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Sweetpotato Action for Security and **Health** in **Africa**

Preliminary results from the cohort study of vitamin A in western Kenya

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Cohort study of vitamin A

COVA primary outcomes;
Assess differences between intervention and control communities in;

- Vitamin A status of mothers and infants
- Hemoglobin concentrations of mothers and their infants
- Serum iron status of mothers and infants

COVA Office

Data collection

- Data collection from November 2012 to June 2014
- Four data collection points
  - **Enrollment** *(Nov 2012 – April 2013) N=505*
  - **4-6 weeks before delivery** *(Jan 2013 –Aug 2013)N=383*
  - **4 months postpartum** *(April 2013 –Jan 2014) N=401*
  - **9 months postpartum** *(Sept 2013 – June 2014) N=384*
- Blood and breast milk analysis performed
- Anthropometry was carried out at each time point

Exclusions

- Preterm births = 4
- Miscarriages =12
- Maternal death =1
- Multiple births= 8
- Infant death =20
- Still births = 11

➢ Overall exclusion was 11% of the enrolled women

Loss to follow up(Missed all visits)

- Untraceable = 7
- Refused to participate =7
- Relocated = 13

➢ The overall loss to follow up throughout the study was 16%

➢ High number of women missing second visit due to early pregnancies

➢ Some women travelled to deliver away from home and returned later

➢ Some women relocated and then later returned

Table 1: Enrollment characteristics of the 505 COVA participants .Data presented as mean ± SD or N (%).

Variables	Overall	Intervention (n= 251)	Control (n= 254)	P value
Maternal age, years	24.3 ± 5.5	24.1 ± 5.5	24.6 ± 5.5	0.326
Gestational age in weeks	20.4 ± 5.1	20.5 ± 5.5	20.4 ± 4.7	0.717
Head of Household*, Husband/Partner	432 (85.5)	205(82.0)	227(89.0)	0.000
Married/ partnered monogamous	399 (79.0)	194 (77.6)	205 (80.4)	0.491
Maternal Education, completed category				
< Primary	155(30.7)	68(27.2)	87(34.1)	0.259
Primary	244(48.3)	125(50.0)	119(46.7)	
*Maternal Occupation**				
Does not work	200 (39.8)	120 (48.0)	80 (31.4)	0.000
Agriculture	168 (33.4)	63 (25.2)	105 (41.2)	

Table 1: Enrollment characteristics cont

Socio-demographic Variables	Overall (n=505)	Intervention (n= 251)	Control (n= 254)	P value
Household Food Insecurity Category				
Secure / mild	276 (56.0)	131 (54.1)	145 (57.8)	0.229
Moderate	102 (20.7)	58 (24.0)	44 (17.5)	
Severe	115 (23.3)	53 (21.9)	62 (24.7)	
Household Dietary Diversity Score	5.45 ± 1.42	5.17 ± 1.36	5.73 ± 1.43	<0.001
HH consumed VA foods previous 24hrs	504(99.8)	249 (99.6)	255(100.0)	0.312
HH consumed OFSP in previous 24hrs	12 (2.4)	12 (4.8)	0 (0.0)	<0.001
Mother has heard of VA	171 (33.9)	109 (43.6)	62 (24.3)	0.000
Mother knows VA prevents disease	46 (26.9)	20 (18.4)	26 (41.9)	0.001
Mother knows VA protects eyes	32 (18.7)	17 (15.6)	15 (24.2)	0.166

Table 2: Mothers' Nutritional Status in Pregnancy: Results from biological indicator analysis at Enrollment and Visit 2

Variable	Control (N=206)	Intervention (N=177)	P-value
Retinol binding protein (µmol/L)			
Enrolment (2nd trimester)	1.4±0.3	1.4±0.4	0.59
Visit 2 (3rd trimester)	1.3±0.3	1.3±0.4	0.37
Hemoglobin (g/dL)			
Enrolment (2nd trimester)	11.9±1.6	12.1±1.4	0.24
Visit 2 (3rd trimester)	11.4±1.6	11.7±1.5	0.07
Ferritin (µg/L)			
Enrolment (2nd trimester)	26.9±17.2	26.8±17.5	0.98
Visit 2 (3rd trimester)	18.1±20.8	18.5±24.5	0.84

Change in prevalence of vitamin A deficiency and iron deficiency in COVA study participants by study group from enrollment (early pregnancy) to visit 2 (3rd trimester)

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Figure 1: Subclinical vitamin A deficiency

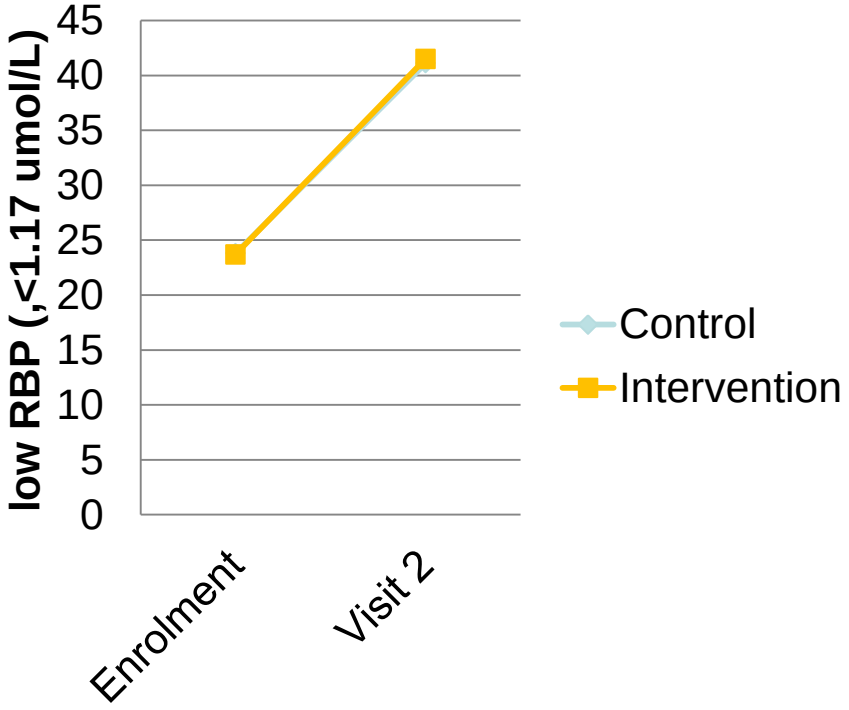


Figure 2: Change in prevalence of Iron deficiency

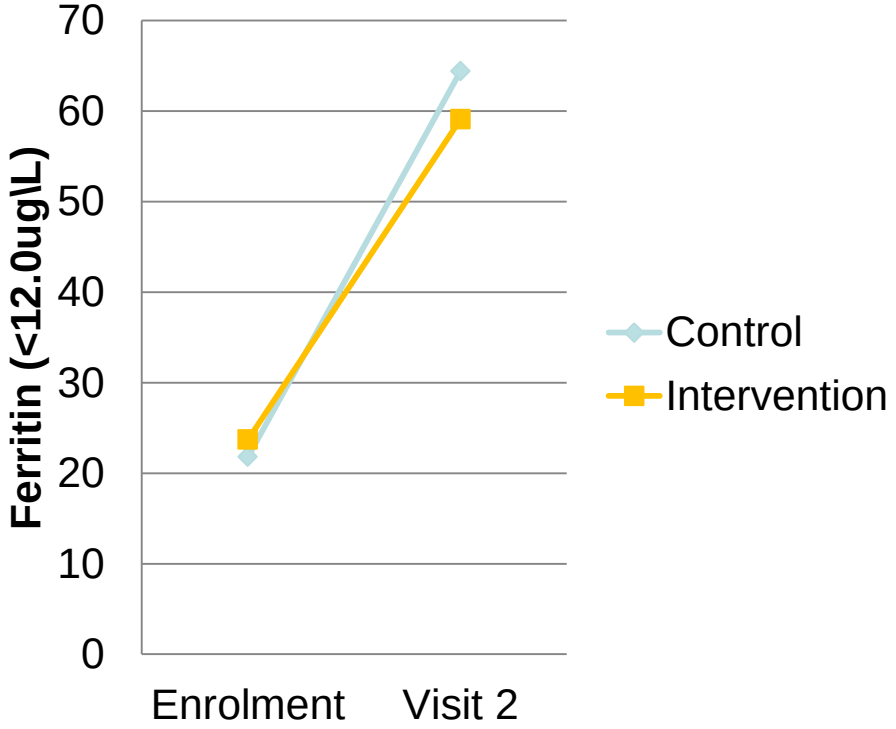


Figure 3: Anemia prevalence among pregnant women in early and late pregnancy

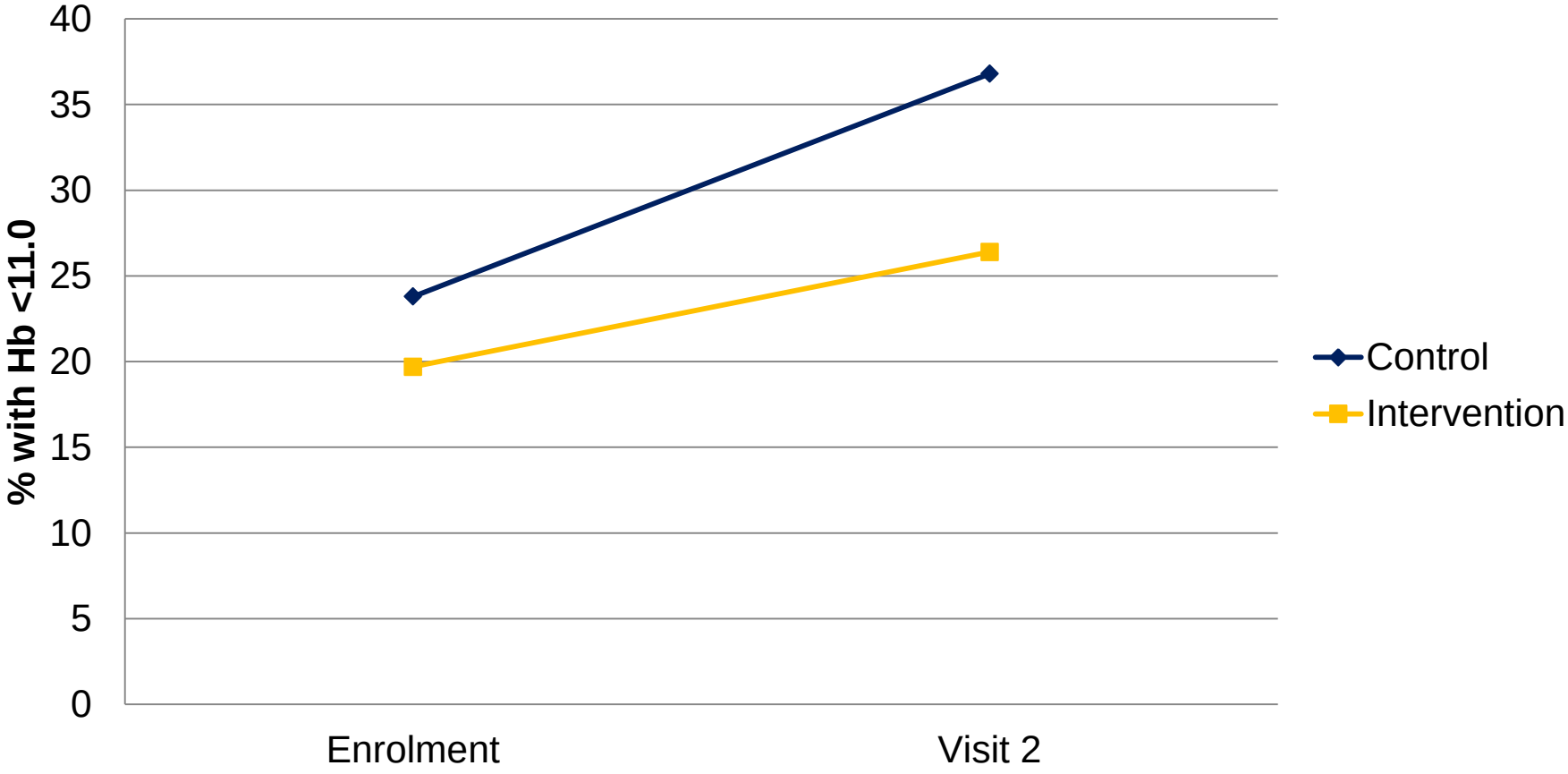


Table 3: Infant nutritional status at 4 months postpartum[1,2]

Infant Variable	Overall	Intervention (N=188)	Control (N=200)	P-value
Retinol binding protein corrected, µmol/L	0.93±0.2	0.94±0.2	0.92±0.2	0.256
Low Retinol binding protein corrected (<1.17 umol/L) [3]	136(35.1)	63 (33.5)	71(36.5)	0.537
Iron deficiency, adjusted for inflammation	11(2.8)	7(3.7)	4(2.0)	0.307
CRP (>5mg/L)	69(17.8)	28(14.9)	41(20.5)	0.149
AGP (>1.0 g/L)	111(28.6)	47(25.0)	64(32.0)	0.127

[1] CRP, C-reactive protein; AGP, Alpha-1-acid glycoprotein
[2] Mean ± SD [all such values (continuous variables)].
[3] n (%) [all such values (categorical variables)]

- They did not differ by degree of program participation

Figure 4: Stunting at 4 and 9 months

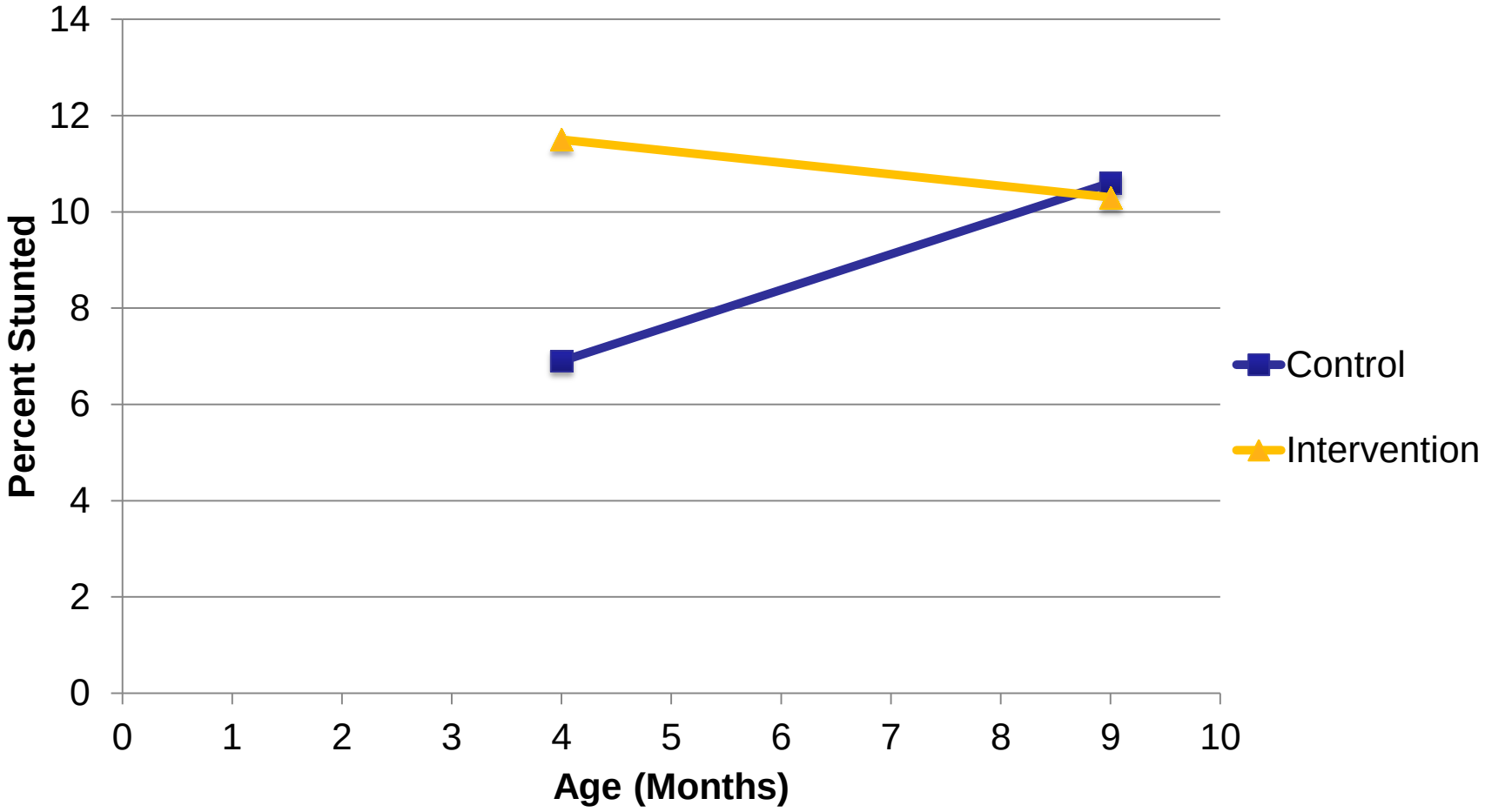


Figure 5: Wasting at 4 and 9 Months

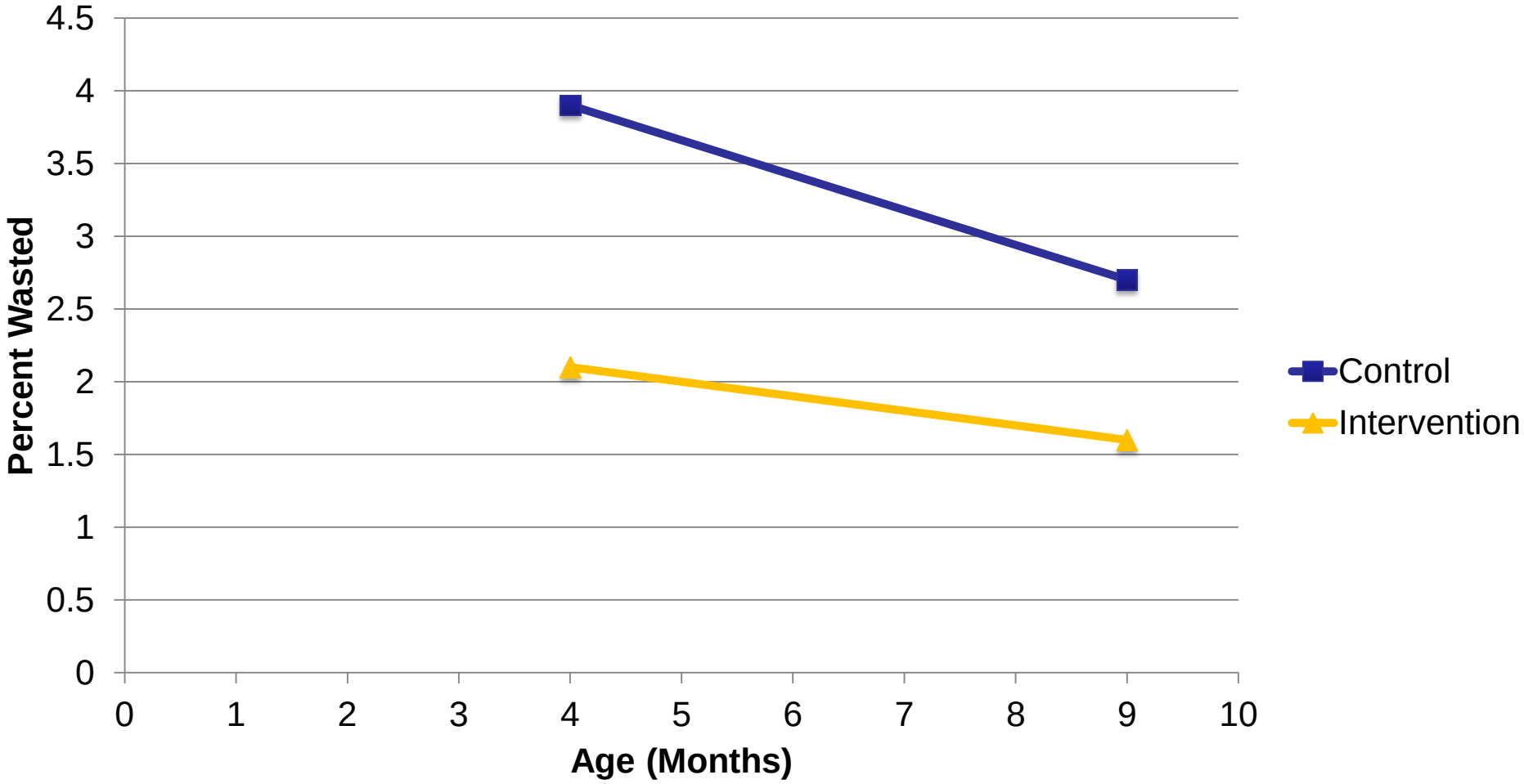
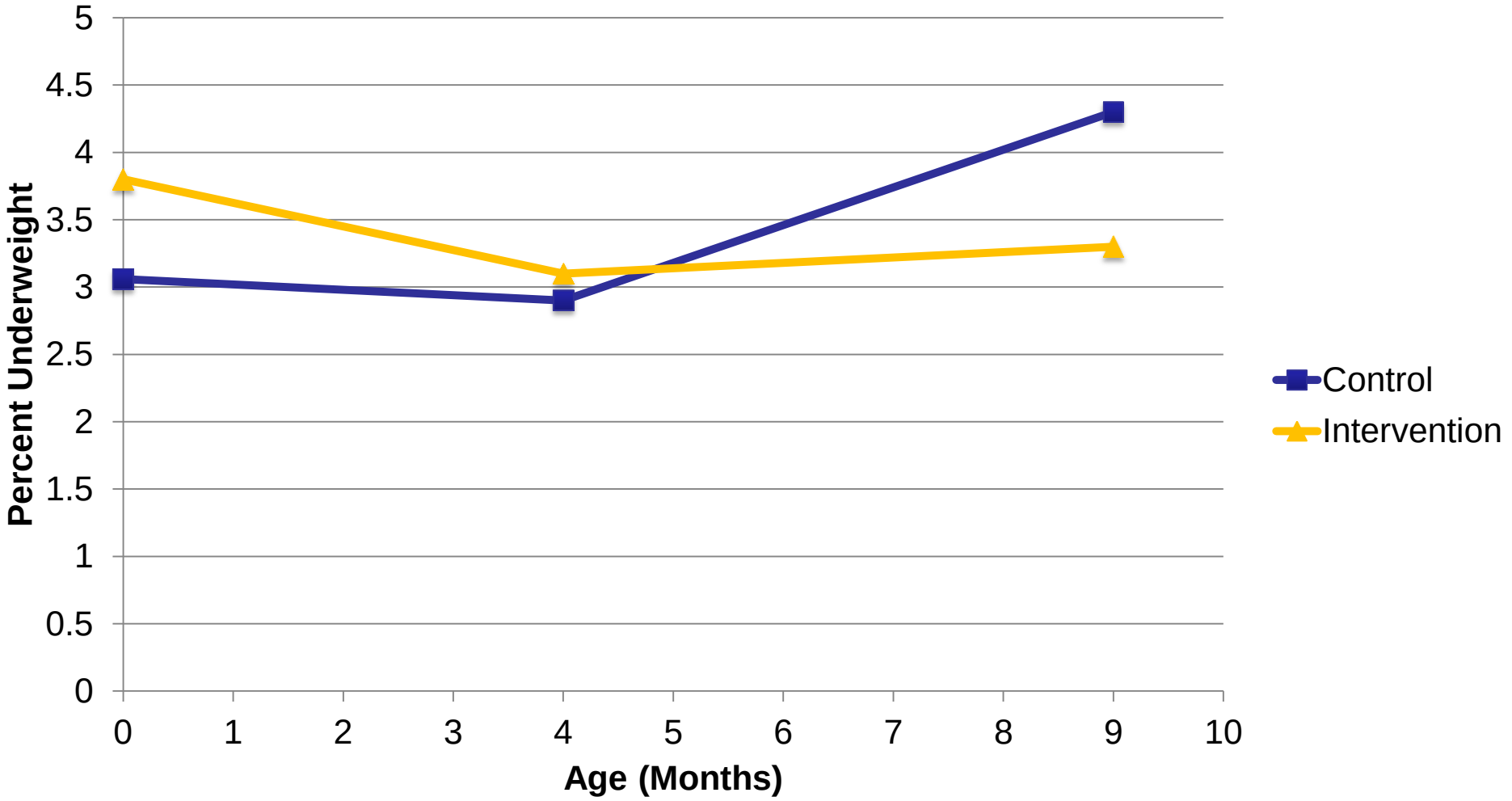


Figure 6: Underweight at 0, 4, and 9 Months



Food consumption study

- Study objective was to assess the impact of the intervention on;
  - Daily energy intake of mothers and their infants 8-9 months postpartum
  - Daily vitamin A intake of mothers and their infants 8-9 months postpartum
  - 24 hour multi-pass recall method was used in data collection

Training & Piloting

Table 4: Median dietary intakes of mothers at 8-10 months postpartum

Mothers Dietary Intakes	Control (n=102)	Intervention (n=104)	p-value
Energy (kcal)	2549.0 (2186.5-2908.0)	2587.3 (2183.3-3027.0)	0.708
α-carotene (µg)*	**74.9 (32.7-121.2)**	**100.1 (34.1-272.9)**	**0.029**
β-carotene (µg)*	**1404.3 (913.0-2160.9)**	**1806.7 (1025.0-3532.6)**	**0.004**
Retinol (µg)	51.0 (40.1-68.3)	56.9 (35.6-76.9)	0.386
Vitamin A (IU)*	**1523.6 (726.4-2562.8)**	**2367.2 (1006.1-5108.8)**	**0.001**
Vitamin A (µg RAE)	313.2 (180.2-1185.6)	375.0 (186.3-1765.8)	0.343

*Statistically significant difference between groups at α-0.05

➢Dietary intakes of vitamin A and its precursors were significantly higher except for retinol among COVA mother participants from intervention as compared to control and this is attributed to OFSP consumptions

Table 5. Median dietary intakes for children at 8-10 months postpartum

Infants	Control (n=102)	Intervention (n=104)	p-value
Energy (kcal)	461.3 (357.0-653.0)	512.5 (378.8-756.5)	0.381
α- carotene (µg)*	**36.0 (13.7-78.2)**	**53.9 (18.5-242.8)**	**0.016**
β-carotene (µg)*	**544.1 (356.9-925.9)**	**754.6 (404.4-1749.2)**	**0.007**
Retinol (µg)	95.7 (63.0-154.8)	102.2 (56.0-157.7)	0.927
Vitamin A (IU)*	**574.0 (324.2-1000.0)**	**1038.9 (487.7-2582.5)**	**<0.001**
Vitamin A (µg RAE)	282.7 (147.0-524.7)	277.8 (158.7-705.7)	0.283

*Statistically significant difference between groups at α-0.05

- Dietary intakes of vitamin A and its precursors were significantly higher except for retinol among COVA children participants from intervention as compared to control and this was attributed to OFSP consumptions

Table 6. Adequacy of VA intakes for mothers and children at 8-10 months postpartum*

	Adequate VA intakes n (%)	Inadequate VA intakes n (%)	p-value
Women			
Intervention	46 (44.2)	58 (55.8)	0.874
Control	44 (43.1)	58 (56.9)	
Infant			
Intervention	**25 (24.0)**	79 (76.0)	**0.003**
Control	**9 (8.8)**	93 (91.2)	

- Adequacy estimated based on IOM estimated average requirements for lactating women and children 7-12 months of age. Cutoffs women1300ug/d RAE and children < 500 ug/d RAE

OFSP was the largest contributor to VA adequacy among infants in the intervention group

Ongoing

1. Determination of VA and iron status from blood collected at 9 months postpartum for women and infants
2. Determination of retinol and carotenoids in breast milk collected at 4 and 9 months postpartum
3. Impact evaluation using complex modeling strategies to account for clustering, confounding and repeated measures.

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Thank you