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Abstract

Sampling Procedures for Estimating the Infant Intake of Human Milk Hormones, Glucose and Total Lipids †

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Abstract: Human milk (HM) components are highly variable, and infants consume different volumes of milk. There has been little focus on evaluating the effectiveness of protocols in estimating infant intake of milk components before studying their impact on infant outcomes. Our goal was to compare 24 h measured intake with estimated intakes from different sampling protocols in order to determine the most accurate method for estimating infant intakes of milk leptin, adiponectin, insulin, glucose and total lipids. Mothers of term infants (n = 20) collected pre- and post-feed samples and measured their infant milk intake during each feed over a 24 h period using the test weighing method at 3–6 months postpartum. Infant true intakes of HM leptin, adiponectin, insulin, glucose and total lipids were calculated by averaging the measured pre- and post-feed concentrations and multiplying by the milk intake for the corresponding feed. Intakes were then summed to provide total intake of each component over 24 h. The estimated intakes were calculated with concentrations determined using five different sampling protocols, designed to be representative of sampling protocols used in previous HM component studies: (a) morning pre-feed sampling, (b) morning post-feed sampling, (c) average of morning pre- and post-feed sampling, (d) average of three pre-feed samples from the morning (06:00–09:00), afternoon (13:00–16:00) and evening (19:00–22:00) and (e) average of six pre- and post-feed samples from the morning (06:00–09:00), afternoon (13:00–16:00) and evening (19:00–22:00). The concentration from each protocol was further multiplied by true measured intake, a constant average intake of 800 mL/24 h and a global average milk intake of 766 mL/24 h to obtain the estimated intakes (15 protocols). The average intake of HM was 791 ± 212 mL. Comparison revealed that using the average measured concentration from three sets of pre- and post-feed samples, taken in the morning (06:00–09:00), afternoon (13:00–16:00) and evening (19:00–22:00), multiplied by either true infant 24 h measured intake, a constant estimate of milk intake (800 mL) or global average of milk intake (766 mL) provided the most accurate estimation of the infant's intake for all components ($p > 0.05$). To obtain accurate estimates of HM leptin, adiponectin, insulin, glucose and total lipid intake in the absence of 24 h sampling, it is recommended to use a sampling protocol that involves taking samples before and after at least three breastfeeding sessions in a 24 h period.

Keywords: human milk; lactation; breastfeeding; leptin; adiponectin; insulin; glucose; fat; lipids; dose; infant nutrition; human milk intake

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