Gac Sanit. 2025;39(S2):322

Gaceta Sanitaria

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670 - PRENATAL EXPOSURE TO PER- AND POLYFLUOROALKYL SUBSTANCES AND ITS IMPACT ON PUBERTAL DEVELOPMENT IN BOYS AND GIRLS FROM THE SPANISH INMA COHORT

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Resumen

Background/Objectives: Puberty is a critical developmental stage regulated by a complex sequence of hormonal events that begins in early fetal life. Disruptions during this period may have long-term consequences on sexual maturation. Per- and polyfluoroalkyl substances (PFAS) are endocrine-disrupting chemicals known to interfere with key hormonal pathways. Since PFAS cross the placental barrier, prenatal exposure may alter endocrine system programming and impact pubertal development. However, evidence remains limited. This study aims to investigate the association between prenatal PFAS exposure and pubertal development in girls and boys.

Methods: PFAS concentrations, including perfluorohexane sulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), and perfluorooctane sulfonic acid (PFOS), were quantified in first-trimester maternal plasma from the Spanish INMA (INfancia y Medio Ambiente) cohort. Pubertal development of their children was assessed longitudinally in three visits, from 7 to 16 years old using the parent-reported Pubertal Development Scale (PDS). Three outcomes were examined - overall pubertal development, adrenal development and gonadal development- with analyses stratified by age. Outcomes were categorized as stage 1 (pre-puberty) or stage 2+ (puberty initiated). Generalized linear mixed models with a Poisson

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distribution were used to evaluate associations between log-transformed PFAS concentrations and the probability of being in stage 2+, adjusting for cohort, maternal age at delivery, maternal education level and child's age at pubertal assessment.

Results: Among girls at 7-9 years old, PFHxS was associated with an increased likelihood of earlier adrenarche (RR 1.82, 95%CI: 1.03-3.22) and PFOS with a lower probability of earlier gonadarche (RR 0.61, 95%CI: 0.37-0.99). Globally, no associations were observed between prenatal PFAS exposure and the risk of earlier puberty onset among boys.

Conclusions/Recommendations: These preliminary findings suggests a congener-specific associations between PFAS and alterations in pubertal timing particularly regarding earlier adrenarche and later gonadarche in girls. Further analyses will explore stratifications (e.g., child body mass index), mixture effects as well as potential effect modifications.

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