Greater Maternal Food Insecurity is Associated with Higher Infant Morbidity Symptoms in Western Kenya

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BACKGROUND

Infant health during the **first two years of life** are essential to well-being later in life. Food insecurity has been shown to impact infant health, but studies are often limited to only a couple morbidity symptoms, and there is **little information on Kenya or during early infancy**. We present a more comprehensive analysis of the relationship between food insecurity and seven infant morbidity symptoms: **fever, difficulty breathing, cough, runny nose, vomiting, diarrhea, and earache**.

OBJECTIVES

- Describe the **relationship** between infant morbidity symptoms and food insecurity
- Determine the most significantly associated **individual symptoms**
- Characterize **covariates** of infant morbidity symptoms

METHODS

Study Setting
Pregnant women in urban, peri-urban, and rural regions in western Kenya were recruited based on food insecurity score and HIV status. Study nurses collected survey data at five time points between six months pregnant and nine months post-partum.

Data Collection
Morbidity Symptoms: mother-reported, two-day recall period
Food Insecurity: Individual Food Insecurity Access Scale (IFIAS)
Household Asset Index: Principal Components Analysis (PCA)
Infant HIV Status: virological test by PCR
BMI: weight and height/length measured

Data Analysis
Bivariate tests (t-test, chi square) were applied using StataSE 15. Multivariate logistic regression model was built using a backwards stepwise function.
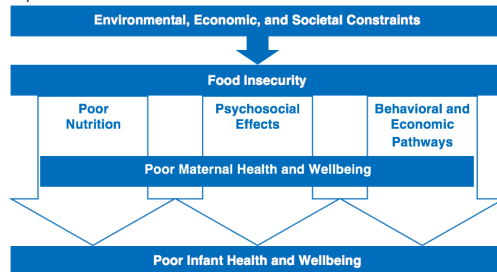

Figure 1: Conceptual framework for the impact of food insecurity on infant morbidity includes three hypothesized pathways.
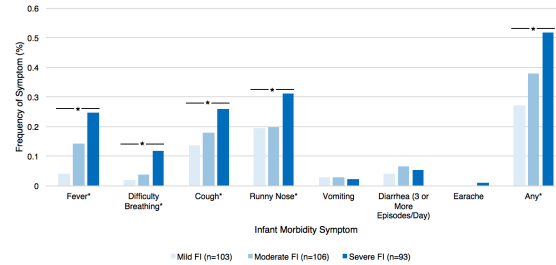
RESULTS

Figure 2: Most infant morbidity symptoms increase in frequency with maternal food insecurity (FI) severity groups: mild (IFIAS 0-7), moderate (IFIAS 8-14), and severe (IFIAS 14-25) (n=302).
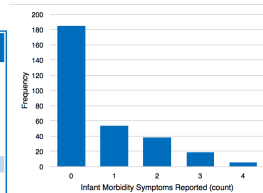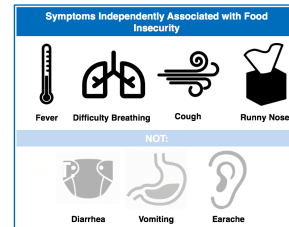*Statistically significant when FI is treated continuously (p<0.05)

Figure 3: Less than a third of infants showed multiple morbidity symptoms at three months of age (n=302).

Table 1: Infant-mother dyad characteristics by infant morbidity symptoms (n=302).

|	Infant Morbidity Symptoms Reported at Nine Months		
	None (n=185)	One or More (n=117)	p
Infant Gender, % Female	52.4	45.7	0.3
Infant HIV Status,* % Positive	1.1	5.1	**0.0**
Infant BMI, mean (SD)	17.7 (2.6)	17.6 (3.1)	0.9
Maternal Food Insecurity, IFIAS score, mean (SD)	9.8 (5.5)	12.2 (5.6)	**0.0**
Maternal Age, years, mean (SD)	25.0 (4.8)	24.4 (4.7)	0.3
Maternal Marital Status, % Married	93.5	91.5	0.5
Maternal Education Level, % Beyond Primary	35.7	26.5	0.1
Maternal HIV Status,* % Positive	48.1	50.4	0.7
Residence Type, %			
Rural	32.4	38.5	**0.0**
Peri-Urban	16.2	26.5	
Urban	51.4	35.0	
Household Asset Index,** %			
High Asset Tertile	35.1	29.9	0.4
Medium Asset Tertile	33.0	35.0	
Low Asset Tertile	31.9	35.0	
Household Size, mean (SD)	4.7 (1.7)	4.4 (1.9)	0.3

*Diagnosed virally at any point in the study duration.
**Collected at and averaged from two time points: two months pre-delivery and at infant age of one year.

Table 2: Logistic regression dichotomizing symptomatic and asymptomatic three-month-olds (n=302).

Covariate	Bivariate Odds Ratio	p	Multivariate Odds Ratio	p	n
Infant Sex, Female	0.76	0.30			258
Infant HIV Status, Positive	4.95	0.05	6.03	0.04	302
Infant BMI	0.99	0.89			229
Healthcare Seeking Behavior					
Minutes to Clinic	1.00	0.81			301
Clinic Visits While Pregnant	0.89	0.06	0.89	0.09	302
Visits to Clinic or Hospital since Birth	0.97	0.90			299
Breastfeeding					302
Initiated Ever	0.46	0.03			
Exclusive at 6 Weeks	0.59	0.03			
Exclusive at 3 Months	0.66	0.08	0.71	0.20	
Maternal Food Insecurity Score	1.08	0.00	1.06	0.02	302
Maternal Age	0.98	0.32			302
Maternal Marital Status, Married	0.74	0.50			302
Marital Education Status, Beyond Primary	0.65	0.10			302
Maternal HIV Status, Positive	1.10	0.70			302
Maternal Symptoms					301
Equivalent to Infant's Symptoms	3.04	0.02			
Any	2.58	0.00	2.59	0.00	
Maternal Depression*, Probable	1.28	0.46			277
Maternal Stress Score*	0.96	0.05			302
Residence Type					302
Peri-Urban	0.58	0.04	2.23	0.03	
Urban	1.38	0.32	0.70	0.22	
Household Size	0.92	0.31			232
Household Asset Index Score					302
Middle Tier	0.97	0.91			
High Tier	0.77	0.38			

*Collected at infant age of 1.5 months.
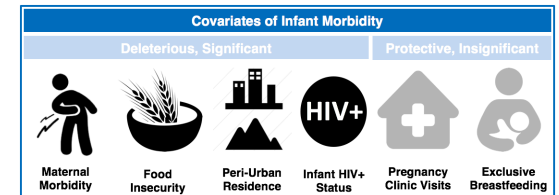
CONCLUSION

- Increased maternal **food insecurity correlates strongly with infant morbidity** at three months of age.
- Four of seven infant morbidities are independently associated with food insecurity: **fever, difficulty breathing, cough, and runny nose**.
- **Positive infant HIV status, peri-urban residence, and maternal symptoms** are associated with higher infant morbidity.
- Causal pathways between food insecurity and infant morbidity should be further investigated.

ACKNOWLEDGEMENTS