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## Contribution of stable isotope to better understand breastfed infant nutritional status in burkina Faso: longitudinal study with body composition measurement at one year

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**Background and objectives:** Exclusive breastfeeding for six months, followed by the introduction of appropriate complementary foods and continued breastfeeding, as recommended by the World Health Organization, are cornerstones in infant nutrition. In Burkina Faso, only limited information is available on the quantities of human milk consumed and the time of introduction of other foods into infants' diets and the effect of feeding practice on the infant's growth. In this work we analyzed infant's nutritional status according to their feeding practice.

**Methods:** We used the deuterium oxide (DO) dose-to-the mother technique to measure the human milk intake (HM) as well as the non-milk water intake (non-HM) by the babies at 3, 6, 9 and 12 mo. We also evaluated the infant body composition at 12 mo by giving a dose of DO to the babies in order to determine the fat-free mass (FFM) and the fat mass (FM). Saliva samples were collected from the babies and their mother and the DO enrichment in saliva was analyzed by FTIR. At each period, the anthropometric measurements were done to assess the infant nutritional status at 3, 6, 9 and 12 mo according to the WHO standards.

**Results:** The HM was maximum at 3mo with a mean of 968.1 ml (95%CI=847.2 ml-1089.1 ml), decreased at 6 mo to 918.4 ml (95%CI=815.9 ml-1020.8 ml) that didn't change until 12 mo. The non-HM that was 54.6 ml (95%CI= -12.6ml-121.7ml) increased significantly (p=0.001) to 175.2 ml (95%CI=100.2ml-250.4ml) at 6 mo. Exclusive breastfeeding was 32% at 3 mo and reduced to 16% at 6mo. Breastfeeding was predominant after 6 mo and the contribution of HM in infant feeding was 80% at 9 mo and 69% at 12 mo.

The anthropometric measurement showed that wasting was 1.5% at 3 mo but increase significantly (p=0.04) to 8.7% at 6 mo. The DO dose to mother confirmed that all of the malnourished infants were not exclusive breastfed. At 9 mo the WHZ<-2 was reduced to 6.8%, but 4.5% of the children were severe malnourished and 12 mo, wasting was 15% with 5% of SAM. That confirmed the complementary feeding practice used by the mothers couldn't cover well the needs of those infants after 6 mo.

The body composition measurement showed that the FFM (7.5kg [95%CI=7.1kg-7.7kg]) as well as the FM (1.8kg [95%CI=1.4kg-2.2kg]) of healthy infants were significantly (p=0.01 and p=0.009) greater than the FFM (5.7kg [95%CI=5.4kg-6.0kg]) and the FM (0.7kg [95%CI=0.4kg-1.0kg]) of the malnourished children.

**Conclusion:** The DO dilution technique helped us to validate infant's feeding practice and their nutritional status in limited resource setting.