Supplementary Materials: Relationships Between Breastfeeding Patterns and Maternal and Infant Body Composition Over the First 12 Months of Lactation

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Table S1. Body composition of breastfed infants aged 2 to 12 months calculated with ultrasound skinfold and bioelectrical impedance equations [a].

Equations	2 months			5 months			9 months			12 months		
	Female	Male	Pooled	Female	Male	Pooled	Female	Male	Pooled	Female	Male	Pooled
Ultrasound 2-skinfolds	n = 6	n = 8	n = 14	n = 10	n = 10	n = 20	n = 9	n = 9	n = 18	n = 9	n = 9	n = 18
FFM (kg)	3.74±0.27 [b]	4.42±0.36	4.23±0.44	5.08±0.49	5.72±0.60	5.52±0.77	6.13±0.66	6.65±0.57	6.56±0.68	6.86±0.78	7.30±0.64	7.15±0.58
FM (kg)	1.21±0.25	1.63±0.53	1.40±0.25	1.78±0.29	2.24±0.55	1.91±0.41	2.19±0.38	2.35±0.66	2.28±0.60	2.24±0.39	2.66±0.58	2.50±0.29
FM (%)	24.2±3.1	26.5±5.1	24.7±2.3	25.8±2.6	27.9±5.3	25.6±2.4	26.3±3.3	25.9±5.5	25.6±5.0	24.5±2.9	26.5±4.7	26.0±3.0
FFMI (kg/m²)	11.5±0.5	12.9±0.5	12.2±0.9	12.5±1.1	13.3±1.1	12.9±1.2	12.8±1.2	13.2±0.7	13.0±1.0	12.7±1.2	12.9±0.7	12.7±1.0
FMI (kg/m²)	3.7±0.6	4.3±0.6	3.9±0.6	4.4±0.7	5.2±1.2	4.8±1.1	4.6±0.9	4.7±1.3	4.6±1.1	4.1±0.8	4.7±1.0	4.5±0.9
Ultrasound 4-skinfolds	n = 6	n = 7	n = 13	n = 10	n = 9	n = 19	n = 9	n = 9	n = 18	n = 9	n = 9	n = 18
FFM (kg)	3.69±0.30	4.53±0.44	4.20±0.47	5.05±0.49	5.84±0.61	5.53±0.77	6.10±0.69	6.74±0.58	6.62±0.67	6.92±0.81	7.56±0.64	7.28±0.56
FM (kg)	1.25±0.26	1.54±0.40	1.43±0.24	1.81±0.37	2.12±0.46	1.90±0.40	2.21±0.52	2.26±0.47	2.22±0.53	2.18±0.44	2.40±0.46	2.37±0.41
FM (%)	25.2±3.5	25.1±3.6	25.3±2.5	26.2±3.6	26.5±3.9	25.4±2.3	26.5±5.2	24.9±3.7	24.9±4.3	23.9±3.6	24.0±3.5	24.5±3.8
FFMI (kg/m²)	11.3±0.5	13.0±0.6	12.2±1.0	12.4±0.9	13.7±0.9	13.0±1.1	12.8±1.0	13.4±0.8	13.1±0.9	12.8±1.2	13.4±0.6	13.0±1.0
FMI (kg/m²)	3.8±0.7	4.2±0.5	4.0±0.6	4.5±1.0	5.0±0.9	4.7±1.0	4.7±1.3	4.5±0.9	4.6±1.1	4.0±0.9	4.2±0.8	4.2±0.8
Bioimpedance spectroscopy	n = 6	n = 7	n = 13	n = 10	n = 10	n = 20	n = 9	n = 9	n = 18	n = 9	n = 7	n = 16
FFM (kg)	3.84±0.27	4.56±0.33	4.36±0.43	4.79±0.37	5.76±0.39	5.19±0.70	6.07±0.66	6.82±0.74	6.64±0.79	6.89±0.85	7.24±0.59	7.27±0.67
FM (kg)	1.10±0.22	1.30±0.26	1.27±0.26	2.07±0.40	2.19±0.48	2.24±0.50	2.25±0.53	2.18±0.52	2.20±0.60	2.21±0.46	2.62±0.57	2.38±0.32
FM (%)	22.1±2.3	22.0±2.5	22.4±2.6	30.0±3.0	27.3±3.2	29.9±3.2	26.9±5.0	24.2±4.9	24.8±5.4	24.3±4.1	26.4±3.9	24.7±3.4

FFMI (kg/m²)	11.8±0.5	13.4±0.4	12.6±1.0	11.8±0.9	13.4±0.6	12.6±1.1	12.7±1.1	13.5±1.0	13.1±1.1	12.7±1.1	13.0±0.6	12.8±0.9
FMI (kg/m²)	3.4±0.5	3.8±0.6	3.6±0.6	5.1±0.9	5.1±0.9	5.1±0.9	4.7±1.2	4.3±1.0	4.5±1.1	4.1±1.0	4.7±0.9	4.4±1.0

[a] Body composition (%FM - percentage fat mass; FM - fat mass; FFM - fat-free mass; FFMI – fat-free mass index; FMI – fat mass index) of breastfed infants aged 2, 5, 9 and 12 months calculated with various equations: ultrasound 2-skinfolds – Slaughter et al. [41] at all ages; ultrasound 4-skinfolds – Brook [42] at all ages; bioimpedance spectroscopy – Lingwood et al. [36] 3 months-old equation at 2 months and 4.5 months-old equation at 5 months; and Bocage [37] at 9 and 12 months. [b] Data are mean ± SD and ranges.

Table S2. Significant differences by lactation duration within measured maternal and breastfeeding characteristics [a].

Characteristic	Months after birth						
	5 and 2	**9 and 2**	**12 and 2**	**9 and 5**	**12 and 5**	**12 and 9**	*p* **overall**
Maternal							
Weight (kg)	0.37	**0.027** [b]	**0.009**	0.50	0.27	0.98	**0.014**
	-1.10 ± 0.68 [c]	**-1.98 ± 0.71**	**-2.23 ± 0.71**	-0.88 ± 0.62	-1.13 ± 0.62	-0.25 ± 0.64	
BMI [f] (kg/m²)	0.35	**0.016**	**0.007**	0.40	0.25	0.99	**0.009**
	-0.38 ± 0.23	**-0.71 ± 0.24**	**-0.78 ± 0.24**	-0.33 ± 0.21	-0.39 ± 0.21	-0.06 ± 0.22	
Fat mass (kg)	0.99	0.25	**0.003**	0.28	**0.002**	0.27	**0.002**
	-0.15 ± 0.50	-0.97 ± 0.52	**-1.81 ± 0.52**	-0.82 ± 0.46	**-1.67 ± 0.46**	-0.85 ± 0.47	
Fat mass (%)	0.98	0.62	**0.004**	0.28	**<0.001**	0.066	**<0.001**
	0.22 ± 0.57	-0.72 ± 0.59	**-2.03 ± 0.59**	-0.94 ± 0.52	**-2.25 ± 0.52**	-1.31 ± 0.54	
FMI [f] (kg/m²)	0.99	0.20	**0.002**	0.22	**<0.001**	0.28	**0.001**
	-0.05 ± 0.17	-0.35 ± 0.18	**-0.64 ± 0.18**	-0.30 ± 0.16	**-0.59 ± 0.16**	-0.29 ± 0.16	
Breastfeeding							
Feeding frequency (SR) [d, f]	0.82	**0.045**	**<0.001**	0.17	**<0.001**	**0.003**	**<0.001**
	0.46 ± 0.53	**1.40 ± 0.54**	**3.14 ± 0.58**	0.94 ± 0.46	**2.69 ± 0.50**	**1.75 ± 0.51**	
Feeding frequency (MP) [e, f]	n/a [e]	n/a	n/a	**<0.001**	**<0.001**	0.19	**<0.001**
				-2.81 ± 0.49	**-3.71 ± 0.46**	-0.90 ± 0.52	
24-h milk intake (g) [e, f]	n/a [e]	n/a	n/a	**<0.001**	**<0.001**	0.73	**<0.001**
				-325 ± 64	**-376 ± 64**	-52 ± 69	

[a] Systematic differences in the measured variables between different months after birth were calculated using general linear hypothesis test (Tukey's all pair comparisons). [b] Bold text indicates significant difference (*p* < 0.05) between two time points. Only variables with at least one significant difference between two time points are presented. [c] Data are parameter estimate and standard error of estimate. [d] Feeding frequency was self-reported by mothers (SR) at the time of the visit as a typical time between feeds (e.g., each 2 h) (*n* = 11, *n* = 19, *n* = 17, *n* = 13 at 2, 5, 9 and 12 months respectively). [e] 24-h milk intake and feeding frequency as meals per 24-h were measured at 24-h milk production between 2 and 5 months (presented at 5 months here, *n* = 17) and within 2 weeks of 9 (*n* = 8) and 12 months (*n* = 9 for feeding frequency, *n* = 8 for milk intake). [f] BMI – body mass index; FMI – fat mass index; MP – milk production; n/a – not applicable; SR – self-reported.

Table S3. Significant differences by age within measured infant characteristics [a].

Characteristic	Months after birth						*p* overall
	5 and 2	**9 and 2**	**12 and 2**	**9 and 5**	**12 and 5**	**12 and 9**	
Length (cm)	<0.001 [b]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	6.81 ± 0.41 [c]	12.36 ± 0.42	16.49 ± 0.42	5.55 ± 0.36	9.68 ± 0.37	4.13 ± 0.37	
Weight (kg)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	1.78 ± 0.13	3.09 ± 0.13	3.85 ± 0.13	1.31 ± 0.12	2.08 ± 0.12	0.77 ± 0.12	
Head circumference (cm)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	3.11 ± 0.20	5.71 ± 0.21	6.72 ± 0.21	2.60 ± 0.18	3.61 ± 0.19	1.01 ± 0.19	
BMI [d] (kg/m²)	<0.001	<0.001	0.17	1.00	0.23	0.20	<0.001
	1.11 ± 0.29	1.14 ± 0.30	0.61 ± 0.30	0.03 ± 0.26	-0.50 ± 0.26	-0.52 ± 0.27	
Fat-free mass US 2SF [d] (kg)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	1.21 ± 0.12	2.23 ± 0.12	2.86 ± 0.12	1.02 ± 0.11	1.65 ± 0.11	0.63 ± 0.11	
Fat-free mass US 4SF [d] (kg)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	1.26 ± 0.12	2.28 ± 0.12	3.02 ± 0.12	1.02 ± 0.11	1.76 ± 0.11	0.74 ± 0.11	
FFMI US 4SF (kg/m²)	0.013	0.006	0.015	1.00	1.00	1.00	<0.010
	0.67 ± 0.22	0.73 ± 0.22	0.68 ± 0.23	0.06 ± 0.19	0.01 ± 0.20	-0.05 ± 0.19	
Fat-free mass BIS [d] (kg)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	0.96 ± 0.13	2.15 ± 0.13	2.76 ± 0.13	1.20 ± 0.11	1.81 ± 0.12	0.61 ± 0.12	
FFMI BIS (kg/m²)	0.75	0.50	1.00	0.032	0.61	0.51	0.072
	-0.21 ± 0.21	0.29 ± 0.21	0.03 ± 0.22	0.50 ± 0.18	0.23 ± 0.19	-0.27 ± 0.19	
Fat mass US 2SF (kg)	<0.001	<0.001	<0.001	0.017	<0.001	0.63	<0.001
	0.57 ± 0.11	0.87 ± 0.12	1.00 ± 0.12	0.30 ± 0.10	0.43 ± 0.10	0.13 ± 0.11	
FMI [d] US 2SF (kg/m²)	0.019	0.074	0.55	0.96	0.33	0.64	0.028
	0.73 ± 0.25	0.62 ± 0.26	0.35 ± 0.26	-0.11 ± 0.23	-0.39 ± 0.23	-0.28 ± 0.23	
Fat mass US 4SF (kg)	<0.001	<0.001	<0.001	0.002	<0.001	1.00	<0.001
	0.47 ± 0.10	0.79 ± 0.10	0.81 ± 0.10	0.32 ± 0.09	0.33 ± 0.09	0.01 ± 0.09	
FMI US 4SF (kg/m²)	0.018	0.034	0.99	0.98	0.045	0.11	0.030
	0.49 ± 0.24	0.41 ± 0.25	-0.08 ± 0.25	-0.09 ± 0.21	-0.57 ± 0.22	-0.49 ± 0.22	
Fat mass BIS (kg)	<0.001	<0.001	<0.001	0.67	0.055	0.49	<0.001
	0.86 ± 0.12	0.97 ± 0.12	1.13 ± 0.12	0.11 ± 0.10	0.27 ± 0.11	0.15 ± 0.11	

FMI BIS (kg/m²)	**<0.001**	**0.004**	0.067	0.12	**0.011**	0.77	**<0.001**
	1.34 ± 0.25	**0.86 ± 0.25**	0.64 ± 0.26	-0.48 ± 0.22	**-0.71 ± 0.23**	-0.22 ± 0.23	
Fat mass BIS (%)	**<0.001**	**0.016**	0.073	**0.021**	**0.006**	0.96	**<0.001**
	6.27 ± 1.12	**3.39 ± 1.15**	2.85 ± 1.18	**-2.88 ± 1.01**	**-3.42 ± 1.05**	-0.54 ± 1.06	

[a] Systematic differences in the measured variables between different months after birth were calculated using general linear hypothesis test (Tukey's all pair comparisons). [b] Bold text indicates significant difference ($p < 0.05$) between two time points. Only variables with at least one significant difference between two time points are presented. [c] Parameter estimate and standard error of estimate. [d] BIS – bioimpedance spectroscopy; BMI – body mass index; FFMI – fat-free mass index; FMI – fat mass index; US 2SF – ultrasound 2-skinfolds; US 4SF – ultrasound 4-skinfolds.