

UMBILICAL CHOLINE AND RELATED METHYLAMINES BETAINE AND DIMETHYLGLYCINE IN RELATION TO BIRTH WEIGHT

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Background: Low birth weight (LBW) is associated with increased morbidity and mortality for the newborn and increased risk on chronic diseases in adulthood. Choline has an essential role in the integrity of cell membranes, methylation reactions and memory development.

Objective: We examined whether umbilical and maternal choline and related methylamines betaine and dimethylglycine (DMG) concentrations were associated with LBW in Dutch women and newborns.

Methods: Blood was sampled from umbilical cords at delivery (n=1126). Maternal blood was sampled at 30-34 weeks of gestational age (n=366). We calculated birth weights standardised for gestational age (SBW) and defined LBW as SBW < 2500 grams.

Results: Maternal concentrations of all analytes were lower compared to umbilical cord concentrations. Plasma betaine and DMG between mothers and newborns were strongly correlated. Higher umbilical cord choline and betaine were associated with lower birth weight ($\beta = -60[-89;-31]$ and $\beta = -65[-94;-36]$). Odds ratio for LBW was 4.12 [1.15;14.78] and 5.68 [1.24;25.91] for the highest umbilical choline and betaine quartile respectively compared to the lowest quartiles.

Conclusion: In contrast to our expectations, we observed an increased risk of lower birth weight with increased umbilical choline and betaine in venous umbilical cord blood. These results might reflect a change in choline consumption or metabolism or a disturbed placental function.