

# CAN METHAEMOGLOBIN LEVELS SERVE TO PREDICT PREECLAMPSIA BEFORE CLINICALLY EVIDENT DISEASE?

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## Background

In spite of improved pregnancy care, one third of the causes of stillbirth are still unknown. The ravages of preeclampsia on mothers and babies can only be reduced by increased understanding of the disorder and determining how to affect appropriate management.

In the town of Labin (ca. 25 500 residents, Croatia), TE Plomin 1, a coal-powered thermoelectric power plant, is the single major air polluter. During a plant downtime from 19 February 1989 to 6 September 1989 we were able to compare records of adverse pregnancies (miscarriages, premature births and stillbirths) in two periods: i) the control period from April to July 1989 and ii) the exposure period from December 1989 to March 1990, in an attempt to establish a relationship between the exposure to products of coal combustion, and complications in pregnancy. Our own work suggest that methaemoglobinemia associated with this exposure result in a complicated pregnancy for both mother and fetus by way of a three stage mechanism. Thus, some of the most adverse outcomes of pregnancy, such as stillbirth or early neonatal death, can be explained by environmental effects.

## Methods

To confirm reproductive loss caused by inhalation of environmental toxics in the population subset of pregnant women living near TE Plomin 1 in Labin, Croatia, were investigated. Data on reproductive loss was based on the records of pregnant women visiting the Obstetric and Gynecologic Primary Care Center in the Labin district for regular monthly pregnancy checkups. About 6180 women of reproductive age used the primary obstetric-gynecological service. Apart from this source we also used the data from records of other pregnant women living in the Labin district, but who obtained their checkups or admissions in the University Clinic of Obstetric and Gynecology in Rijeka, the Regional Obstetric Hospital in Pula, the Departments of Prematurity Care in Pula and Rijeka and from National Department of Statistics in Zagreb. The data were processed using well-known statistical methods and linear correlation tests.

## Results

Research into the frequency of reproductive loss has revealed that the frequencies of miscarriages and stillbirths were significantly lower in the control than in the exposure period ( $p < 0.05$ ). The stillbirths were recorded only in the exposure period and during the second half of pregnancy. Only mothers of stillborn babies (and a mother of a baby who died in the second day) had methaemoglobin values  $> 1.5$  g/L (1 % of haemoglobin). Methaemoglobinemia and stillbirths recorded over the exposure period are significantly higher than in the control period ( $p = 0.0205$ ).

## Conclusions

Our data suggest that methaemoglobinemia is associated with complicated pregnancy and may lead to its adverse outcome. Methaemoglobin can aggravate the mother and foetal hypoxia, and can indirectly explain the unrecognized actual level of foetal methaemoglobin, subsequent acute failure of foetal vital organs and, as end-stage of the impact of environmental toxics, foetal death, frequently named;unexplained. This fact lead us to instigate routine measurements of the level of maternal methaemoglobin from early pregnancy on and so indirectly recognize the adverse effects of environmental toxics on mother and foetus before morphological ultrasonic examination could reveal results as reliable. The findings of this retrospective epidemiologic study emphasize the necessity for further research.

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