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Preliminary analysis of the Botswana Infant Feeding Study: Prevalence of wasting, stunting and underweight, and formula feeding in HIV-exposed infants

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Maintaining a negative HIV status in infants exposed to HIV during pregnancy and breast feeding often takes priority over maintaining optimal nutritional status (Patel, 2010). This may have dire consequences, because children who are undernourished are more likely to die, compared to those who are well-nourished (UNICEF, 2013). In Botswana, mortality in children aged five years or younger has increased from 50/1000 in 1997 to 76/1000 in 2007 (BFHS IV, 2007). It is therefore, important to understand the determinants of nutritional status of infants, and also determine if there are differences in nutritional status between HIV-exposed and non-HIV exposed infants. This may inform evidence-based practices aimed at improving nutritional status and thus reducing mortality in infants. This study, therefore aimed to investigate nutritional status, feeding practices and nutritional intake of HIV-exposed compared to non-HIV exposed infants aged 6–24 months.

A comparative cross-sectional study was conducted in HIV-exposed and non-HIV exposed infants aged 6–24 months attending routine child welfare clinics in 18 health facilities located in four districts in Botswana. Data were collected by two trained surveyors in addition to a study team leader. Weight and length were taken using calibrated Seca® Scales (385, 875) and Seca® measuring board (417) and stadiometer (Seca® 217). A USDA 5 Pass 24-hour recall was used to measure dietary intake. Socio-demographic, anthropometric, medical, and behavioural data – both current and retrospective - were collected from the mother/care giver and also from each child's clinic card. This preliminary analysis focuses on underweight, wasting and stunting defined by WHO as a Z score of ≤ -2 for weight for age, weight for length and length for age respectively (UNICEF, 2013), and self-reported feeding strategies. Ethical approval was obtained from University of Nottingham's Medical School research ethics committee and also from the Health Research and Development Committee, Ministry of Health in Botswana.

A total of 413 eligible participants were recruited into the study, and this preliminary analysis has focused on a sub-sample of 75 participants. 46 (61.3 %) infants were non-HIV exposed and 29 (38.7 %) were HIV-exposed infants, recruited from a single district consisting of 3 health facilities (health post, clinic and hospital). HIV-exposed infants were significantly more likely to be underweight (17.2 %) than non-HIV exposed infants (2.2 %), ($X^2_{(1)} = 5.487$, $p = 0.049$). In addition, wasting was more likely to occur in HIV-exposed infants than in non-HIV exposed infants (13.8 % vs. 2.2 % respectively; $X^2_{(1)} = 3.859$, $p = 0.019$). There was no significant difference in stunting prevalence between the two groups. Analysis of feeding practices as reported by the care-giver showed that HIV-exposed infants were more likely to be formula fed (89.7 %) compared to non-HIV exposed infants who are likely to be breastfed (78.3 %) at 0–6 months ($X^2_{(2)} = 48.705$, $p < 0.001$) and at 6–12 months (89.7 % and 58.7 % respectively, $X^2_{(3)} = 30.233$, $p < 0.001$).

The findings of this preliminary analysis of a larger dataset demonstrated that HIV-exposed infants in Botswana are significantly more likely to be wasted and/or underweight compared to non-HIV exposed infants. One explanation for this finding may lie in the observed differences in feeding practices. HIV-exposed infants are significantly more likely to be fed formula during the first year of life which may result in diarrhoea and underfeeding. Analyses of the whole dataset will extend this work to investigate potential mediators and moderators of the relationship between HIV exposure status and malnutrition in multivariate analysis.

1. BFHS IV (Botswana Family Health Survey), (2007), Central Statistics Office, Botswana.
2. Patel D, Bland R., Coovadia H, Rollins, *et al.* (2010). *AIDS*. 24: 437–445.
3. United Nations Children's Fund, UNICEF (2013), (Publication No. E.13.XX.4). Retrieved from http://www.unicef.org/media/files/nutrition_report_2013.pdf