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21205 | Exposure to naturally occurring metals during early-pregnancy and pregnancy outcomes: results from the IoMum cohort

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Abstract

This work aimed to characterize exposure to Aluminium (Al), Lithium (Li), Barium (Ba), and Strontium (Sr) and their association with sociodemographic and lifestyle factors, anthropometric parameters of the newborn and pregnancy complications.

Spot urine samples (n=349) of eligible pregnant women attending the routine 1st-trimester ultrasound scan from April 2018 to April 2019 at Centro Hospitalar Universitário de S. João were analysed through ICP-MS to quantify the metals' urinary concentrations (MUC). Inclusion criteria were: gestational age between 10 weeks and 13 weeks plus 6 days with confirmed foetal vitality and signature of the informed consent. MUCs are presented through median (IQR) in µg/L or µg/g creatinine.

MUCs were: Al 8.3 (4.7-14.7), Li 18.5 (10.3-34-3), Ba 1.7 (1.0-3.0), and Sr 100.7 (70.3-166.7), which are within the levels previously described in the literature.
Increased excretion of Al was found in healthcare (HCP) (12.76 (7.41-23.23) vs 10.05 (5.05-20.63) μg/g in other occupations; p=0.048) and in hairdressing professionals (HDP) (18.73 (13.25-31.24) versus 10.33 (5.52-20.82) μg/g in other occupations; p=0.039). Urinary Al decreased from normal weight (12.34 (7.12-23.36) μg/g) to obese women (5.91 (3.45-14.66) μg/g (p=0.002). Urinary Sr decreased as the ingestion of milk increased (from 160.32 (98.27-228.88) μg/g in the group consuming 1 cup of milk < 3 times a month to 109.66 (66.51-182.64) μg/g in the group consuming 1 cup of milk ≥4 times a week; p=0.000). Finally, mothers of appropriate for gestational age (AGA) newborns consistently presented higher urinary Ba or Sr in comparison to small (SGA) and large for gestational age (LGA) newborns, whereas mothers of SGA newborns (weight or head circumference) had higher excretion of Al or Li in comparison with AGA or LGA.
In conclusion, Al excretion may result from occupational exposure of pregnant women. For the observed levels of exposure, Ba and Sr were innocuous while Al or Li were potentially toxic to the newborn.

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