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Energy Balance during Postpartum Period is Associated with Metabolic Adaptation

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Previous studies have demonstrated that perturbations in body weight result in modified resting metabolic rate (i.e. metabolic adaption) that attempts to return the body to its customary weight (i.e. the set-point theory). How body weight changes during pregnancy impacts resting metabolic rate (RMR) and subsequently affects the ability to return to pre-pregnancy weight postpartum has not been investigated. **PURPOSE:** To examine if metabolic adaptation occurs during the postpartum period. **METHODS:** RMR and body composition were measured after an overnight fast in 26 women (mean age 34, range 26-40; mean BMI 28.1±6.0 kg/m^2) at 3, 6, 9 and 12 months postpartum. Energy balance over the postpartum period was calculated as the sum of the change in both fat mass (FM) and fat-free mass (FFM) multiplied by their respective energy densities. The ratio of RMR to FFM was used to assess the degree of metabolic adaptation. The degree of linearity between weight change and energy balance with metabolic adaptation was assessed using Pearson correlation. **RESULTS:** Weight loss (mean weight loss: -3.4±3.6 kg) was positively associated ($\rho = 0.4$, $p = 0.03$) with metabolic adaptation (mean RMR/FFM: 31.8±2.8 kcal/d/kg). Total energy balance (mean energy balance: -28719± 29546 kcal) was positively associated ($\rho = 0.5$, $p = 0.01$) with metabolic adaptation, indicating that a greater negative energy balance is associated with a lower resting metabolic rate relative to metabolically active fat-free mass (i.e. a greater metabolic efficiency). This relationship was independent of whether or not women had returned to their pre-pregnancy (i.e. set-point) body weight. **CONCLUSION:** The acute perturbation in body weight away from the set-point as a result of pregnancy contributes to the presence of metabolic adaptation during the postpartum period. The increase in metabolic efficiency in relation to greater weight loss during this time may contribute to difficulty in continuing to lose weight, or maintaining lost weight, after childbirth.