

Supplementary Information

Table 1: Maternal descriptive statistics overall and by maternal anemic status (yes/no) during (a) pregnancy and at (b) one-month postpartum. Anemia thresholds were determined according to the World Health Organization (WHO) guidelines established in 2011.

(a) Pregnancy

Characteristics	Study Population	Maternal Anemic status Pregnancy			Maternal Anemic status One-Month Postpartum		
		Non-Anemic	Anemic	<i>p</i> -value	Non-Anemic	Anemic	<i>p</i> -value
	N= 298	(n=195)	(n=100)		(n=161)	(n=134)	
Area				0.036*			0.86
Urban	154 (51.7)	109 (55.9)	43 (43.0)	-	84 (51.2)	70 (52.2)	-
Rural	144 (48.3)	86 (44.1)	57 (57.0)	-	80 (48.8)	64 (47.8)	-
*Age (years) (mean, CI)	28 (24, 31)	27 (26, 28)	27 (26 29)	0.5986	28 (27, 29)	26 (25, 28)	0.0673
*Hemoglobin (g/L) (mean, CI)	113.0 (105.0, 122.0)	-	-	-	116.3 (114.4, 118.2)	110.3 (108.0, 112.7)	0.0001**
Anemia							0.018*
Yes	100 (33.0)	-	-	-	79 (40.5)	55 (55.0)	-

Characteristics	Study Population	Maternal Anemic status Pregnancy			Maternal Anemic status One-Month Postpartum		
		Non-Anemic	Anemic	<i>p</i> -value	Non-Anemic	Anemic	<i>p</i> -value
No	195 (64.4)	-	-	-	116 (59.5)	45 (45.0)	-
*Weight (Kg)	56.9 (50.6, 64.1)	60.1 (58.4, 61.8)	55.8 (54.1, 57.5)	0.0021**	58.5 (56.8, 60.3)	58.8 (56.9, 60.8)	0.8131
*Height (m)	1.5 (1.5, 1.6)	1.5 (1.5, 1.6)	1.5 (1.5, 1.5)	0.4207	1.5 (1.5, 1.6)	1.5 (1.5, 1.56)	0.5240
BMI (Kg/m²)				0.177	N=(161)	N=134	0.374
Underweight	7 (2.3)	4 (2.1)	3 (3.0)	-	5 (3.1)	2 (1.5)	-
Normal	169 (56.7)	105 (53.9)	64 (64.0)	-	96 (59.6)	73 (54.5)	-
Overweight	119 (39.9)	86 (44.1)	33 (33.0)	-	60 (37.3)	59 (44.0)	-
Blood Pressure (mm Hg)		(n=193)	(n=99)	0.737			
Hypertension	-	-	-				
Normal range	260 (87.3)	171 (88.6)	89 (89.9)				
Hypotension	32 (10.7)	22 (11.4)	10 (10.1)				
*Income /per month (USD)	87.0 (17.4, 116.0)	139.9 (95.8, 183.9)	193.6 (72.3, 314.8)	0.3177	145.01 (95.5, 194.5)	173.75 (80.4, 267.1)	0.5741

Characteristics	Study Population	Maternal Anemic status Pregnancy			Maternal Anemic status One-Month Postpartum		
		Non-Anemic	Anemic	<i>p</i> -value	Non-Anemic	Anemic	<i>p</i> -value
Work Status				0.401	161	134	0.134
Unemployed	98 (31.5)	62 (31.8)	32 (32.0)	-	46 (28.6)	48 (35.8)	-
Employed	131 (44.0)	91 (46.7)	40 (40.0)	-	80 (49.7)	51 (38.1)	-
Other	70 (23.5)	42 (21.5)	28 (28.0)	-	35 (21.7)	35 (26.1)	-
Education				0.785			0.320
Primary	76 (25.5)	52 (26.7)	24 (24.0)	-	37 (23.0)	39 (29.1)	-
Secondary	119 (39.9)	76 (39.0)	43 (43.0)	-	64 (39.8)	55 (41.0)	-
University/ Higher	100 (33.6)	67 (34.3)	33 (33.0)	-	60 (37.3)	40 (29.9)	-
Marital Status				0.936			0.738
Never married	26 (8.7)	17 (8.7)	9 (9.0)	-	15 (9.3)	11 (8.2)	-
Currently married	269 (90.3)	178 (91.3)	91 (91.0)	-	146 (90.7)	123 (91.8)	-
Alcohol consumption (yes/no)				0.271			0.529
Yes	62 (20.8)	36 (18.5)	26 (26.0)		18 (11.2)	12 (9.0)	
No	233 (78.2)	159 (81.5)	74 (74.0)		143 (88.8)	122 (91.0)	

Characteristics	Study Population	Maternal Anemic status Pregnancy			Maternal Anemic status One-Month Postpartum		
		Non-Anemic	Anemic	<i>p</i> -value	Non-Anemic	Anemic	<i>p</i> -value
Antenatal care visits	3.0 (2.0, 5.0)	3.6 (2.60, 4.6)	3.2 (2.83, 3.5)	0.5317	3.6 (2.46, 4.8)	3.2 (2.90, 3.5)	0.4981
Iron Supplementation				0.377			0.529
Yes	265 (88.9)	173 (88.7)	92 (92.0)	-	143 (88.8)	122 (91.0)	-
No	30 (10.1)	22 (11.3)	8 (8.0)	-	18 (11.2)	12 (9.0)	-

(b) One-month post-partum

Characteristics	Study Population	Maternal Anemic status Pregnancy			Maternal Anemic status One-month Postpartum		
		Non-Anemic	Anemic	<i>p</i> -value	Non-Anemic	Anemic	<i>p</i> -value
	N= 298	(n=195)	(n=100)		(n=147)	(n=128)	
Hemoglobin level (g/L)	122.0 (113.0, 131.0)	122.7 (120.9, 124.6)	119.2 (116.9, 121.4)	0.0213	-	-	-
Anemia				0.018*	-	-	-
Yes	134 (45.0)	79 (40.5)	55 (55.00)	-	-	-	-
No	164 (55.0)	116 (59.5)	45 (45.00)	-	-	-	-

Characteristics	Study Population	Maternal Anemic status Pregnancy			Maternal Anemic status One-Month Postpartum		
		Non-Anemic	Anemic	<i>p</i> -value	Non-Anemic	Anemic	<i>p</i> -value
Blood Pressure (mm Hg)		-	-	-	-	-	0.748
Hypertension	9 (3.0)	-	-	-	6 (3.7)	3 (2.2)	-
Normal range	281 (94.3)	-	-	-	154 (93.9)	127 (94.8)	-
Hypotension	8 (2.7)	-	-	-	4 (2.4)	4 (3.0)	-

The continuous variables are presented as medians with the according 25th and 75th inter quartile range marked (*). The categorical variables are presented total numbers and percentages. T-tests are presented as means and 95% confidence intervals (CI). Significance at $p < 0.05$. BMI is categorized as follows: Underweight (>18.5); Normal weight ($18.5 - <25$) and Overweight (25.0 to $30+$). Blood Pressure is categorized as follows: Hypertension = systolic blood pressure (SBP) ≥ 140 and diastolic blood pressure (DBP) ≥ 90 ; Normal range = SBP ≤ 139 and DBP ≤ 89 ; Hypotension= SBP ≤ 90 and DBP ≤ 60 . Acronyms: USD=United States dollar; g = gram, Kg = Kilogram; m= meter, cm= centimeter; mm= millimeter; Hg= mercury; L= Liter

Table 2: Infant (one-month postpartum) descriptive statistics overall and by maternal anemic status (yes/no) during and after pregnancy (one-month post-partum. Anemia thresholds were determined according to the World Health Organization (WHO) guidelines established in 2011.

Infant

Characteristics	Study Population	Maternal Anemic status Pregnancy			Maternal Anemic status One-month Postpartum		
		Non-Anemic	Anemic	<i>p</i> -value	Non-Anemic	Anemic	<i>p</i> -value
	N= 298	(n=195)	(n=100)		(n=164)	(n=134)	
Sex				0.346			0.103
Female	149 (50.0)	94 (48.2)	54 (54.0)	-	89 (54.3)	60 (44.8)	-
Male	149 (50.0)	101 (51.8)	46 (46.0)	-	75 (45.7)	74 (55.2)	-
*Hemoglobin Levels (g/L)		(n=195)	(n=99)		(n=163)	(n=134)	
	121.0 (110.0, 135.0)	124.07 (121.49, 126.66)	122 (118.32, 126.00)	0.4054	125.26 (122.39, 128.14)	121.07 (117.91, 124.24)	0.0535*
Anemia							
Yes	74 (24.8)						
No	223 (74.8)						
*Weight- (kg)	4.2 (3.80, 4.5)	4.27 (4.11, 4.44)	4.11 (4.01, 4.21)	0.1779	4.25 (4.06, 4.44)	4.19 (4.11, 4.29)	0.6679
*Height (cm)	53.0 (51.3, 54.1)	52.54 (52.10, 52.98)	52.78 (52.27, 53.28)	0.5177	52.70 (52.24, 53.17)	52.56 (52.07, 53.04)	0.6748

Infant

Characteristics	Study Population	Maternal Anemic status Pregnancy			Maternal Anemic status One-month Postpartum		
		Non-Anemic	Anemic	<i>p</i> -value	Non-Anemic	Anemic	<i>p</i> -value
*Head circumference (cm)	36.0 (35.1, 37.0)	36.0 (35.6, 6.3)	35.8 (35.5, 36.2)	0.5414	36.0 (35.4, 36.6)	36.1 (35.9, 36.3)	0.7758
*Mid-upper arm circumference (cm)	11.7 (11.0, 12.3)	11.9 (11.53, 12.3)	11.8 (11.56, 12.1)	0.7388	11.93 (11.5, 12.4)	11.80 (11.6, 12.0)	0.6205
*Triceps skinfold (cm)	0.8 (0.7, 1.0)	0.8 (0.8, 0.8)	0.9 (0.8, 0.9)	0.8698	0.8 (0.8, 0.9)	0.9 (0.8, 0.9)	0.2890
*Subscapular skinfold (cm)	0.7 (0.6, 0.9)	0.8 (0.8, 0.8)	0.8 (0.7, 0.8)	0.3392	0.8 (0.8, 0.8)	0.8 (0.7, 0.8)	0.3781
*Quadriiceps skinfold (cm)	1.2 (1.0, 1.4)	1.2 (1.1, 1.2)	1.2 (1.1, 1.2)	0.6444	1.2 (1.1, 1.2)	1.2 (1.1, 1.2)	0.2909
*Flank skinfold (cm)	0.7 (0.6, 0.9)	0.8 (0.7, 0.9)	0.8 (0.7, 0.8)	0.7605	0.8 (0.7, 0.9)	0.8 (0.7, 0.9)	0.4080
Doctors visit				0.168			0.266
yes	21 (7.1)	11 (5.6)	10 (10.0)	-	14 (8.5)	7 (5.2)	-
no	277 (93.0)	184 (94.4)	90 (90.0)	-	150 (91.5)	127 (94.8)	-

Infant

Characteristics	Study Population	Maternal Anemic status Pregnancy			Maternal Anemic status One-month Postpartum		
		Non-Anemic	Anemic	<i>p</i> -value	Non-Anemic	Anemic	<i>p</i> -value
Iron supplementation		(n=51)	(n=33)	0.497	(n=41)	(n=43)	0.415
Yes	8 (2.7)	4(7.8)	4 (12.1)	-	5 (12.2)	3 (7.0)	-
No	0 (0.0)	-	-	-	0 (0.0)	0 (0.0)	-
Don't know	76 (25.5)	47(92.2)	29 (87.9)	-	36 (87.8)	40 (93.4)	-

The continuous variables are presented as medians with the according 25th and 75th IQR marked with (*). The categorical variables are presented as total numbers and percentages. T-tests are presented as means and 95% confidence intervals (CI). Significance at $p < 0.05$. Acronyms: g = gram; Kg = Kilogram; cm= centimeter; L= Liter

Table 2: Associations of pregnancy anemia (yes/no) and pregnancy hemoglobin levels on infant anemia (yes/no) and infant anthropometrics measurements. Anemia thresholds were determined according to the World Health Organization (WHO) guidelines established in 2011.

Outcome	Maternal Anemia Pregnancy Hb < 110 g/L		Maternal Anemia Pregnancy Hemoglobin levels (g/L)	
	Crude	Fully ad- justed	Crude	Fully adjusted
	OR 95% CI		β -estimates, 95% CI	
	n=298	n=292	n=298	n=291
Infant Anemia Hb < 110 g/L	0.35 (-0.19, 0.89)	1.52 (0.84, 2.74)	0.07 (-0.09, 0.23)	0.04 (-0.12, 0.21)
Maternal Ane- mia Postpartum (yes/no)	0.58** (0.09, 1.07)	2.06** (1.21, 3.48)	0.23** (0.12, 0.34)	0.24** (0.13, 0.34)
	β -estimates, 95% CI		β -estimates, 95% CI	
WAZ	-0.16 (-0.41, 0.08)	-0.09 (-0.34, 0.16)	0.004 (-0.005, 0.01)	0.002 (-0.007, 0.01)
HAZ	0.07 (-0.16, 0.32)	0.12 (-0.13, 0.37)	0.002 (-0.007, 0.01)	0.002 (-0.007, 0.01)
HC for age z scores	-0.06 (-0.25, 0.13)	-0.02 (-0.22, 0.18)	0.004 (-0.002, 0.01)	0.004 (-0.004, 0.01)
MUAC for age z-scores	-0.04 (-0.28, 0.20)	-0.06 (-0.31, 0.19)	-0.001 (-0.009, 0.008)	-0.001 (-0.009, 0.008)
Triceps^a for age z-scores	0.02 (-0.22, 0.26)	0.06 (-0.19, 0.32)	0.001 (-0.007, 0.009)	-0.001 (-0.01, 0.01)
Subscapular^a for age z-scores	-0.12 (-0.36, 0.12)	-0.08 (-0.33, 0.17)	0.0001 (-0.01, 0.01)	-0.001 (-0.01, 0.01)
Quadriceps^a for age z-scores	-0.06 (-0.30, 0.19)	-0.06 (-0.32, 0.19)	0.002 (-0.01, 0.01)	0.001 (-0.01, 0.01)
Flank^a for age z-scores	-0.04 (-0.28, 0.20)	-0.06 (-0.32, 0.19)	-0.001 (-0.01, 0.01)	-0.0003 (-0.01, 0.01)

*Significance: $p < 0.05$

** Significance: $p < 0.01$

^a Skinfold thickness

Estimates are presented as odds ratio (OR) for (logistic regression) and mean differences (β -estimates) for linear regression with the corresponding 95% confidence intervals (CI).

All models are fully adjusted for sex and age of the infant, maternal BMI, highest educational attainment, marital status, antenatal care visits, urban or rural residence, employment status, monthly income, alcohol consumption, and blood pressure.

HAZ= Height for age z-scores, WAZ= Weight for age z-scores, HC= Head circumference

Table 4: Associations of postpartum anemia (yes/no) and hemoglobin levels on infant anemia (yes/no) and infant anthropometrics for age z-scores. Anemia thresholds were determined according to the World Health Organization (WHO) guidelines established in 2011.

Outcome	Maternal Anemia Postpartum Hb < 120 g/L		Maternal Anemia Postpartum Hemoglobin levels (g/L)	
	Crude	Fully adjusted	Crude	Fully adjusted
	OR 95% CI		β -estimates, 95% CI	
	n=298	n=292	n=298	n=292
Infant Anemia Hb < 110 g/L	0.55* (0.02, 1.08)	1.54 (0.88, 2.71)	0.30** (0.13, 0.47)	0.23** (0.06, 0.40)
	β -estimates, 95% CI			
WAZ	-0.05 (-0.28, 0.18)	-0.08 (-0.31, 0.15)	-0.004 (-0.01, -0.005)	-0.003 (-0.01, 0.01)
HAZ	-0.05 (-0.28, 0.18)	-0.06 (-0.30, 0.17)	0.0004 (-0.01, 0.01)	0.001 (-0.01, 0.01)
HC for age z-scores	0.03 (-0.19, 0.26)	0.09 (-0.09, 0.29)	-0.006 (-0.01, -0.003)	-0.007 (-0.01, 0.001)
MUAC for age z-scores	-0.05 (-0.29, 0.17)	-0.09 (-0.33, 0.14)	0.005 (-0.003, 0.01)	0.005 (-0.004, 0.01)
Triceps^a for age z-scores	0.12 (-0.11, 0.35)	0.14 (-0.10, 0.38)	-0.004 (-0.01, 0.01)	-0.004 (-0.01, 0.004)
Subscapular^a for age z-scores	-0.10 (-0.33, 0.13)	-0.09 (-0.34, 0.15)	0.002 (-0.01, 0.01)	0.002 (-0.01, 0.02)
Quadriceps^a for age z-scores	-0.12 (-0.35, 0.11)	-0.05 (-0.29, 0.19)	0.003 (-0.01, 0.01)	0.0003 (-0.01, 0.01)
Flank^a for age z-scores	-0.09 (-0.32, 0.13)	-0.10 (-0.35, 0.14)	0.0004 (-0.01, 0.01)	0.001 (-0.01, 0.01)

*Significance: $p < 0.05$

** Significance: $p < 0.01$

^a Skinfold thickness

Estimates are presented as odds ratio (OR) for (logistic regression) and mean differences (β -estimates) for linear regression with the corresponding 95% confidence intervals (CI).

All models are fully adjusted for sex and age of the infant, maternal BMI, highest educational attainment, marital status, antenatal care visits, urban or rural residence, employment status, monthly income, alcohol consumption, and blood pressure.

HAZ= Height for age z-scores, WAZ= Weight for age z-scores, HC= Head circumference

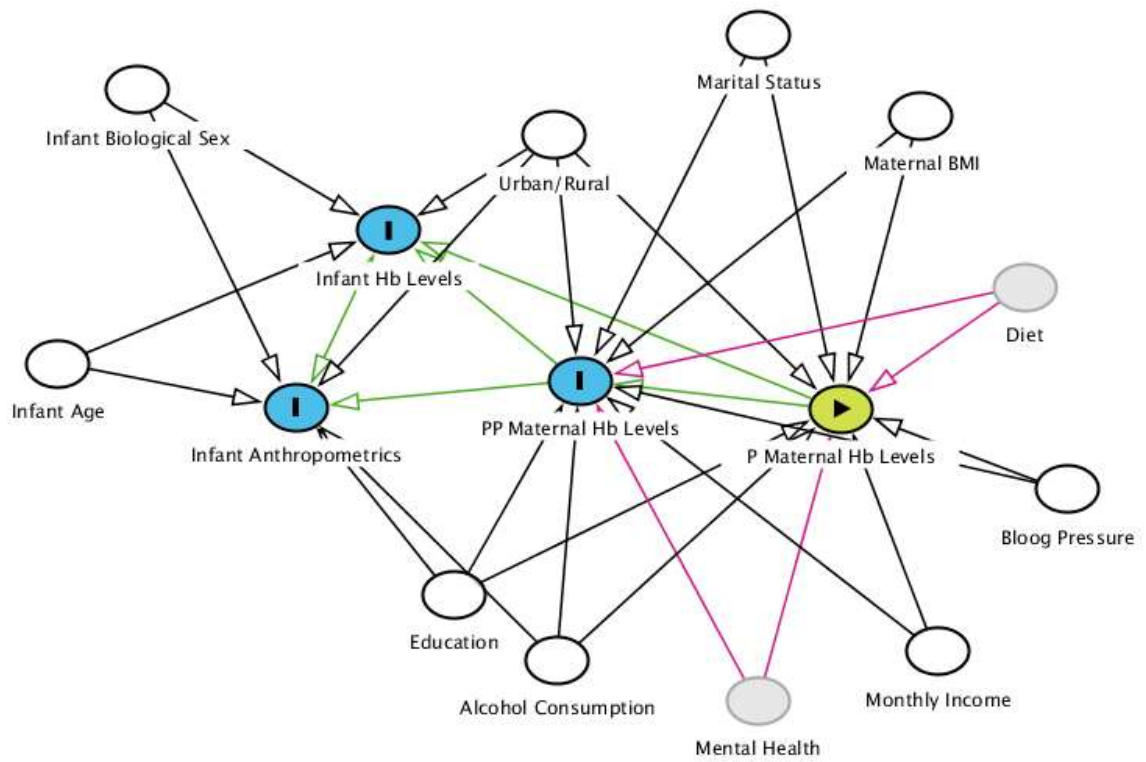


Figure 1: Directed Acyclic Graph (DAG) to inform confounder selection. P= Pregnancy; PP= Post-partum; Hb= Hemoglobin; BMI = Body Mass Index