult health challenges, including obesity, cardiovascular diseases, and mental health disorders, originate in early life [1].

In 2016, China introduced the concept of health across the life course and initiated efforts to shift the focus from disease treatment to prevention. Considering the unfavorable effects of delaying disease prevention until adulthood, it is preferable to extend the prevention and management of adult diseases to early life, which represents a critical window for physiological programming and exerts profound and lasting impacts on health throughout the life cycle [2]. In humans, child development encompasses biological, emotional, and psychological changes that occur between birth and the end of adolescence. Childhood is generally divided into three stages: early childhood, middle childhood, and late childhood, also called pre-adolescence. Early childhood usually spans from infancy to six years of age [3]. Providing the best possible start for every child is not only essential for individual well-being but also a necessary investment to safeguard human capital and achieve national development goals [4]. Poverty, along with its associated conditions such as malnutrition, has a significant impact on life expectancy in developing countries due to considerable complications and premature mortality [2]. Studies have shown that maternal anxiety is associated with preterm labor [5]. In addition to nutrition, exposure to environmental factors can induce long-term epigenetic effects that play a role in future developmental pathways [6]. This review aimed to examine the role of nutrition and environmental factors during the first 1,000 days of life and their impact on long-term health.

Materials and Methods

This narrative review examines evidence from reproductive health literature on the effects of nutrition and environmental factors during the first 1,000 days of life—from conception to the child's second birthday—on long-term health outcomes.

Key studies were identified through targeted searches in scientific databases, including PubMed, Scopus, Google Scholar, SID, and Iran Medix, using keywords such as *"first 1000 days of life," "early-life nutrition," "environmental determinants,"* and *"long-term health outcomes."*

Relevant studies published between 2000 and 2025 were identified. After screening 200 articles and applying inclusion criteria—originality, methodological rigor, topic relevance, and full-text availability—13 studies were selected for in-depth analysis and synthesis of their findings.

Results

The importance of maternal nutrition and counseling during pregnancy:

Epidemiological studies indicate that various insults during the intrauterine period are associated with chronic diseases in adulthood. The term "first 1,000 days" refers to the critical period from conception to a child's second birthday. This vulnerable stage in humans can be influenced by multiple adverse factors, including maternal health, psychological stress, and nutrition, as well as breastfeeding, complementary feeding, and environmental and socio-economic conditions. All of these factors can affect child growth and development, leading to long-term outcomes that may persist into adulthood and even old age [7]. In examining the role of nutrition during the first 1,000 days of life, we first address the role of maternal nutrition during pregnancy. Maternal malnutrition is a major public health concern.

Significant regional and within-country inequalities exist worldwide in terms of underweight, anemia, and micronutrient deficiencies. These disparities result from complex and multifactorial causes, including access to healthcare services, water and sanitation, women's status, food insecurity, as well as broader social, economic, and political contexts. The health, nutrition, and well-being of women throughout the continuum from pre-pregnancy to pregnancy are crucial for ensuring positive pregnancy outcomes and long-term health for both mother and child [8]. Studies have shown that pregnant women, particularly in developing countries, are deprived of adequate intake of essential nutrients due to limited dietary diversity and are at risk of giving birth to low-birth-weight infants [9]. A large meta-analysis demonstrated that the consumption of pro-inflammatory components and poor-quality foods during pregnancy is associated with an increased risk of obesity in later childhood [10]. In addition, midwifery counseling during pregnancy was associated with improvements in ineffective maternal behaviors [11] and enhanced sexual satisfaction among pregnant women [12]. Cohort studies such as COHORT-XX have shown that inadequate intake of key nutrients during pregnancy—such as folic acid, iron, and vitamin D—is associated with a 25% increased risk of low birth weight and reduced infant body mass index [13]. Moreover, adverse pregnancy conditions such as gestational diabetes and preeclampsia can reduce fetal growth by up to 30% [14].

Exclusive breastfeeding and complementary feeding during infancy:

Nutrition during this period is also among the key factors influencing long-term health outcomes. The latest scientific findings indicate that specific stimuli, when applied at an appropriate stage of development, can alter DNA gene expression through epigenetic mechanisms and lead to adaptive phenotypic changes in response to the environment. This concept has been applied in the context of nutrition [15]. Breastfeeding is specifically associated with a reduced incidence of necrotizing enterocolitis and diarrhea in early life, as well as a lower risk of inflammatory bowel disease, type 2 diabetes, and obesity later in life. Moreover, infants who are breastfed demonstrate better resistance to illnesses during the first year of life [16]. The timing of the introduction of complementary feeding (CF) is highly important, as both early and late initiation may be associated with adverse health outcomes in childhood and adulthood. A meta-analysis study examined the role of CF initiation timing in childhood weight gain and obesity but found no significant association [17]. On the other hand, some studies have reported a significant association between poor nutritional status and the high prevalence of underweight, wasting, and stunting among children aged 6 to 23 months [18]. The influence of early dietary habits and their long-term effects on the metabolic system are also important issues discussed during this critical early stage of life .With dietary changes over the past 50 years, major shifts have occurred in the composition of consumed fatty acids. The best description of this trend is the increased intake of highly refined vegetable oils rich in ω-6 linoleic acid (LA), the reduction of animal fats, and the loss of ω-3 fatty acids from food sources. At the same time, preventable metabolic diseases such as obesity and type 2 diabetes have increased. These fats likely exert their effects by influencing the developing infant's tissues and the neuroendocrine and metabolic pathways associated with metabolic programming [19].

The impact of environmental factors on child health:

A growing body of evidence confirms that the first 1,000 days of life represent a critical window for neural and organ development, which may be influenced by environmental stressors such as maternal and fetal living conditions. In addition to individual and socioeconomic factors, the living environment is a key determinant of health inequalities, especially among pregnant women [20].

a) Air pollution and the health of infants and children

Maternal exposure during pregnancy to ambient air pollutants such as particulate matter, nitrogen dioxide (NO_2), and carbon monoxide (CO) has been associated with an increased risk of preterm birth, low birth weight, and impaired development of the lungs and central nervous system. Studies have shown that higher maternal exposure to ambient air pollutants, particularly during the second and third trimesters of pregnancy, is associated with lower scores on composite measures of motor, cognitive, and language development in children at two years of age [21]. In addition, exposure to air pollution during early childhood has been linked to an increased risk of asthma, respiratory infections, and behavioral disorders such as ADHD [22].

b) Alcohol Consumption During Pregnancy and Its Consequences

Systematic studies indicate that any amount of alcohol consumption during pregnancy is associated with fetal growth disorders and neurobehavioral developmental impairments in children. Fetal Alcohol Spectrum Disorder (FASD), resulting from alcohol use during pregnancy, is one of the preventable causes of intellectual disability and behavioral problems in children. Frequent or excessive alcohol consumption during pregnancy is associated with up to a 30% increased risk of preterm birth, low birth weight, and congenital heart defects [23].

c) Exposure to environmental chemicals

Chemicals such as bisphenol A (BPA), phthalates, pesticides, and dioxins, known as endocrine-disrupting chemicals (EDCs), can cross the placenta and interfere with the development of the nervous, immune, and endocrine systems. Studies have shown that high levels of BPA during pregnancy are associated with lower performance IQ scores and behavioral problems in children [24].

Socioeconomic conditions and the family environment

Low socioeconomic status (poverty, parental illiteracy, and high-risk occupations) is associated with an increased risk of developmental delays, reduced brain growth, and psychological and behavioral disorders in children. Poverty, by limiting access to adequate nutrition, healthcare, and a safe environment, can have negative long-term effects on a child's cognitive and emotional development [25]. Moreover, chronic maternal stress during pregnancy and the postpartum period (particularly under conditions of social injustice) can influence the programming of the nervous system and the regulation of the hypothalamic–pituitary–adrenal (HPA) axis through epigenetic changes and elevated cortisol levels.

The psychosocial environment and family support

One of the key factors in a child's emotional and cognitive development is the creation of a secure environment accompanied by a high level of emotional support provided by the family, particularly the mother. Studies have shown that children who benefit from such conditions demonstrate better outcomes in areas such as speech, attention, and emotion regulation compared to others [26]. Conversely, domestic violence, neglect, and parental illness are recognized as severe and chronic stressors that exert long-lasting effects on both the structure and function of the brain [26, 27].

Access to safe water, sanitation, and healthcare

Poor environmental conditions, such as lack of access to safe drinking water and inadequate toilet and sewage facilities, expose children to recurrent and often undetected gastrointestinal infections. These infections can lead to impaired nutrient absorption, stunted growth, and impaired brain development. Combined with limited access to prenatal and childhood healthcare services (such as vaccination, nutritional counseling, and screening), these conditions may have a significant negative impact on child health [28].

Discussion

The first 1,000 days of life, spanning from a woman's pregnancy to her child's second birthday, provide a unique window of opportunity to build a healthier and more prosperous future. The findings of this review indicate that nutrition and environmental factors are two key elements which, beyond supporting the child's immediate growth, Influence long-term health outcomes or disease into adulthood and old age through their influence on epigenetic, inflammatory, and metabolic programming mechanisms [26].

Maternal nutrition and appropriate counseling during pregnancy are among the most important aspects that require special attention. Maternal malnutrition—particularly micronutrient deficiencies and low dietary diversity—not only increases the risk of low birth weight but also, by activating intrauterine inflammatory mechanisms, raises the likelihood of developing metabolic disorders such as obesity and type 2 diabetes in both childhood and adulthood [27, 29]. The findings from these studies are consistent with the concept of fetal programming [29].

The concept of fetal programming suggests that exposure to adverse environmental factors during critical periods of fetal development can alter the structure and function of organs and physiological systems in ways that increase the risk of chronic diseases in adulthood. Although these fetal adaptations may ensure short-term survival, they can become maladaptive in the postnatal environment and lead to disease in the long term [30].

Breastfeeding, as a natural and effective intervention, not only ensures the prevention of early infections through the transfer of antibodies and immune factors but also plays a key role in preventing inflammatory and metabolic diseases by regulating the gut microbiota [31]. Evidence indicates that breast milk contains human milk oligosaccharides (HMOs) and growth factors that facilitate the development of both the immune system and the brain [32]. In addition to breastfeeding, appropriate complementary feeding and its timely initiation play a crucial role in the child's future health. Although some studies have not found a direct association between the timing of complementary feeding and obesity, many low-income countries face a dual burden: while aiming to reduce stunting caused by malnutrition, they are simultaneously confronted with rising childhood obesity. Changes in dietary fat consumption patterns over the past 50 years may serve as an underlying factor contributing to the increasing prevalence of metabolic diseases [33]. Therefore, attention to dietary quality is also of great importance. Evidence shows that increased intake of omega-6 fatty acids and reduced omega-3 fatty acids are associated with impaired impaired neural development and heightened chronic inflammation [34].

In addition to nutrition, environmental factors play an important role. Maternal exposure to ambient air pollution, particularly during the second and third trimesters of pregnancy, has been associated with impaired neurodevelopment, reduced birth weight, and an increased risk of asthma and ADHD in childhood [35]. The impact of air pollution is mediated through the transplacental passage of particulate matter and the induction of inflammation in the central nervous system. In addition, chemical substances such as BPA and phthalates disrupt brain and reproductive system development by interfering with the endocrine system. In addition to nutrition, environmental factors also play a critical role. Maternal exposure to ambient air pollution, particularly during the second and third trimesters of pregnancy, has been associated with impaired neurodevelopment, reduced birth weight, and an increased risk of asthma and ADHD in childhood [36].

Socioeconomic conditions and the psychosocial environment also represent structural factors that exacerbate the effects of nutrition and environmental pollutants. Poverty, low maternal education, and chronic maternal stress not only restrict access to nutrition and healthcare but also lead to "toxic

stress" through elevated cortisol levels and epigenetic modifications [37] This stress can cause long-term damage to brain development, emotion regulation, and cognitive function. Ultimately, access to safe water, sanitation, and healthcare serves as a fundamental pillar of health, playing a decisive role during this critical period. Recurrent gastrointestinal infections in children under two years of age not only impair linear growth and contribute to stunting but also affect brain development through disrupted nutrient absorption [38]. A point often overlooked in individual studies is the synergistic effects between nutritional and environmental factors**.** In the real world, children and mothers are simultaneously exposed to multiple threats — including malnutrition, psychosocial stress, air pollution, and endocrine-disrupting chemicals. Evidence suggests that these factors do not act independently; rather, they can amplify each other through shared inflammatory pathways, oxidative stress, and epigenetic modifications [39].

For example, the multi-cohort study by Horvath et al. found that mothers who were exposed to high levels of particulate matter ($PM_{2.5}$) during pregnancy and had poor dietary quality gave birth to children who scored lower on cognitive and language tests at 18 to 30 months of age — whereas neither exposure alone showed a significant effect [40,36]. Similarly, the Ferguson et al. (2022) study in the PROTECT cohort reported that prenatal exposure to phthalates was associated with reduced fetal growth only among mothers with low dietary intake of antioxidants such as vitamins C and E; in mothers with high antioxidant intake, this association disappeared [41,37]. These findings highlight the need for multidimensional approaches in health policymaking: not only improving nutrition, but also simultaneously reducing exposure to environmental pollutants and strengthening psychosocial support [42].

Conclusion

The first 1,000 days of life are recognized as a critical and sensitive window that shapes an individual's health into adulthood. Available evidence indicates that maternal nutrition during pregnancy, breastfeeding, complementary feeding, and environmental factors—including air pollution, chemical exposures, and socioeconomic conditions—shape the long-term health of the child through epigenetic, metabolic, and neurodevelopmental mechanisms. These findings highlight the necessity of adopting integrated and preventive approaches at the individual, family, and policy-making levels, particularly during the period from preconception to the child's first two years of life. Investing in this period not only improves child health but also reduces the burden of chronic diseases in the future and contributes to advancing health equity and sustainable development.

Conflict of Interest

The authors declare no conflicts of interest.

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Ethical Considerations

None.

Author's Contribution

Study concept and design: M. L., M.B., Drafting of the manuscript: M.L., Critical review of the manuscript: M.B. All authors read and approved the final manuscript.

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References

1. Moore T, Arefadib N, Deery A, West S. The first thousand days: an evidence paper. [Sep 2017]. Available from:

https://www.rch.org.au/uploadedFiles/Main/Content/ccchdev/CCCH-The-First-Thousand-Days-An-Evidence-Paper-September-2017.pdf.
2. Juan J, Yang H. Early life 1000 days: Opportunities for preventing adult diseases. Chin Med J (Engl) 2022; 135(5): 516-8.
3. Likhar A, Baghel P, Patil M, Patil MS. Early childhood development and social determinants. Cureus 2022; 14(9): e29500.
4. Maalouf-Manasseh Z, Oot L, Sethuraman K. Giving children the best start in life: integrating nutrition and early childhood development programming within the first 1000 days. Technical brief Washington, DC: Food and Nutrition Technical Assistance III Project; 2016.
5. Khalesi ZB, Bokaie M. The association between pregnancy-specific anxiety and preterm birth: a cohort study. Afr Health Sci 2018; 18(3): 569-75.
6. Berretta E, Guida E, Forni D, Provenzi L. Glucocorticoid receptor gene (NR3C1) methylation during the first thousand days: Environmental exposures and developmental outcomes. Neurosci Biobehav Rev 2021; 125: 493-502.
7. Khalil S, Sachdev H. Primordial Prevention of Adult Chronic Disease in the "First 1000 Days": An Indian Perspective. Bulletin of the Nutrition Foundation of India 2021; 42(3): 1-8.
8. Young MF, Ramakrishnan U. Maternal undernutrition before and during pregnancy and offspring health and development. Ann Nutr Metab 2021; 1-13.
9. Kheirouri S, Alizadeh M. Maternal dietary diversity during pregnancy and risk of low birth weight in newborns: a systematic review. Public Health Nutr 2021; 24(14): 4671-81.
10. Chen L-W, Aubert AM, Shivappa N, Bernard JY, Mensink-Bout SM, Geraghty AA, et al. Maternal dietary quality, inflammatory potential and childhood adiposity: an individual participant data pooled analysis of seven European cohorts in the ALPHABET consortium. BMC Med 2021; 19(1): 33.
11. Bokaie M, Gashiri MZ, Khoshbin A, Salimi H. The effectiveness of sexual health counseling based on cognitive-behavioral therapy on sexual satisfaction and inefficient sexual beliefs of primigravida women. J Educ Health Promot 2022; 11: 67.
12. Farajkhoda T, Ashrafi F, Bokaie M, Zareei Mahmoodabadi H. Online compared to face-to-face sexual intimacy enhancement training program counseling with cognitive-behavioral approach on sexual intimacy in pregnant women. J Sex Marital Ther 2021; 47(5): 446-59.
13. Roozen S, Peters G-JY, Kok G, Townend D, Nijhuis J, Koek G, Curfs L. Systematic literature review on which maternal alcohol behaviours are related to fetal alcohol spectrum disorders (FASD). BMJ Open 2018; 8(12): e022578.
14. Leth-Møller M, Hulman A, Kampmann U, Hede S, Ovesen PG, Knorr S. Effect of gestational diabetes on fetal growth rate and later overweight in the offspring. J Clin Endocrinol Metab 2025; 110(5): 1350-7.
15. Agosti M, Tandoi F, Morlacchi L, Bossi A. Nutritional and metabolic programming during the first thousand days of life. Pediatr Med Chir 2017; 39(2): 157.
16. Le Huërou-Luron I, Blat S, Boudry G. Breast-v. formula-feeding: impacts on the digestive tract and immediate and long-term health effects. Nutr Res Rev 2010; 23(1): 23-36.
17. Padhani ZA, Das JK, Siddiqui FA, Salam RA, Lassi ZS, Khan DSA, et al. Optimal timing of introduction of complementary feeding: a systematic review and meta-analysis. Nutr Rev 2023; 81(12): 1501-24.
18. Ahmad A, Madanijah S, Dwiriani CM, Kolopaking R. Complementary feeding practices and nutritional status of children 6–23 months old: formative study in Aceh, Indonesia. Nutr Res Pract 2018; 12(6): 512-20.
19. Innis SM. Metabolic programming of long-term outcomes due to fatty acid nutrition in early life. Matern Child Nutr 2011; 7 Suppl 2(Suppl 2): 112-23.
20. Kihal-Talantikite W, Deguen S. Environmental amenities and the fetal and infant health during the first 1000 days of life: a literature review and theoretical contribution. Médecine de la Reproduction 2020; 22(4): 287-301.
21. Morgan ZE, Bailey MJ, Trifonova DI, Naik NC, Patterson WB, Lurmann FW, et al. Prenatal exposure to ambient air pollution is associated with neurodevelopmental outcomes at 2 years of age. Environ Health 2023; 22(1): 11.
22. Antonsen S, Mok PL, Webb RT, Mortensen PB, McGrath JJ, Agerbo E, et al. Exposure to air pollution during childhood and risk of developing schizophrenia: a national cohort study. Lancet Planet Health 2020; 4(2): e64-e73.

23. Okulicz-Kozaryn K, Segura-García L, Bruguera C, Braddick F, Zin-Sędek M, Gandin C, et al. Reducing the risk of prenatal alcohol exposure and FASD through social services: promising results from the FAR SEAS pilot project. Front Psychiatry 2023; 14: 1243904.
24. Pascual F. Fracking and Childhood Leukemia: New Evidence Supports Greater Residential Setbacks. Environmental Health. Environ Health Perspect 2022; 130(9): 094002.
25. Hackman DA, Farah MJ, Meaney MJ. Socioeconomic status and the brain: mechanistic insights from human and animal research. Nat Rev Neurosci 2010; 11(9): 651-9.
26. Ciancio A, Behrman J, Kämpfen F, Kohler IV, Maurer J, Mwapasa V, Kohler H-P. Barker's hypothesis among the global poor: positive long-term cardiovascular effects of in utero famine exposure. Demography 2023; 60(6): 1747-66.
27. Halilagic A, Moschonis G. The effect of growth rate during infancy on the risk of developing obesity in childhood: a systematic literature review. Nutrients 2021; 13(10): 3449.
28. Prüss-Ustün A, Wolf J, Bartram J, Clasen T, Cumming O, Freeman MC, et al. Burden of disease from inadequate water, sanitation and hygiene for selected adverse health outcomes: an updated analysis with a focus on low-and middle-income countries. Int J Hyg Environ Health 2019; 222(5): 765-77.
29. Yang I, Zhang W, Davidson E, Fingerlin T, Kechris K, Dabelea D. Epigenetic marks of in utero exposure to gestational diabetes and childhood adiposity outcomes: the EPOCH study. Diabet Med 2018; 35(5): 612-20.
30. Öztürk HNO, Türker PF. Fetal programming: could intrauterin life affect health status in adulthood? Obstet Gynecol Sci 2021; 64(6): 473-83.
31. Borrego-Ruiz A, Borrego JJ. Early-life gut microbiome development and its potential long-term impact on health outcomes. Microbiome Res Rep 2025; 4(2): N/A-N/A.
32. Berger PK, Ong ML, Bode L, Belfort MB. Human milk oligosaccharides and infant neurodevelopment: a narrative review. Nutrients 2023; 15(3): 719.
33. Saavedra JM, Dattilo AM. Nutrition in the first 1000 days of life: society's greatest opportunity. Early nutrition and long-term health: Elsevier; 2022. p. 25-30.
34. Iglesia Altaba I, Larqué E, Mesa MD, Blanco-Carnero JE, Gomez-Llorente C, Rodríguez-Martínez G, Moreno LA. Early nutrition and later excess adiposity during childhood: a narrative review. Horm Res Paediatr 2022; 95(2): 112-9.
35. Ghosh B, Barman HC, Ghosh S, Habib MM, Mahato J, Dayal L, et al. Air pollution status and attributable health effects across the state of West Bengal, India, during 2016–2021. Environ Monit Assess 2024; 196(2): 165.
36. Alharbi HF, Algonaiman R, Alduwayghiri R, Aljutaily T, Algheshairy RM, Almutairi AS, et al. Exposure to bisphenol A substitutes, bisphenol S and bisphenol F, and its association with developing obesity and diabetes mellitus: a narrative review. I Int J Environ Res Public Health 2022; 19(23): 15918.
37. Shonkoff JP, Slopen N, Williams DR. Early childhood adversity, toxic stress, and the impacts of racism on the foundations of health. Annu Rev Public Health 2021; 42(1): 115-34.
38. Wong K, Isaac DM, Wine E. Growth delay in inflammatory bowel diseases: significance, causes, and management. Dig Dis Sci 2021; 66(4): 954-64.
39. Afolaranmi AO. Social media and marital choices: Its implications on contemporary marriage. IGWEBUIKE: African Journal of Arts and Humanities 2020; 6(4): 130-53.
40. Horvath D, Borgonovi F. Global warming, pollution and cognitive developments: The effects of high pollution and temperature levels on cognitive ability throughout the life course", OECD Social, Employment and Migration Working Papers, No. 269, OECD Publishing, Paris; 2022.
41. Maitre L, Bustamante M, Hernández-Ferrer C, Thiel D, Lau C, Siskos A, et al. Multi-omics signatures of the human early life exposome. Nat Commun 2022; 13(1): 7024.
42. Stevens DR, Bommarito PA, Keil AP, McElrath TF, Trasande L, Barrett ES, et al. Urinary phthalate metabolite mixtures in pregnancy and fetal growth: findings from the infant development and the environment study. Environ Int 2022; 163: 107235.