



Prevalence of vitamin A deficiency among lactating mothers and infants in Bhaktapur, Nepal



Manjeswori Ulak¹, Tor A. Strand², Andrew L. Thorne-Lyman³, Sigrun Henjum⁴, Prakash S. Shrestha¹, Wafaie W. Fawzi³, and Ram K. Chandyo^{1,2}

¹ Department of Child Health, Institute of Medicine, Maharajgunj, ² Centre for Intervention Science in Maternal and Child Health Centre for International Health, University of Bergen, Norway, ³ Harvard T.H. Chan School of Public Health, Boston, MA, USA, ⁴ Oslo and Akershus University College of Applied Science, Norway

Abstract

Background: Optimal status of vitamin A among infant is required to reduce morbidity and mortality.

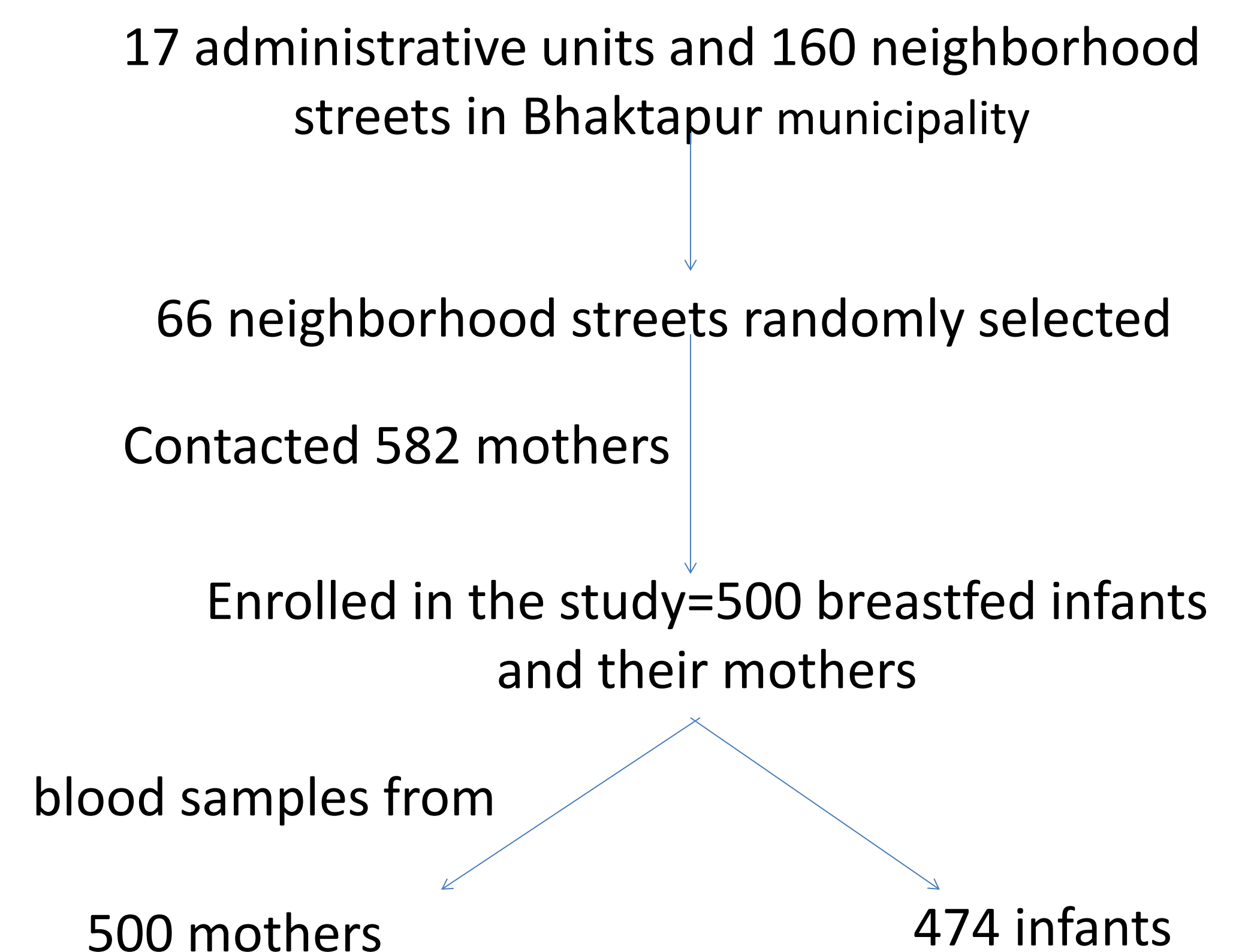
Objectives: To estimate vitamin A status by measuring plasma retinol concentrations and explore association between its status among lactating Nepalese mothers and their infants.

Methods: In a cross-sectional survey, a total of 500 randomly selected mother-infant pairs were enrolled and vitamin A deficiency and marginal deficiency was defined when plasma retinol was $<0.70 \mu\text{mol/L}$ and $<1.05 \mu\text{mol/L}$, respectively.

Results:

The mean (SD) and IQR of plasma retinol among infants were $0.96 \mu\text{mol/L}$ (0.25), and (0.79 - $1.1 \mu\text{mol/L}$), respectively. Similar figures among mothers were $1.5 \mu\text{mol/L}$ (0.46), and (1.2 - $1.8 \mu\text{mol/L}$). The prevalence of vitamin A deficiency and marginal deficiency was 3, 13% among mothers which was fivefold higher among infants (15 and 65%). None of the mothers and infants were severely deficient ($<0.35 \mu\text{mol/L}$) in vitamin A. In linear regression analysis, vitamin A status of infant was significantly associated with mother status and 25% infants of mothers with marginal vitamin A deficiency were vitamin A deficient while it was 13% among infants of mother with normal vitamin A status ($p=0.01$).

Flow chart of enrollment process



Baseline characteristics of 500 mothers and infants pair

Features	Infants	Features	Mothers
Mean age (SD),m	6.8 (2.9)	Mean age (SD),y	25.8 (4.2)
Median months of exclusive breastfeeding	3.0	Mean body mass index. Kg/m ²	22.5 (3.1)
Mean birth weight, g (SD)	2891 (491)	Mother with BMI >25 kg/m ²	17%
Stunted (<-2 Z score length for age)	10%	Mother education 10 grade or more	47%
Home delivery	10%	Mother received large dose of vitamin A in last 4 months	2%

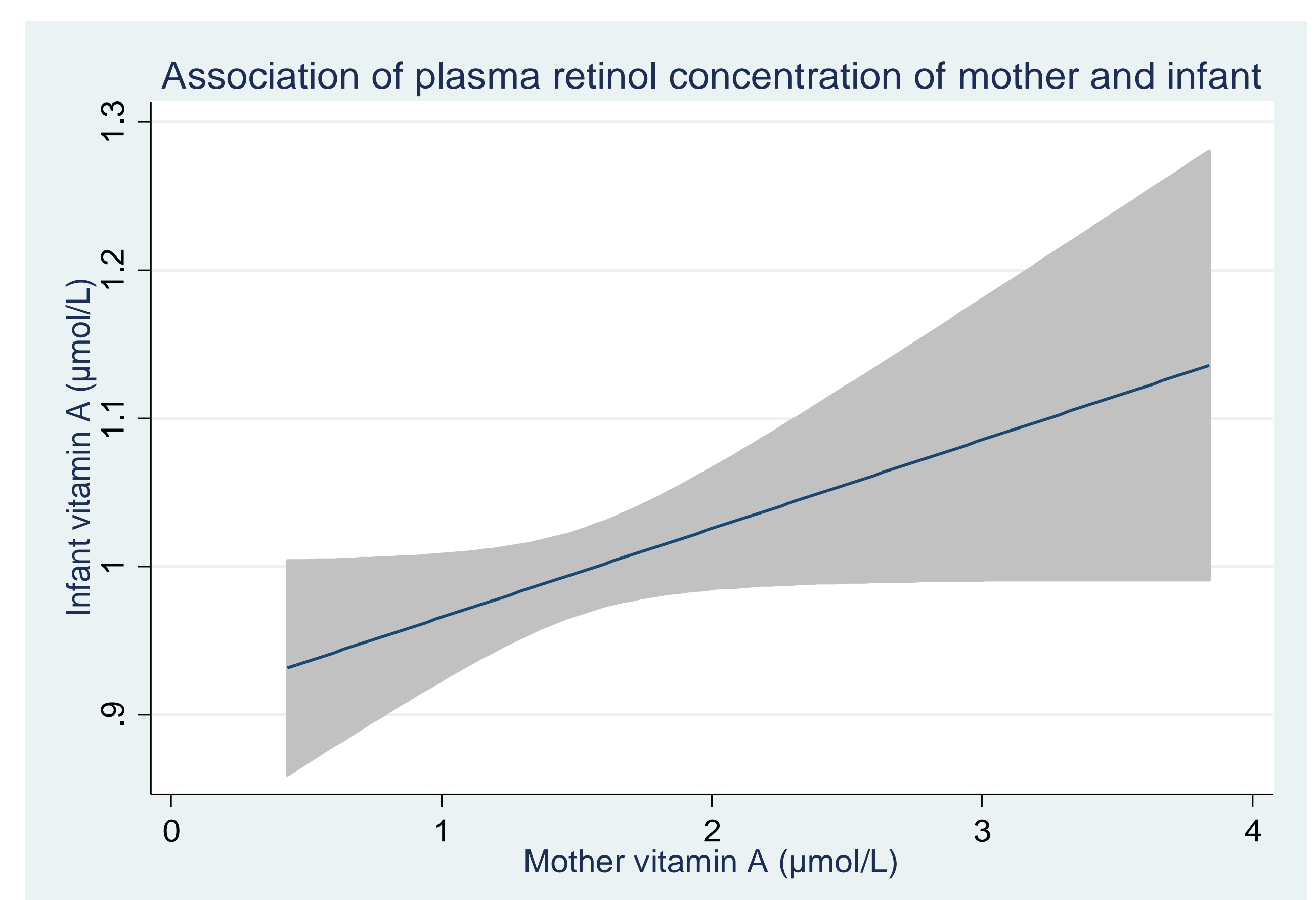
Vitamin A status among mothers and infants pair

Features	Infants	Mothers
Mean plasma retinol, (IQR)	0.96 (0.79, 1.1)	1.5 (1.2, 1.8)
Vitamin A deficiency (<0.70 $\mu\text{mol/L}$)	15%	3%
Marginal vitamin A deficiency (<1.05 $\mu\text{mol/L}$)	65%	13%
Vitamin A deficiency among C-reactive protein <5 mg/L	9%	2%
Marginal Vitamin A deficiency among C-reactive protein <5 mg/L	60%	12%

Determinants of vitamin A status in breastfed infant*

Variable	β -coefficient	95% CI	P values
Maternal plasma retinol concentration	0.05	0.002, 0.09	0.03
Age of infants (in months)	0.01	0.007, 0.02	<0.001
Gender	-0.03	-0.07, 0.01	0.1
Hemoglobin concentration	0.03	0.02, 0.05	<0.001
CRP concentrations	-0.005	-0.007, -0.003	<0.001

* Linear regression analysis adjusted for the variable listed in the table



Conclusion: Vitamin A deficiency particularly among infants is moderate public health problem and associated positively with age of infants and the mother plasma retinol concentrations. Our results highlight the importance of continued vitamin A supplementation for young children of mother with marginal vitamin A status.