

# Timing and determinants of malnutrition in children under 2 years in a birth cohort in Dhanusha district

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## Background

In Nepal, the Terai regions has the highest levels of wasting and one of the highest prevalences of stunting in under five-year olds (1). Little is known about the timing and determinants of malnutrition in this population.

## Objective

Using cohort data from the central Terai region, our objectives were to:

1. Characterize the timing of wasting and stunting in the first 24 months of life
2. Determine potential risk factors for wasting and stunting

## Methods

Study design: Observational, cohort study

Participants:

- New-borns in 60 randomly selected Village Development Committees (VDCs) in Dhanusha district.
- Singleton and full-term babies ( $n=602$ ) were enrolled within 72 hours of birth (May-September 2012) and followed-up until 24 months of age.

Data:

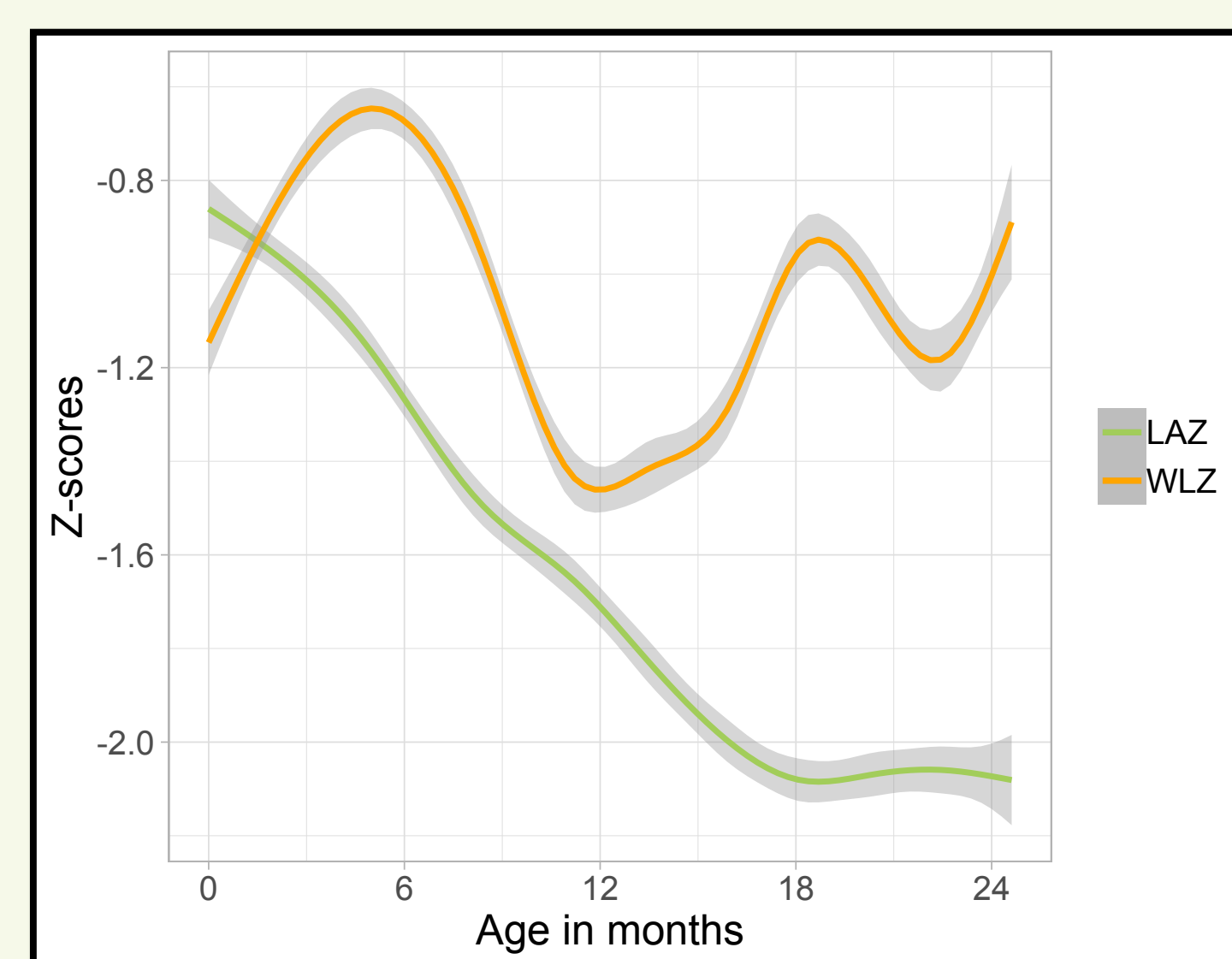
- At enrolment, the children's weight and length were measured and information on the socioeconomic situation of the household were collected.
- Anthropometric measurements were repeated every 28 days, information on dietary intake was collected every three months.

Analysis:

- We described the children's growth trajectories in terms of length-for-age and weight-for-length z-scores (LAZ and WLZ).
- We describe the adherence to recommended infant and young child feeding practices (2) in the cohort.
- We tested the associations of potential determinants of wasting and stunting at the household, feeding and maternal level with wasting and stunting at birth, and at the ages 1-5 (exclusive breastfeeding period) and 6-24 months (complementary feeding period).

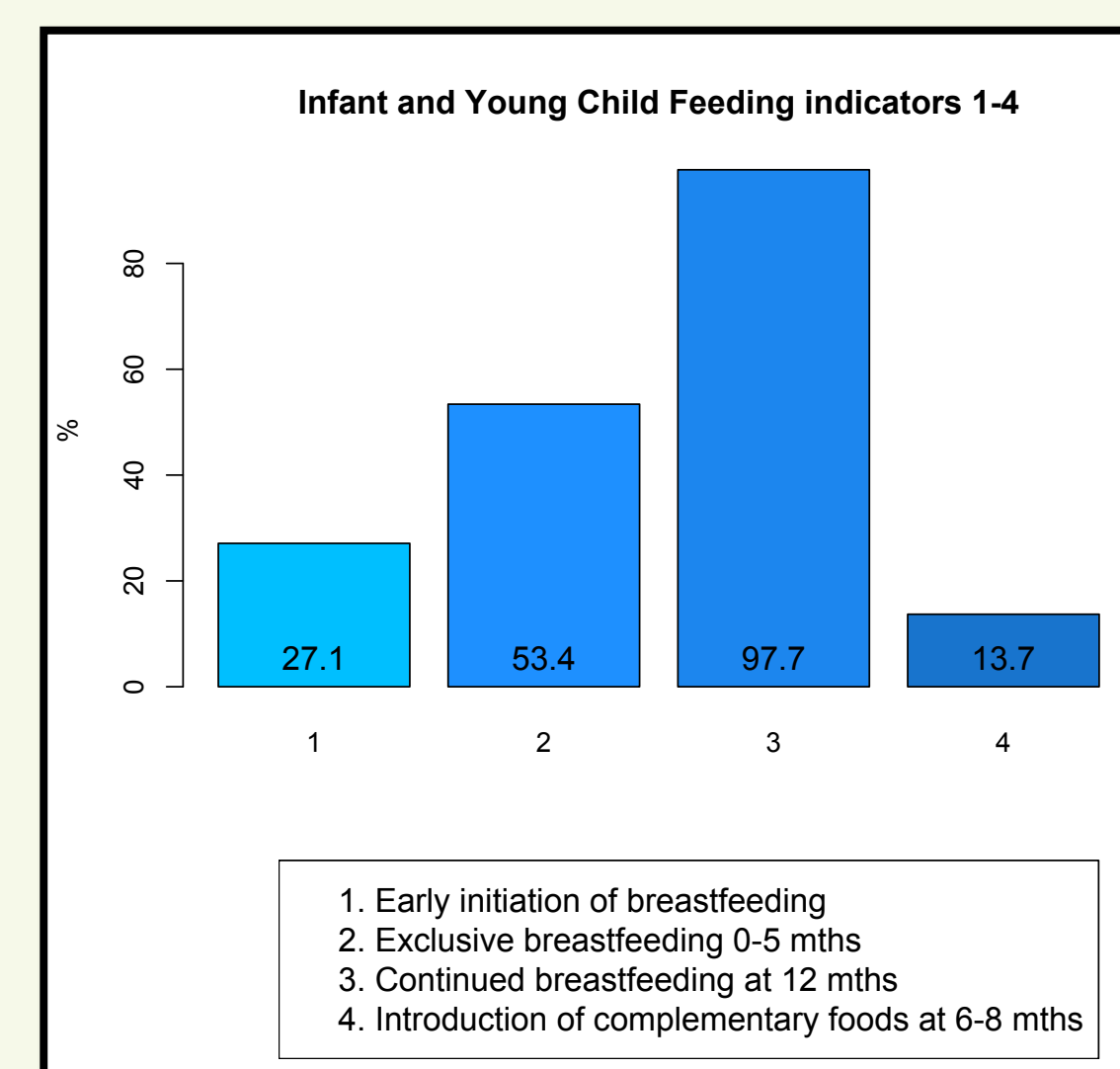
## Results - 1. Growth trajectories

- At birth, 16% of the children were already stunted ( $LAZ < -2$ ) and the prevalence increased steadily to 57% at the end of the study.
- Almost one third of the children had low birthweight ( $<2500g$ ).
- Wasting ( $WLZ < -2$ ) prevalence fluctuated between 8% (age 5.5 months) and 29% (age 14 months).

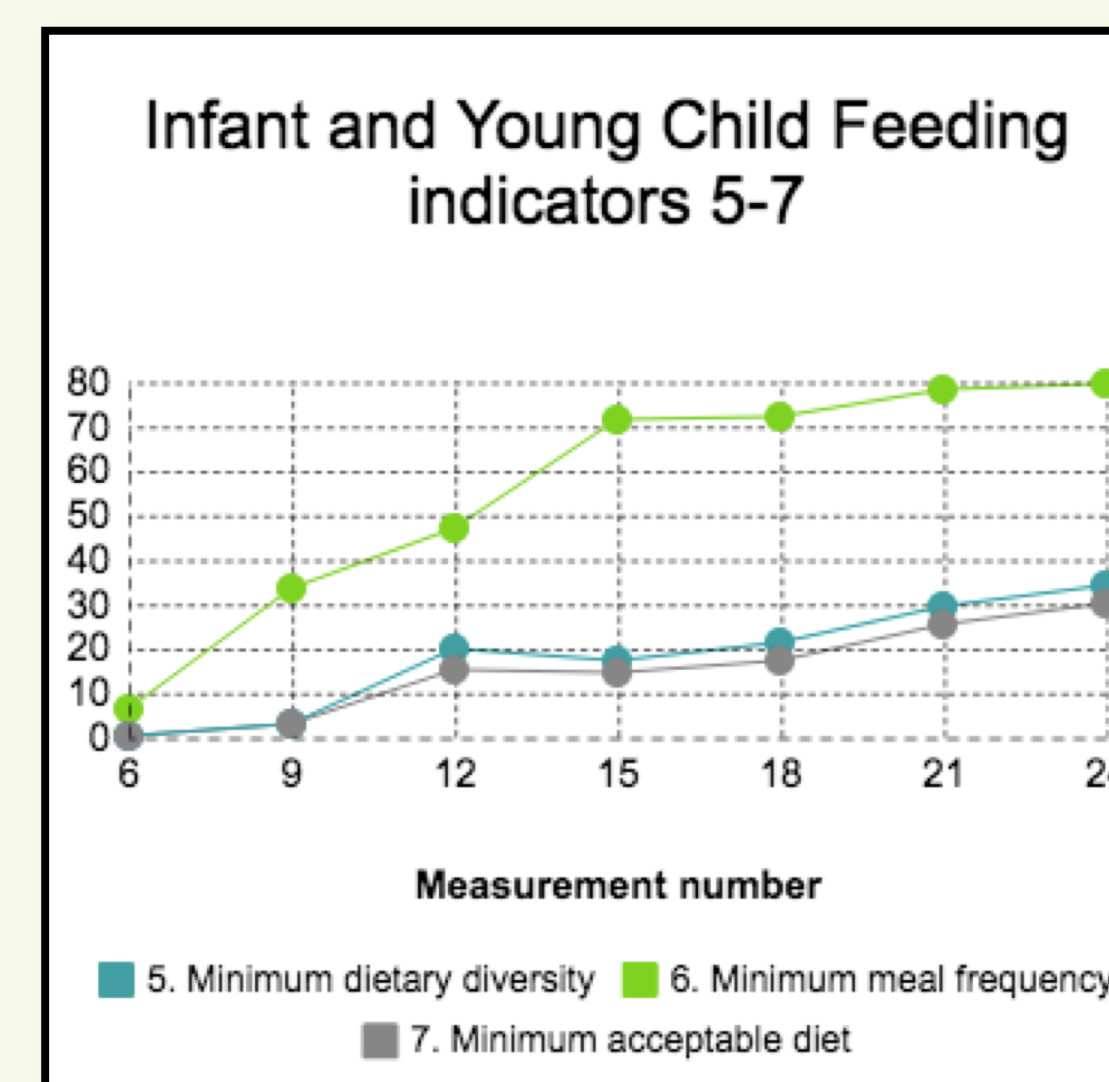


Length-for-age (LAZ) and weight-for-length z-scores (WLZ) 0-24 m.

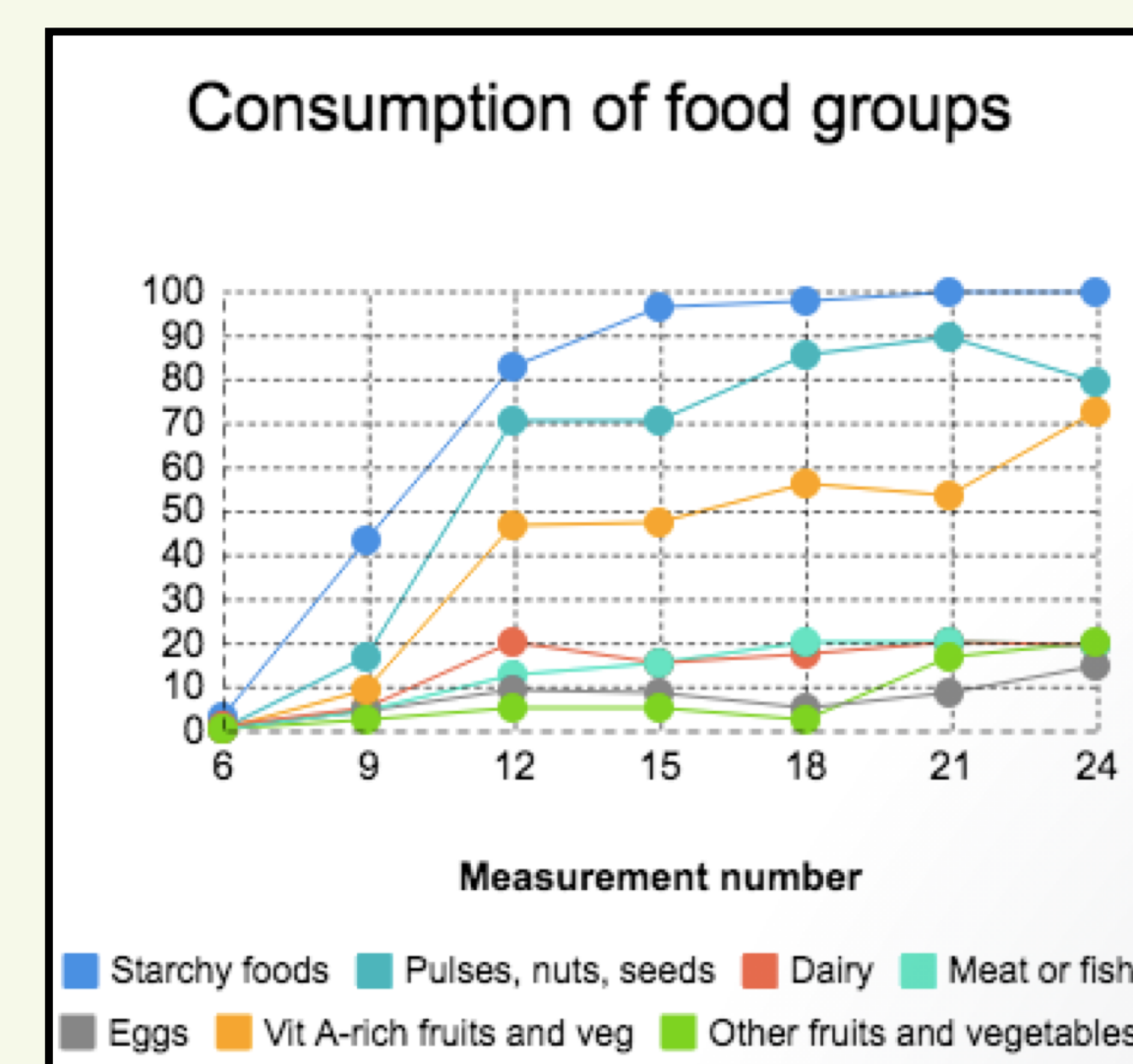
## Results - 2. Adherence to recommended Infant and Young Child Feeding (IYCF) practices



- 27.1% of the children were breastfed within the first hour after birth.
- Just more than half of the mothers exclusively breastfed in the first six months, but almost all continued breastfeeding until the child was one year old (97.7%).
- 13.7% of the children were introduced to complementary foods at 6-8 months.



- At nine months, only 3% of the children were fed the minimum dietary diversity and this proportion only increased to 34% at the end of the study.
- One third of the children were fed the minimum times per day at nine months and this proportion increased to 79% when the children were two years old.
- Consumption of animal-source food was very low throughout the study.



## Results - 3. Selected risk factors of wasting and stunting

Results from logistic regressions, adjusted for household wealth

### At birth

- **Adolescent pregnancy:** In our sample, 30.1% ( $n=181$ ) of mothers were under 20 years at the time of giving birth to the study child. These children of adolescent mothers had a 64% (OR 1.64, 95% CI: 1.06-2.54) and 86% (OR 1.86, 95% CI: 1.17-2.94) higher odds of being born wasted or stunted, respectively.

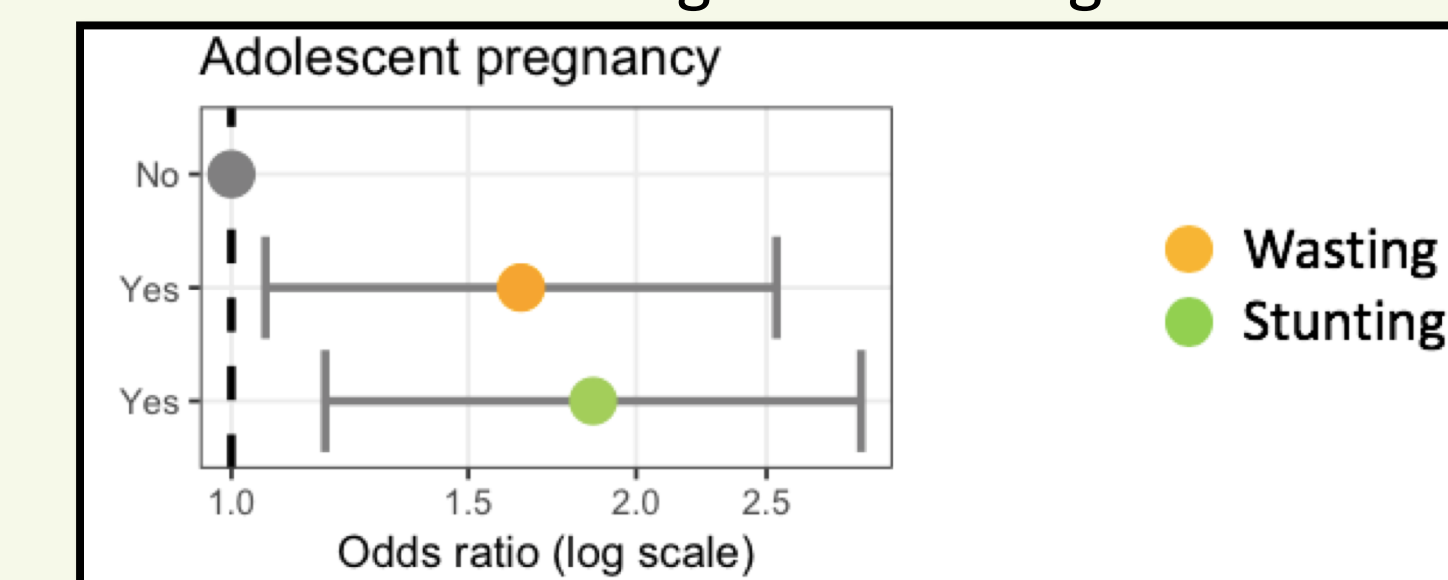
### 1-5 months

- **Exclusive breastfeeding:** Those children who were exclusively breastfed in the first six months (53.4%,  $n=296$ ) had a lower odds of wasting (OR 0.67, 95% CI: 0.46-0.99), but we found no association with stunting (OR 0.68, 95% CI: 0.45-1.02).
- **Maternal education:** Mothers who had any level of formal education (33.1%,  $n=199$ ) were less likely to have a stunted child (OR 0.58, 95% CI: 0.37-0.93), but we found no association with wasting in this age period (OR 0.87, 95% CI: 0.57-1.31).

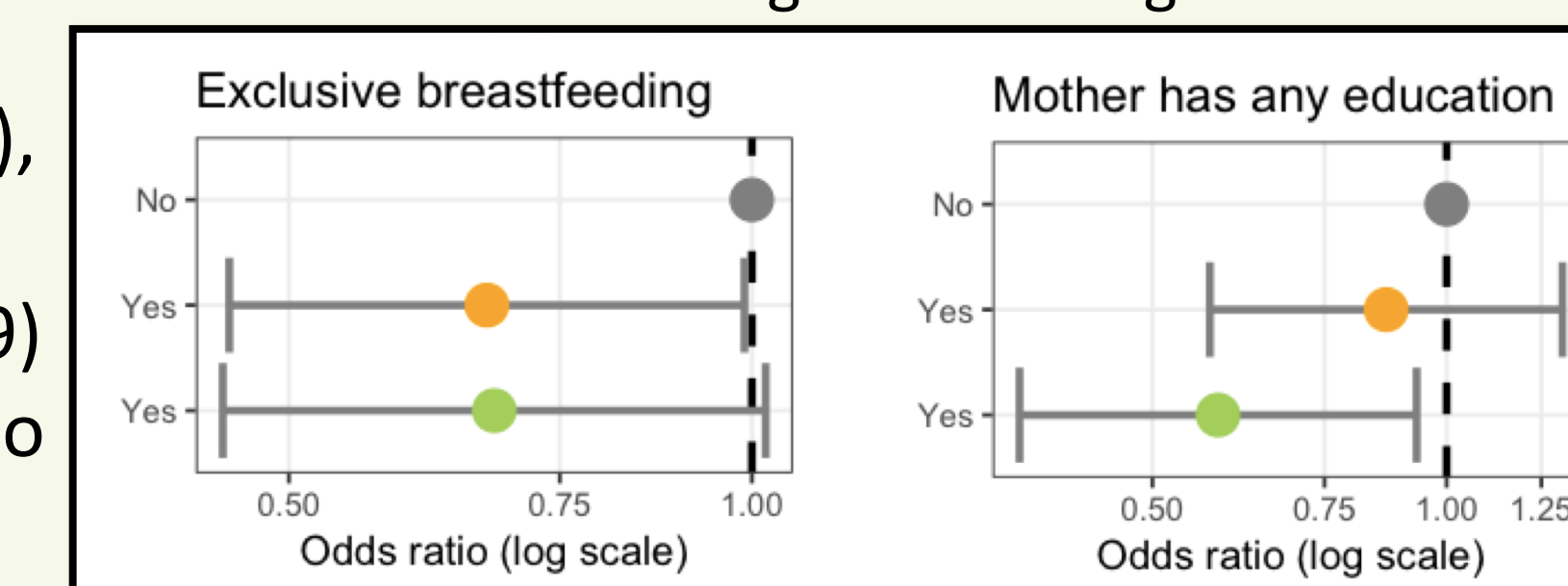
### 6-24 month

- **Maternal education:** Children of mothers with some formal education had lower odds of being wasted (OR 0.65, 95% CI: 0.42-0.99) or stunted (OR 0.63, 95% CI: 0.42-0.94) in the complementary feeding period, compared to mothers with no level of formal education.
- **Household food insecurity:** Children from severely or moderately food insecure households were more likely to be wasted (OR 1.86, 95% CI: 1.05-3.29) or stunted (OR 1.94, 95% CI: 1.08-3.49) than children from food secure households.

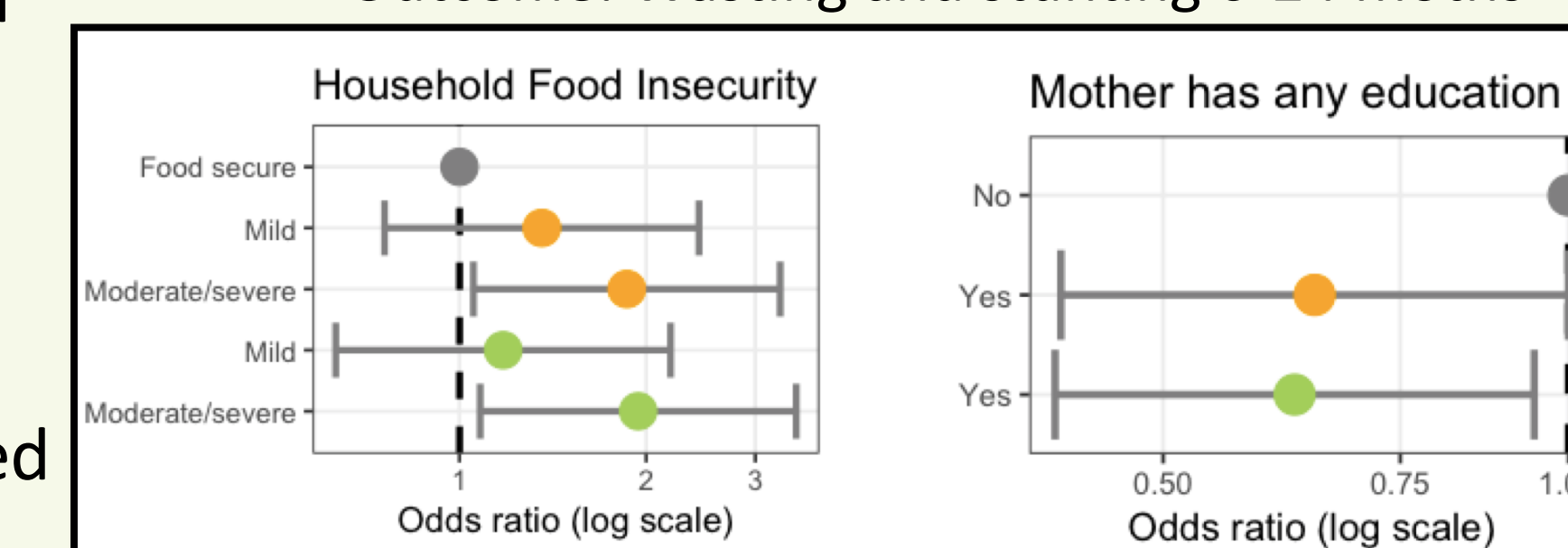
Outcome: Wasting and stunting at birth



Outcome: Wasting and stunting 1-5 months



Outcome: Wasting and stunting 6-24 months



## Conclusions

- Wasting and stunting in our Dhanusha cohort were
  - above the national and regional average
  - already prevalent at birth with 20% WLZ  $< -2$  and 16% LAZ  $< -2$ , respectively
- While LAZ dropped steadily from birth to approx. 18 months, WLZ improved in the first six months (exclusive breastfeeding period) and dropped off rapidly with the beginning of the complementary feeding period.
- Adherence to recommended feeding practises was poor, particularly with regard to timely introduction of complementary foods and dietary diversity.
- The risk factors for wasting and stunting often differ and seem to change as the child ages.

## Recommendations

- Social and behaviour-change communication interventions in Province 2 need to focus particularly upon
  - timely introduction of complementary foods,
  - promotion of increased dietary diversity, especially animal foods.
- Interventions to improve education of girls and delay age of marriage / child bearing are needed to address undernutrition in Nepal.

## References:

- (1) Ministry of Health Nepal, New ERA (2017): Nepal Demographic Health Survey 2016 – Final Report.
- (2) World Health Organization, UNICEF et al. (2010) Indicators for assessing infant and young child feeding practices.