HOW TO ASSESS EXPOSURE TO CHLORINATION BY-PRODUCTS (CBPs) IN DRINKING WATER DURING THE LAST TRIMESTER OF PREGNANCY

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Epidemiological studies have linked Chlorination By Products (CBPs) in drinking water to adverse birth outcomes: however most of them have been hindered by inaccurate assessment of individual exposure as usually standard values, measured by water suppliers, are used.

A personal measurement of exposure has to consider ways of exposure besides drinking water, such as inhalation and skin absorption during showering, bathing and swimming.

To improve the quality of exposure assessment, a study was performed in Italy, with the aim of evaluating carefully the personal exposure of a sample of pregnant women with a questionnaire.

During 1999 237 pregnant women during the last trimester (36 to 37 weeks pregnant) were recruited at the Obstetrics and Gynaecology Units in three different Italian towns (Udine, Modena and Napoli). -

Each woman was given a copy of a structured questionnaire (Q1) and a copy of a 7-day diary (7DD) to be completed at home just before childbirth which was considered the reference information. During the post delivery stay in the hospital she was asked to complete a questionnaire identical to the Q1 (post delivery questionnaire or Q2).

In the questionnaire specific questions addressed both drinking water ingestion and other routes of exposure to CBPs (showering, bathing and swimming): qualitative and quantitative information was collected.

Reproducibility was tested comparing Q2 with Q1, while validity was tested comparing the Q2 with the 7DD. Intraclass Correlation Coefficient (ICC), Pearson's and Spearman's correlation coefficients, kappa statistic, sensitivity and specificity were calculated.

Correlation coefficients between Q1 and Q2 always exceed 0.5 for total water daily intake and tap water intake in liters (0.64 and 0.79 respectively): a high proportion of the total variance in tap water ingestion was due to between-person variance (ICC=0.85).

Also correlation coefficients for frequency and duration in minutes of showering and bathing were high (0.85 and 0.87, 00.72 and 0.85 respectively), while the kappa for indoor swimming pool attendance was 0.82 (95%CI: 0.70-0.94). Also information from Q2 and 7DD appeared highly correlated: sensitivity and specificity in assessing indoor swimming were 0.75 and 0.92 respectively.

The questionnaire appeared valid and reproducible in measuring habits related to CBPs exposure, not only about drinking water intake (mean 2.6$\pm$0.96 l/day, and 0.6$\pm$0.5 l/day for tap water), but also regarding to showering and bathing, both for frequency and duration, and about swimming pool attendance. This study provides evidence that most of the variability in drinking water intake and other habits depends on inter-personal differences, and an assessment of exposure on individual basis, together with water sampling at home if possible, is required when the association between CBPs exposure and pregnancy outcomes is investigated.