Pesticides exposure of pregnant women and the metabolism of vitamin D

Lhilali. I [1], Zouine. N [1], Menouni. A [1,2], Duca. R [2], Godderris. L [2], El Jaafari. S [1] .

1 Cluster of Competency “Environment and Health”, Moulay Ismail University, Meknes, Morocco.

2 Environment and Health Unit, Department of Public Health and Primary Care, Katholic Universiteit Leuven, Leuven, Belgium.

Introduction :

The maternal vitamin D deficiency is a real public health problem associated with adverse effects on the mother and the health of the child throughout life. In Morocco, hypovitaminosis D affects about 90.1% of pregnant women. As a result, the factors that regulate vitamin D metabolism are of paramount importance especially during pregnancy. In fact, prolonged and chronic exposure to phytosanitary products known to bioaccumulate in ecosystems and living organisms and their cocktail effect can disrupt this metabolism. However, the relationship between pesticide exposure and hypovitaminosis D in humans and more particularly in pregnant women is rarely studied, as is the mechanism of action of pesticides on vitamin D metabolism. This study aims to correlate prenatal exposure to pesticides with the status of vitamin D and to evaluate gene expression of vitamin D metabolism in the placenta.

Methods :

In a pilot study among 300 mother-child pairs in Meknes, exposure biomarkers of 30 pesticides (parent compounds and metabolites) belonging to three chemical families of pesticides: organochlorines, organophosphorus compounds and pyrethroids, will be measured in urine and blood by HPLC / MS-MS and GC / MS, and correlated with serum levels 25 (OH) D and 1,25 (OH) 2D, the results will be completed by a food frequency questionnaire (FFQ). The analysis of the gene expression of CYP2R1, CYP27B1, CYP24A1 and CTP3A4 in the placenta will be measured using RT-PCR.

Expected results:

Pesticide exposure would alter 25-hydroxyvitamin D concentration and these metabolites in pregnant women and phosphocalcium status in neonates by acting on genes related to vitamin D metabolism via activation of nuclear receptors of xenobiotic metabolism.

Conclusion:

This study is a first on the subject in Morocco. the data will be used to assess whether pesticide exposure is associated with vitamin D deficiency in pregnant women and newborns by taking into account lifestyle and chronic dietary exposure to pesticide residues. Our study aims to explore the genetic and epigenetic regulation of vitamin D in the understanding of action mechanisms of pesticides.

Keywords: vitamin d deficiency, pesticides, CYP450.