

Supplementary Materials

Macronutrient Intake during Complementary Feeding in Very Low Birth Weight Infants comparing Early and Late Introduction of Solid Foods: A Secondary Outcome Analysis

1. Macronutrient intake comparing early and late introduction of solid foods

Nutrient intake was evaluated by comparing early and late introduction of solid foods using linear mixed-effects models. These models included the complementary feeding group, sex, gestational age, and nutrition at 6 weeks corrected age (CA) as covariates, with a random intercept to address potential correlation among siblings of multiple births. Marginal means, calculated from these models and averaged across covariates, were determined for the two groups. Standard errors and p-values were then calculated to test the null hypothesis of no difference between the groups. The p-values for between-group comparisons of the same nutrient at different timepoints were adjusted using the Bonferroni-Holm method. Statistical significance was set at $p\text{-adj.} < 0.05$.

Dietary intakes were categorized into two main types: solids and milk (breastmilk, infant formula). The distribution of these sources is presented as percentage of the total nutritional intake. Tea, water, and liquid beverages were collectively categorized as solids, despite liquids not being considered in determining the beginning of complementary feeding.

Dietary intakes for fat and carbohydrates are only presented in % of energy as no other reference values for infants during complementary feeding are available.

Supplementary Table S1: Dietary macronutrient intake comparing early and late introduction of complementary feeding.

CA	Protein (g/kg/d)							Energy (kcal/d)						
	Early			Late			p-adj.	Early			Late			p-adj.
	Mean ± SE	% (milk)	% (solids)	Mean ± SE	% (milk)	% (solids)		Mean ± SE	% (milk)	% (solids)	Mean ± SE	% (milk)	% (solids)	
6 weeks	2.52 (±0.11)	99.9	0.1	2.31 (±0.11)	100.0	0.0	0.38	514 (±14)	99.9	0.1	484 (±14)	100.0	0.0	0.23
12 weeks	1.95 (±0.06)	95.6	4.4	1.88 (±0.07)	100.0	0.0	0.77	535 (±12)	96.2	3.8	510 (±13)	100.0	0.0	0.23
6 months	2.20 (±0.08)	56.6	43.4	1.98 (±0.09)	69.9	30.1	0.38	655 (±16)	64.9	35.1	594 (±17)	76.5	23.5	0.05
9 months	2.47 (±0.11)	34.3	65.7	2.51 (±0.12)	37.6	62.4	0.95	741 (±21)	42.6	57.4	738 (±22)	46.4	53.6	0.92
12 months	2.71 (±0.12)	26.6	73.4	2.72 (±0.13)	25.0	75.0	0.95	791 (±26)	32.8	67.2	815 (±26)	32.6	67.4	0.64
Recommended daily protein intake: 1.6 g/kg/d.								Recommended daily energy intake: 0-3 months: 500-550 kcal/d; 4-12 months: 600-700 kcal/d.						
CA	Protein (% of energy)							Fat (% of energy)						
	Early			Late			p-adj.	Early			Late			p-adj.
	Mean ± SE	% (milk)	% (solids)	Mean ± SE	% (milk)	% (solids)		Mean ± SE	% (milk)	% (solids)	Mean ± SE	% (milk)	% (solids)	
6 weeks	8.2 (±0.21)	99.9	0.1	8.0 (±0.21)	100.0	0.0	0.60	48.6 (±0.37)	100	0	49.0 (±0.36)	100	0	0.38
12 weeks	7.9 (±0.13)	95.6	4.4	7.8 (±0.16)	100.0	0.0	0.60	47.5 (±0.38)	98.3	1.7	49.3 (±0.43)	100	0	0.005
6 months	9.3 (±0.24)	56.6	43.4	8.8 (±0.26)	69.9	30.1	0.43	39.7 (±0.68)	77.7	22.3	43.5 (±0.75)	84.7	15.3	0.001
9 months	10.7 (±0.27)	34.3	65.7	10.4 (±0.28)	37.6	62.4	0.60	35.4 (±0.88)	54.2	45.8	37.6 (±0.92)	58.2	41.8	0.38
12 months	12.3 (±0.34)	26.6	73.4	11.3 (±0.36)	25.0	75.0	0.25	35.8 (±0.74)	40.5	59.5	34.7 (±0.75)	42.2	57.8	0.38
Recommended daily protein intake: <15% of energy.								Recommended daily fat intake 0-3 months: 45-50% of energy; 4-12 months: 35-45% of energy.						
CA	Carbohydrates (% of energy)							Arachidonic Acid (mg/d)						
	Early			Late			p-adj.	Early			Late			p-adj.
	Mean ± SE	% (milk)	% (solids)	Mean ± SE	% (milk)	% (solids)		Mean ± SE	% (milk)	% (solids)	Mean ± SE	% (milk)	% (solids)	
6 weeks	43.2 (±0.28)	99.9	0.1	43.0 (±0.28)	100	0	0.59	114.0 (±5.3)	99.9	0.1	113.0 (±5.3)	100.0	0.0	0.94
12 weeks	44.5 (±0.35)	94.6	5.4	42.9 (±0.39)	100	0	0.003	108.0 (±4.7)	95.6	4.4	121.0 (±5.3)	100.0	0.0	0.13
6 months	51.1 (±0.61)	57.7	42.3	47.7 (±0.67)	71.3	28.6	0.002	89.1 (±5.1)	56.6	43.4	103.4 (±5.5)	69.9	30.1	0.13
9 months	54.0 (±0.83)	36.9	63.1	52.0 (±0.88)	40.6	59.4	0.14	83.6 (±7.9)	34.3	65.7	75.2 (±8.2)	37.6	62.4	0.59
12 months	51.9 (±0.73)	29.5	70.5	54.0 (±0.74)	27.9	72.1	0.06	74.1 (±7.6)	26.6	73.4	66.5 (±7.7)	25.0	75.0	0.59
/								Recommended daily AA intake: 0-6 months: 140 mg/d; 6-12 months: no recommendations exist.						
CA	Docosahexaenoic Acid (mg/d)							Linoleic Acid (% of energy)						
	Early			Late			p-adj.	Early			Late			p-adj.
	Mean ± SE	% (milk)	% (solids)	Mean ± SE	% (milk)	% (solids)		Mean ± SE	% (milk)	% (solids)	Mean ± SE	% (milk)	% (solids)	
6 weeks	94.8 (±4.4)	100.0	0.0	94.1 (±4.4)	100.0	0.0	0.91	6.0 (±0.11)	100.0	0.0	6.0 (±0.11)	100.0	0.0	0.98
12 weeks	97.7 (±4.2)	97.8	2.2	105.0 (±4.8)	100.0	0.0	0.60	6.2 (±0.10)	97.1	2.9	6.0 (±0.11)	100.0	0.0	0.52
6 months	95.5 (±5.7)	83.7	16.3	98.1 (±6.2)	91.4	8.6	0.91	5.6 (±0.13)	72.4	27.6	5.7 (±0.14)	82.0	18.0	0.55
9 months	86.8 (±9.3)	65.1	34.9	78.1 (±9.8)	72.0	28.0	0.85	5.0 (±0.16)	51.5	48.5	5.0 (±0.17)	54.8	45.2	0.98
12 months	81.4 (±7.8)	50.5	49.5	66.7 (±7.9)	61.1	38.9	0.60	5.0 (±0.17)	41.2	58.8	4.7 (±0.17)	40.7	59.3	0.53
Recommended daily DHA intake: 0-12 months: 100 mg/d.								Recommended daily LA intake: 0-3 months: 4.0% of energy; 4-12 months: 3.5% of energy.						
CA	α-Linolenic Acid (% of energy)							LA/ALA ratio						
	Early			Late			p-adj.	Early			Late			p-adj.
	Mean ± SE	% (milk)	% (solids)	Mean ± SE	% (milk)	% (solids)		Mean ± SE	% (milk)	% (solids)	Mean ± SE	% (milk)	% (solids)	
6 weeks	0.71 (±0.02)	100.0	0.0	0.66 (±0.03)	100.0	0.0	0.25	9.1 (±0.2)	/	/	9.6 (±0.2)	/	/	0.23
12 weeks	0.75 (±0.02)	95.1	4.9	0.70 (±0.03)	100.0	0.0	0.25	8.7 (±0.2)	/	/	9.2 (±0.2)	/	/	0.23
6 months	0.86 (±0.05)	61.2	23.8	0.82 (±0.05)	72.2	27.8	0.44	7.0 (±0.3)	/	/	7.7 (±0.3)	/	/	0.23
9 months	0.87 (±0.08)	42.9	57.1	0.78 (±0.08)	44.5	55.5	0.44	6.8 (±0.3)	/	/	6.8 (±0.4)	/	/	0.85
12 months	0.77 (±0.04)	35.0	65.0	0.67 (±0.04)	35.5	64.5	0.25	7.3 (±0.3)	/	/	7.5 (±0.3)	/	/	0.78
Recommended daily ALA intake: 0-12 months: 0.5 % of energy.								Recommended daily LA/ALA ratio: 0-3 months: 8:1; 4-12 months: 7:1.						

CA: corrected age; SE: standard error. p-adj. <0.05 were considered statistically significant and marked bold.

2. Subgroup analysis: macronutrient intake in infants with and without comorbidities

Supplementary Table S2: Number of infants with neonatal comorbidities.

Parameter	Early (n=115)	Late (n=82)
Necrotizing enterocolitis \geq grade II	5 (4%)	6 (7%)
Bronchopulmonary dysplasia	14 (12%)	23 (28%)
Intraventricular haemorrhage \geq grade II	17 (15%)	12 (15%)
Periventricular leukomalacia	0 (0%)	1 (1%)

2.1. Subgroup analysis of nutritional intake in infants without comorbidities and infants with BPD, NEC or IVH

Nutrient intake was evaluated by comparing infants without comorbidities and infants diagnosed with bronchopulmonary dysplasia (BPD), necrotizing enterocolitis \geq grade II (NEC), or intraventricular hemorrhage \geq grade II (IVH). To detect differences between study subgroups, students t-test or Mann-Whitney-U-test were applied. As an additional analysis, the p-values for between-subgroup comparisons of the same nutrient at different timepoints were adjusted using the Bonferroni-Holm method. Standard errors and adjusted p-values were calculated to test the null hypothesis of no difference between the groups. Statistical significance was set at p-adj. < 0.05. The statistical analysis was performed using R version 4.1.1 (R Core Team, 2022).

Supplementary Table S3: Nutritional intake in infants without comorbidities and infants with BPD, NEC or IVH.

CA	Protein (g/kg/d)						
	Infants without BPD, NEC, IVH	BPD	p-adj.	NEC	p-adj.	IVH	p-adj.
	Mean \pm SE	Mean \pm SE		Mean \pm SE		Mean \pm SE	
6 weeks	2.36 (\pm 0.08)	2.55 (\pm 0.19)	0.84	2.87 (\pm 0.25)	0.41	2.44 (\pm 0.07)	0.94
12 weeks	1.91 (\pm 0.04)	1.97 (\pm 0.11)	0.93	2.10 (\pm 0.15)	0.51	1.89 (\pm 0.17)	0.57
6 months	2.15 (\pm 0.08)	1.93 (\pm 0.10)	0.51	2.27 (\pm 0.26)	0.84	1.95 (\pm 0.11)	0.84
9 months	2.46 (\pm 0.10)	2.40 (\pm 0.10)	0.91	2.21 (\pm 0.20)	0.84	2.25 (\pm 0.15)	0.57
12 months	2.75 (\pm 0.09)	2.71 (\pm 0.21)	0.84	2.28 (\pm 0.21)	0.41	2.44 (\pm 0.21)	0.41
Recommended daily protein intake: 1.6 g/kg/d.							
CA	Energy (kcal/d)						
	Infants without BPD, NEC, IVH	BPD	p-adj.	NEC	p-adj.	IVH	p-adj.
	Mean \pm SE	Mean \pm SE		Mean \pm SE		Mean \pm SE	
6 weeks	508 (\pm 9)	489 (\pm 24)	0.42	465 (\pm 29)	0.32	482 (\pm 28)	0.42
12 weeks	546 (\pm 9)	513 (\pm 18)	0.08	470 (\pm 26)	0.08	505 (\pm 25)	0.08
6 months	646 (\pm 13)	614 (\pm 27)	0.30	634 (\pm 55)	0.70	608 (\pm 25)	0.32

9 months	753 (±17)	730 (±24)	0.65	682 (±63)	0.30	693 (±39)	0.14
12 months	821 (±18)	784 (±35)	0.41	706 (±45)	0.13	739 (±54)	0.08
Recommended daily energy intake: 0-3 months: 500-550 kcal/d; 4-12 months: 600-700 kcal/d.							
Protein (% energy)							
CA	Infants without BPD, NEC, IVH	BPD	p-adj.	NEC	p-adj.	IVH	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	8.2 (±0.1)	8.7 (±0.4)	0.91	9.5 (±0.6)	0.22	8.3 (±0.4)	0.85
12 weeks	7.8 (±0.1)	7.9 (±0.2)	0.91	8.8 (±0.5)	0.22	8.0 (±0.3)	0.91
6 months	9.3 (±0.2)	8.6 (±0.3)	0.33	8.9 (±0.5)	0.85	8.4 (±0.3)	0.22
9 months	10.7 (±0.2)	9.9 (±0.4)	0.18	10.1 (±1.0)	0.27	10.0 (±0.4)	0.39
12 months	12.3 (±0.3)	11.2 (±0.5)	0.27	10.3 (±0.3)	0.18	11.0 (±0.5)	0.22
Recommended daily protein intake: <15% of energy.							
Fat (% of energy)							
CA	Infants without BPD, NEC, IVH	BPD	p-adj.	NEC	p-adj.	IVH	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	48.2 (±0.3)	48.9 (±0.5)	0.61	47.3 (±1.0)	0.61	48.0 (±0.7)	0.96
12 weeks	47.9 (±0.3)	48.4 (±0.6)	0.61	47.9 (±0.9)	0.96	48.0 (±1.0)	0.61
6 months	40.8 (±0.6)	42.7 (±1.2)	0.61	41.3 (±1.9)	0.96	40.8 (±1.4)	0.98
9 months	35.9 (±0.7)	37.1 (±1.3)	0.66	38.9 (±2.6)	0.61	37.7 (±2.0)	0.61
12 months	34.9 (±0.6)	34.3 (±1.2)	0.94	38.0 (±2.4)	0.61	35.2 (±1.4)	0.96
Recommended daily fat intake 0-3 months: 45-50% of energy; 4-12 months: 35-45% of energy.							
Carbohydrates (% of energy)							
CA	Infants without BPD, NEC, IVH	BPD	p-adj.	NEC	p-adj.	IVH	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	43.6 (±0.2)	42.5 (±0.4)	0.09	43.2 (±0.8)	0.80	43.7 (±0.6)	0.85
12 weeks	44.3 (±0.3)	43.7 (±0.5)	0.69	43.3 (±0.7)	0.69	43.9 (±1.0)	0.69
6 months	49.9 (±0.5)	48.7 (±1.1)	0.69	49.7 (±1.9)	0.84	50.8 (±1.3)	0.80
9 months	53.4 (±0.6)	53.0 (±1.1)	0.84	51.0 (±1.7)	0.75	52.1 (±1.7)	0.80
12 months	52.9 (±0.6)	54.5 (±1.1)	0.69	51.7 (±2.3)	0.80	53.8 (±1.3)	0.80
/							
Arachidonic Acid (mg/d)							
CA	Infants without BPD, NEC, IVH	BPD	p-adj.	NEC	p-adj.	IVH	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	117 (±4)	102 (±9)	0.43	98 (±14)	0.44	101 (±7)	0.17
12 weeks	122 (±4)	112 (±7)	0.48	99 (±17)	0.44	108 (±11)	0.44
6 months	101 (±4)	102 (±9)	0.88	93 (±19)	0.67	84 (±9)	0.38
9 months	82 (±6)	81 (±9)	0.66	59 (±27)	0.44	76 (±13)	0.85
12 months	80 (±7)	65 (±10)	0.52	43 (±14)	0.17	49 (±10)	0.17
Recommended daily AA intake: 0-6 months: 140 mg/d; 6-12 months: no recommendations exist.							
Docosahexaenoic Acid (mg/d)							
CA	Infants without BPD, NEC, IVH	BPD	p-adj.	NEC	p-adj.	IVH	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	103 (±3)	93 (±6)	0.30	89 (±7)	0.33	93 (±8)	0.34
12 weeks	110 (±3)	104 (±6)	0.28	98 (±18)	0.28	94 (±10)	0.26
6 months	105 (±5)	89 (±7)	0.33	95 (±12)	0.65	80 (±8)	0.14

9 months	90 (±8)	101 (±14)	0.34	53 (±24)	0.26	92 (±21)	0.79
12 months	82 (±7)	65 (±8)	0.44	44 (±17)	0.14	52 (±9)	0.14
Recommended daily DHA intake: 0-12 months: 100 mg/d.							
	Linoleic Acid (% of energy)						
CA	Infants without BPD, NEC, IVH	BPD	p-adj.	NEC	p-adj.	IVH	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	6.14 (±0.09)	6.44 (±0.19)	0.77	6.09 (±0.41)	0.98	6.19 (±0.21)	0.77
12 weeks	6.19 (±0.08)	6.37 (±0.15)	0.77	6.07 (±0.40)	0.77	6.03 (±0.24)	0.77
6 months	5.55 (±0.09)	5.76 (±0.21)	0.77	5.90 (±0.39)	0.77	5.54 (±0.33)	0.46
9 months	5.04 (±0.12)	4.92 (±0.21)	0.77	4.96 (±1.00)	0.92	4.89 (±0.39)	0.77
12 months	4.81 (±0.11)	4.65 (±0.22)	0.77	5.24 (±0.64)	0.77	4.71 (±0.39)	0.85
Recommended daily LA intake: 0-3 months: 4.0% of energy; 4-12 months: 3.5% of energy.							
	α-Linolenic Acid (% of energy)						
CA	Infants without BPD, NEC, IVH	BPD	p-adj.	NEC	p-adj.	IVH	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	0.72 (±0.02)	0.76 (±0.04)	0.83	0.74 (±0.11)	0.94	0.79 (±0.07)	0.92
12 weeks	0.72 (±0.02)	0.79 (±0.04)	0.83	0.71 (±0.08)	0.94	0.75 (±0.06)	0.94
6 months	0.83 (±0.04)	0.81 (±0.06)	0.94	0.96 (±0.12)	0.83	0.83 (±0.07)	0.94
9 months	0.81 (±0.04)	0.74 (±0.04)	0.94	0.87 (±0.09)	0.83	1.01 (±0.31)	0.94
12 months	0.74 (±0.03)	0.70 (±0.04)	0.94	0.92 (±0.10)	0.56	0.72 (±0.05)	0.94
Recommended daily ALA intake: 0-12 months: 0.5 % of energy.							
	LA/ALA ratio						
CA	Infants without BPD, NEC, IVH	BPD	p-adj.	NEC	p-adj.	IVH	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	9.1 (±0.2)	9.1 (±0.4)	0.94	9.3 (±0.9)	0.94	8.6 (±0.6)	0.94
12 weeks	8.8 (±0.2)	8.6 (±0.4)	0.94	9.2 (±0.6)	0.94	8.7 (±0.7)	0.94
6 months	7.4 (±0.2)	7.6 (±0.4)	0.94	6.8 (±0.7)	0.94	7.2 (±0.5)	0.94
9 months	6.8 (±0.2)	7.2 (±0.6)	0.94	5.4 (±0.8)	0.94	6.7 (±0.7)	0.94
12 months	7.2 (±0.3)	7.0 (±0.4)	0.94	6.0 (±0.6)	0.94	6.8 (±0.4)	0.94
Recommended daily LA/ALA ratio: 0-3 months: 8:1; 4-12 months: 7:1.							
CA: corrected age; BPD: bronchopulmonary dysplasia; NEC: necrotizing enterocolitis; IVH: intraventricular hemorrhage; AA: arachidonic acid; DHA: docosahexaenoic acid; LA: linoleic acid; ALA: α-linolenic acid; SE: standard error. p-adj. <0.05 were considered statistically							

2.2. Subgroup analysis: Macronutrient intake comparing early and late introduction of solid foods in infants with and without comorbidities

Nutrient intake was evaluated by comparing the timepoint of solid food introduction (early vs. late) in infants without comorbidities and comorbidities and infants diagnosed with bronchopulmonary dysplasia (BPD), necrotizing enterocolitis \geq grade II (NEC), or intraventricular hemorrhage \geq grade II (IVH). To detect differences between study subgroups, students t-test or Mann-Whitney-U-test were applied. For infants with NEC no statistical testing was conducted between the early and late group due to the low number of infants with NEC. Standard errors and adjusted p-values were calculated to test the null hypothesis of no difference between the groups. Statistical significance was set at p-adj. < 0.05 . As an additional analysis, the p-values for between-subgroup comparisons of the same nutrient at different timepoints were adjusted using the Bonferroni-Holm method. The statistical analysis was performed using R version 4.1.1 (R Core Team, 2022).

2.2.1. Macronutrient intake comparing early and late introduction of solids in infants with BPD

Supplementary Table S4: Numbers of available dietary records from infants with/without bronchopulmonary dysplasia.

CA	EARLY			LATE		
	total	Infants without BPD, NEC, IVH	BPD	total	Infants without BPD, NEC, IVH	BPD
6 weeks	75	64 (85%)	11 (15%)	54	37 (69%)	17 (31%)
12 weeks	92	79 (86%)	13 (14%)	57	36 (63%)	21 (37%)
6 months	77	66 (86%)	11 (14%)	58	41 (71%)	17 (29%)
9 months	54	48 (89%)	6 (11%)	46	29 (65%)	16 (35%)
12 months	53	48 (91%)	5 (9%)	49	32 (65%)	17 (35%)

CA: corrected age; BPD: bronchopulmonary dysplasia; NEC: necrotizing enterocolitis; IVH: intraventricular hemorrhage. Data are presented as numbers with percentages in parentheses.

Supplementary Table S5: Nutrient intake comparing early and late introduction of solids in infants with bronchopulmonary dysplasia.

CA	Protein (g/kg/d)			Energy (kcal/d)		
	Early	Late	p-adj.	Early	Late	p-adj.
	Mean \pm SE	Mean \pm SE		Mean \pm SE	Mean \pm SE	
6 weeks	2.82 (± 0.38)	2.37 (± 0.19)	0.38	511 (± 48)	474 (± 25)	0.57
12 weeks	2.18 (± 0.26)	1.83 (± 0.08)	0.38	546 (± 34)	493 (± 19)	0.57
6 months	2.14 (± 0.19)	1.80 (± 0.10)	0.35	673 (± 54)	576 (± 26)	0.43
9 months	2.65 (± 0.10)	2.30 (± 0.13)	0.35	721 (± 47)	734 (± 28)	0.81

12 months	3.09 (±0.72)	2.59 (±0.19)	0.38	812 (±66)	775 (±42)	0.57	
CA	Protein (% of energy)			Fat (% of energy)			
	Early	Late	p-adj.	Early	Late	p-adj.	
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		
	6 weeks	9.0 (±0.6)	8.5 (±0.6)	0.68	48.3 (±0.8)	49.2 (±0.7)	0.45
	12 weeks	8.3 (±0.4)	7.7 (±0.3)	0.68	47.1 (±1.1)	49.1 (±0.5)	0.45
	6 months	8.7 (±0.4)	8.5 (±0.3)	0.68	39.5 (±1.7)	44.8 (±1.4)	0.11
	9 months	11.3 (±0.8)	9.3 (±0.3)	0.08	35.3 (±3.6)	37.8 (±1.2)	0.45
12 months	11.7 (±1.6)	11.0 (±0.4)	0.68	34.2 (±3.9)	34.3 (±1.1)	0.45	
CA	Carbohydrates (% of energy)			Arachidonic Acid (mg/d)			
	Early	Late	p-adj.	Early	Late	p-adj.	
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		
	6 weeks	42.7 (±0.6)	42.3 (±0.5)	0.85	103 (±14)	102 (±13)	0.96
	12 weeks	44.6 (±1.2)	43.2 (±0.4)	0.85	109 (±13)	113 (±9)	0.95
	6 months	51.8 (±1.7)	46.7 (±1.3)	0.12	93 (±17)	109 (±9)	0.94
	9 months	53.4 (±3.3)	52.9 (±1.0)	0.85	67 (±21)	87 (±10)	0.94
12 months	54.1 (±4.0)	54.6 (±1.0)	0.85	73 (±31)	63 (±9)	0.95	
CA	Docosahexaenoic Acid (mg/d)			Linoleic Acid (% of energy)			
	Early	Late	p-adj.	Early	Late	p-adj.	
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		
	6 weeks	97 (±10)	90 (±8)	0.71	6.5 (±0.3)	6.4 (±0.2)	0.44
	12 weeks	113 (±11)	98 (±7)	0.71	6.4 (±0.3)	6.3 (±0.2)	0.44
	6 months	86 (±15)	91 (±6)	0.71	5.7 (±0.5)	5.8 (±0.2)	0.87
	9 months	106 (±49)	99 (±11)	0.71	4.5 (±0.5)	5.1 (±0.2)	0.44
12 months	56 (±25)	68 (±9)	0.71	4.6 (±6)	4.7 (±6)	0.44	
CA	α-Linolenic Acid (% of energy)			LA/ALA ratio (% of energy)			
	Early	Late	p-adj.	Early	Late	p-adj.	
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		
	6 weeks	0.82 (±0.07)	0.71 (±0.05)	0.48	8.4 (±0.6)	9.6 (±0.5)	0.73
	12 weeks	0.86 (±0.07)	0.76 (±0.05)	0.48	8.1 (±0.6)	8.9 (±0.4)	0.73
	6 months	0.80 (±0.08)	0.83 (±0.08)	0.98	7.4 (±0.6)	7.7 (±0.5)	0.73
	9 months	0.66 (±0.10)	0.77 (±0.05)	0.98	8.0 (±1.8)	6.9 (±0.4)	0.73
12 months	0.77 (±0.12)	0.68 (±0.04)	0.98	6.4 (±0.9)	7.2 (±0.5)	0.73	
CA: corrected age; SE: standard error. p-adj. <0.05 were considered statistically significant and marked bold.							

2.2.2. Macronutrient intake comparing early and late introduction of solids in infants with NEC

Supplementary Table S6: Numbers of available dietary records from infants with/without necrotizing enterocolitis \geq grade II.

CA	EARLY			LATE		
	total	Infants without BPD, NEC, IVH	NEC	total	Infants without BPD, NEC, IVH	NEC
6 weeks	67	64 (85%)	3 (5%)	43	37 (86%)	6 (14%)
12 weeks	84	79 (94%)	5 (6%)	42	36 (86%)	6 (14%)
6 months	70	66 (94%)	4 (6%)	47	41 (85%)	6 (15%)
9 months	50	48 (96%)	2 (4%)	33	29 (88%)	4 (12%)
12 months	52	48 (92%)	4 (8%)	37	32 (86%)	5 (14%)
CA: corrected age; BPD: bronchopulmonary dysplasia; NEC: necrotizing enterocolitis; IVH: intraventricular hemorrhage. Data are presented as numbers with percentages in parentheses						

Supplementary Table S7: Nutrient intake comparing early and late introduction of solids in infants with necrotizing enterocolitis \geq grade II.

CA	Protein (g/kg/d)		Energy (kcal/d)	
	Early	Late	Early	Late
	Mean \pm SE	Mean \pm SE	Mean \pm SE	Mean \pm SE
6 weeks	2.50 (\pm 0.54)	3.05 (\pm 0.27)	433 (\pm 19)	481 (\pm 42)
12 weeks	2.00 (\pm 0.27)	2.17 (\pm 0.17)	471 (\pm 52)	469 (\pm 27)
6 months	2.77 (\pm 0.52)	1.93 (\pm 0.20)	718 (\pm 107)	578 (\pm 55)
9 months	2.41 (\pm 0.36)	2.11 (\pm 0.26)	832 (\pm 151)	606 (\pm 23)
12 months	2.49 (\pm 0.46)	2.12 (\pm 0.10)	708 (\pm 101)	704 (\pm 34)
CA	Protein (% of energy)		Fat (% of energy)	
	Early	Late	Early	Late
	Mean \pm SE	Mean \pm SE	Mean \pm SE	Mean \pm SE
6 weeks	9.6 (\pm 1.1)	9.4 (\pm 0.7)	45.3 (\pm 1.0)	48.4 (\pm 1.4)
12 weeks	8.7 (\pm 0.7)	8.9 (\pm 0.7)	47.1 (\pm 1.3)	48.5 (\pm 1.3)
6 months	9.6 (\pm 1.1)	8.5 (\pm 0.4)	40.6 (\pm 1.7)	41.8 (\pm 3.1)
9 months	8.9 (\pm 0.1)	10.7 (\pm 1.5)	40.9 (\pm 0.4)	37.9 (\pm 4.0)
12 months	10.6 (\pm 0.4)	10.0 (\pm 0.5)	38.5 (\pm 3.3)	37.6 (\pm 3.8)
CA	Carbohydrates (% of energy)		Arachidonic Acid (mg/d)	
	Early	Late	Early	Late
	Mean \pm SE	Mean \pm SE	Mean \pm SE	Mean \pm SE
6 weeks	45.2 (\pm 0.8)	42.2 (\pm 0.8)	73.0 (\pm 36.5)	110.3 (\pm 9.4)
12 weeks	44.2 (\pm 1.0)	42.6 (\pm 0.9)	90.5 (\pm 37.5)	106.4 (\pm 10.2)
6 months	49.8 (\pm 1.5)	49.7 (\pm 3.2)	112.7 (\pm 38.3)	79.5 (\pm 18.9)
9 months	50.2 (\pm 0.5)	51.4 (\pm 2.8)	134.7 (\pm 33.6)	20.7 (\pm 11.9)
12 months	50.9 (\pm 3.4)	52.4 (\pm 3.4)	51.9 (\pm 30.7)	35.9 (\pm 12.2)

CA	Docosahexaenoic Acid (mg/d)		Linoleic Acid (% of energy)	
	Early	Late	Early	Late
	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
6 weeks	83.9 (±13.5)	31.2 (±9.6)	6.4 (±1.0)	6.0 (±0.4)
12 weeks	83.3 (±28.0)	110.5 (±24.5)	6.6 (±0.7)	5.6 (±0.3)
6 months	109.1 (±20.0)	84.9 (±14.4)	6.0 (±0.6)	5.9 (±0.6)
9 months	113.3 (±50.7)	23.4 (±12.4)	5.6 (±0.3)	4.7 (±1.5)
12 months	56.8 (±38.1)	33.4 (±12.0)	5.8 (±1.0)	4.8 (±0.9)
CA	α-Linolenic Acid (% of energy)		LA/ALA ratio (% of energy)	
	Early	Late	Early	Late
	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
6 weeks	0.57 (±0.11)	0.82 (±0.15)	11.25 (±0.72)	8.26 (±1.08)
12 weeks	0.69 (±0.12)	0.73 (±0.12)	10.08 (±0.60)	8.45 (±0.94)
6 months	1.10 (±0.28)	0.87 (±0.09)	6.12 (±0.94)	7.17 (±1.09)
9 months	0.98 (±0.02)	0.81 (±0.13)	5.66 (±0.41)	5.27 (±1.28)
12 months	1.07 (±0.14)	0.79 (±0.11)	5.68 (±0.96)	6.24 (±0.74)
CA: corrected age; SE: standard error. No p-values were calculated between the groups due to the small number of infants with NEC.				

2.2.3. Macronutrient intake comparing early and late introduction of solids in infants with IVH

Supplementary Table S8: Numbers of available dietary records from infants with/without intraventricular hemorrhage \geq grade II.

CA	EARLY			LATE		
	total	Infants without BPD, NEC, IVH	IVH	total	Infants without BPD, NEC, IVH	IVH
6 weeks	75	64 (85%)	11 (15%)	42	37 (88%)	5 (12%)
12 weeks	91	79 (87%)	12 (13%)	44	36 (82%)	8 (18%)
6 months	78	66 (85%)	12 (15%)	49	41 (84%)	8 (16%)
9 months	56	48 (86%)	8 (14%)	36	29 (81%)	7 (19%)
12 months	59	48 (86%)	11 (14%)	41	32 (78%)	9 (22%)
CA: corrected age; BPD: bronchopulmonary dysplasia; NEC: necrotizing enterocolitis; IVH: intraventricular hemorrhage. Data are presented as numbers with percentages in parentheses.						

Supplementary Table S9: Nutrient intake comparing early and late introduction of solids in infants with intraventricular hemorrhage \geq grade II.

CA	Protein (g/kg/d)			Energy (kcal/d)		
	Early	Late	p-adj.	Early	Late	p-adj.
	Mean \pm SE	Mean \pm SE		Mean \pm SE	Mean \pm SE	
6 weeks	2.46 (\pm 0.34)	2.39 (\pm 0.42)	0.97	513 (\pm 33)	414 (\pm 41)	0.50
12 weeks	2.00 (\pm 0.26)	1.71 (\pm 0.16)	0.97	532 (\pm 36)	464 (\pm 27)	0.51
6 months	1.98 (\pm 0.14)	1.89 (\pm 0.17)	0.97	622 (\pm 30)	588 (\pm 44)	0.85
9 months	2.45 (\pm 0.25)	2.02 (\pm 0.08)	0.97	716 (\pm 69)	668 (\pm 31)	0.85
12 months	2.52 (\pm 0.36)	2.34 (\pm 0.17)	0.97	775 (\pm 95)	694 (\pm 32)	0.85
CA	Protein (% of energy)			Fat (% of energy)		
	Early	Late	p-adj.	Early	Late	p-adj.
	Mean \pm SE	Mean \pm SE		Mean \pm SE	Mean \pm SE	
6 weeks	8.0 (\pm 0.4)	8.8 (\pm 0.8)	0.96	47.9 (\pm 0.7)	48.3 (\pm 1.7)	0.76
12 weeks	8.1 (\pm 0.4)	7.8 (\pm 0.5)	0.96	47.0 (\pm 1.6)	49.7 (\pm 1.1)	0.68
6 months	8.4 (\pm 0.4)	8.3 (\pm 0.4)	0.96	39.6 (\pm 1.8)	52.6 (\pm 2.3)	0.68
9 months	10.3 (\pm 0.7)	9.8 (\pm 0.5)	0.96	36.5 (\pm 3.1)	39.3 (\pm 2.6)	0.76
12 months	11.0 (\pm 0.8)	11.0 (\pm 0.6)	0.96	34.1 (\pm 1.6)	36.5 (\pm 2.5)	0.68
CA	Carbohydrates (% of energy)			Arachidonic Acid (mg/d)		
	Early	Late	p-adj.	Early	Late	p-adj.
	Mean \pm SE	Mean \pm SE		Mean \pm SE	Mean \pm SE	
6 weeks	44.1 (\pm 0.7)	42.9 (\pm 1.1)	0.46	106.8 (\pm 7.5)	87.6 (\pm 12.9)	0.91
12 weeks	44.9 (\pm 1.5)	42.5 (\pm 0.8)	0.46	106.9 (\pm 16.1)	108.9 (\pm 12.6)	0.93
6 months	51.9 (\pm 1.6)	49.1 (\pm 2.3)	0.46	80.1 (\pm 13.1)	88.9 (\pm 12.9)	0.93
9 months	53.2 (\pm 2.5)	50.9 (\pm 2.5)	0.53	87.4 (\pm 19.4)	63.9 (\pm 15.2)	0.91
12 months	54.9 (\pm 1.8)	52.5 (\pm 2.0)	0.46	52.3 (\pm 16.2)	45.4 (\pm 11.0)	0.93

CA	Docosahexaenoic Acid (mg/d)			Linoleic Acid (% of energy)		
	Early	Late	p-adj.	Early	Late	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE	
6 weeks	103.0 (±8.7)	70.1 (±12.1)	0.25	6.42 (±0.20)	5.68 (±0.44)	0.48
12 weeks	100.4 (±15.6)	84.1 (±9.1)	0.47	6.41 (±0.33)	5.45 (±0.18)	0.48
6 months	72.0 (±11.4)	91.3 (±10.5)	0.42	5.51 (±0.49)	5.59 (±0.41)	0.98
9 months	107.9 (±33.3)	72.9 (±24.1)	0.42	4.88 (±0.47)	4.90 (±0.69)	0.98
12 months	57.1 (±12.7)	44.5 (±13.9)	0.47	4.89 (±0.50)	4.50 (±0.63)	0.98

CA	α-Linolenic Acid (% of energy)			LA/ALA ratio (% of energy)		
	Early	Late	p-adj.	Early	Late	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE	
6 weeks	0.80 (±0.08)	0.76 (±0.17)	0.97	8.64 (±0.77)	8.62 (±1.3)	0.73
12 weeks	0.83 (±0.8)	0.64 (±0.08)	0.66	8.28 (±0.79)	9.21 (±0.78)	0.73
6 months	0.85 (±0.10)	0.80 (±0.08)	0.97	6.95 (±0.60)	7.52 (±0.85)	0.73
9 months	1.21 (±0.59)	0.79 (±0.10)	0.97	6.81 (±1.18)	6.50 (±0.72)	0.73
12 months	0.72 (±0.05)	0.72 (±0.09)	0.97	6.92 (±0.59)	6.59 (±0.71)	0.73

CA: corrected age; SE: standard error. p-adj. <0.05 were considered statistically significant and marked bold.

3. Subgroup analysis: macronutrient intake in breastfed, formula-fed, mixed-fed infants and infants without milk-feeding

Nutrient intake was assessed by comparing breastfed with formula-fed, mixed-fed and infants who received neither breastmilk nor formula (=no milk). To detect differences between the type of feeding, students t-test or Mann-Whitney-U-test were applied (breastfed vs. formula, mixed, none). Statistical testing was not performed for mixed-fed infants at 9 and 12 months CA and “no milk” from 6 weeks – 6 months CA, due to the small sample size. Standard errors and adjusted p-values were calculated to test the null hypothesis of no difference between the type of feeding. Statistical significance was set at $p\text{-adj.} < 0.05$. As an additional analysis, the p-values for between-type of feeding comparisons of the same nutrient at different timepoints were adjusted using the Bonferroni-Holm method. The statistical analysis was performed using R version 4.1.1 (R Core Team, 2022).

CA	Protein (g/kg/d)						
	Breastfed	Formula	p-adj.	Mixed	p-adj.	No milk	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	2.24 (±0.09)	2.44 (±0.09)	0.90	2.61 (±0.17)	0.16		
12 weeks	1.72 (±0.05)	1.99 (±0.06)	0.07	1.93 (±0.06)	0.03	/	
6 months	1.87 (±0.07)	2.18 (±0.07)	0.07	2.11 (±0.21)	0.99		
9 months	1.99 (±0.10)	2.47 (±0.07)	0.02	3.15 (±0.56)	/	3.05 (±0.56)	0.03
12 months	2.48 (±0.14)	2.67 (±0.10)	0.99	2.24 (±0.33)	/	2.29 (±0.11)	0.26
Recommended daily protein intake: 1.6 g/kg/d.							
CA	Energy (kcal/d)						
	Breastfed	Formula	p-adj.	Mixed	p-adj.	No milk	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	506 (±14)	504 (±11)	0.70	488 (±19)	0.42		
12 weeks	535 (±9)	534 (±11)	0.70	532 (±12)	0.70	/	
6 months	649 (±15)	631 (±15)	0.41	643 (±25)	0.70		
9 months	690 (±27)	748 (±15)	0.32	967 (±144)	/	732 (±61)	0.70
12 months	847 (±38)	814 (±21)	0.70	846 (±96)	/	743 (±32)	0.32
Recommended daily energy intake: 0-3 months: 500-550 kcal/d; 4-12 months: 600-700 kcal/d.							
CA	Protein (% energy)						
	Breastfed	Formula	p-adj.	Mixed	p-adj.	No milk	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	7.4 (±0.2)	8.6 (±0.2)	<0.001	8.4 (±0.2)	0.003		
12 weeks	6.8 (±0.1)	8.3 (±0.1)	<0.001	7.6 (±0.2)	<0.001	/	
6 months	7.8 (±0.2)	9.5 (±0.2)	<0.001	9.2 (±0.7)	0.04		
9 months	9.6 (±0.3)	10.6 (±0.2)	0.04	9.4 (±1.0)	/	13.1 (±1.0)	0.002
12 months	10.9 (±0.4)	11.4 (±0.3)	0.68	9.6 (±1.0)	/	14.0 (±0.6)	0.003
Recommended daily protein intake: <15% of energy.							
CA	Fat (% energy)						
	Breastfed	Formula	p-adj.	Mixed	p-adj.	No milk	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	50.8 (±0.6)	47.3 (±0.2)	<0.001	48.3 (±0.6)	<0.001		
12 weeks	52.1 (±0.1)	46.3 (±0.3)	<0.001	49.2 (±0.4)	<0.001	/	
6 months	46.0 (±0.8)	39.4 (±0.6)	<0.001	42.8 (±1.3)	0.05		
9 months	38.0 (±1.3)	36.2 (±0.7)	0.30	37.1 (±2.0)	/	33.9 (±3.6)	0.28
12 months	34.8 (±1.4)	35.4 (±0.5)	0.63	40.4 (±4.4)	/	34.8 (±2.0)	0.58
Recommended daily fat intake 0-3 months: 45-50% of energy; 4-12 months: 35-45% of energy							
CA	Carbohydrates (% of energy)						
	Breastfed	Formula	p-adj.	Mixed	p-adj.	No milk	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	41.8 (±0.3)	44.1 (±0.2)	<0.001	43.3 (±0.5)	0.002		
12 weeks	41.1 (±0.2)	45.4 (±0.3)	<0.001	43.2 (±0.4)	<0.001	/	
6 months	46.2 (±0.7)	51.1 (±0.5)	<0.001	48.0 (±0.9)	0.86		
9 months	52.3 (±2.0)	53.3 (±0.7)	0.55	53.4 (±2.4)	/	53.0 (±2.9)	1.00
12 months	54.3 (±1.2)	53.2 (±0.5)	0.53	49.9 (±3.4)	/	53.1 (±1.3)	0.52
/							
CA	Arachidonic Acid (mg/d)						

	Breastfed	Formula	p-adj.	Mixed	p-adj.	No milk	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	133 (±4)	108 (±5)	0.001	102 (±7)	<0.001		
12 weeks	143 (±3)	109 (±4)	<0.001	119 (±7)	<0.001	/	
6 months	131 (±4)	86 (±4)	<0.001	117 (±9)	0.27		
9 months	97 (±7)	82 (±5)	0.02	81 (±11)	/	35 (±17)	0.008
12 months	81 (±8)	79 (±7)	0.37	108 (±29)	/	41 (±9)	0.001
Recommended daily AA intake: 0-6 months: 140 mg/d; 6-12 months: no recommendations exist.							
CA	Docosahexaenoic Acid (mg/d)						
	Breastfed	Formula	p-adj.	Mixed	p-adj.	No milk	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	90 (±3)	107 (±3)	0.06	86 (±6)	0.48		
12 weeks	98 (±2)	112 (±4)	0.15	103 (±6)	0.49	/	
6 months	101 (±6)	99 (±5)	0.48	100 (±8)	0.72		
9 months	78 (±9)	96 (±8)	0.48	79 (±16)	/	41 (±18)	0.26
12 months	64 (±8)	84 (±6)	0.48	86 (±28)	/	84 (±17)	0.06
Recommended daily DHA intake: 0-12 months: 100 mg/d.							
CA	Linoleic Acid (% of energy)						
	Breastfed	Formula	p-adj.	Mixed	p-adj.	No milk	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	5.21 (±0.06)	6.58 (±0.13)	<0.001	6.20 (±0.20)	<0.001		
12 weeks	5.29 (±0.04)	6.57 (±0.09)	<0.001	5.97 (±0.13)	<0.001	/	
6 months	5.22 (±0.11)	5.77 (±0.11)	0.01	4.50 (±0.21)	0.54		
9 months	4.74 (±0.13)	5.13 (±0.11)	0.16	5.87 (±0.25)	/	3.69 (±0.64)	0.16
12 months	4.48 (±0.30)	5.01 (±0.11)	0.29	4.87 (±0.65)	/	4.27 (±0.29)	0.67
Recommended daily LA intake: 0-3 months: 4.0% of energy; 4-12 months: 3.5% of energy.							
CA	α-Linolenic Acid (% of energy)						
	Breastfed	Formula	p-adj.	Mixed	p-adj.	No milk	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	0.49 (±0.02)	0.82 (±0.03)	<0.001	0.74 (±0.05)	<0.001		
12 weeks	0.48 (±0.01)	0.83 (±0.02)	<0.001	0.69 (±0.02)	<0.001	/	
6 months	0.70 (±0.09)	0.89 (±0.03)	<0.001	0.78 (±0.07)	0.007		
9 months	0.70 (±0.04)	0.88 (±0.06)	0.002	0.59 (±0.10)	/	0.64 (±0.10)	0.78
12 months	0.70 (±0.09)	0.77 (±0.03)	0.15	0.67 (±0.20)	/	0.71 (±0.08)	0.25
Recommended daily ALA intake: 0-12 months: 0.5 % of energy							
CA	LA/ALA ratio						
	Breastfed	Formula	p-adj.	Mixed	p-adj.	No milk	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE		Mean ± SE	
6 weeks	10.8 (±0.06)	6.58 (±0.12)	<0.001	6.20 (±0.20)	<0.001		
12 weeks	5.29 (±0.04)	6.57 (±0.09)	<0.001	5.97 (±0.13)	<0.001	/	
6 months	5.22 (±0.11)	5.77 (±0.11)	<0.001	5.50 (±0.22)	0.01		
9 months	4.74 (±0.13)	5.13 (±0.11)	0.02	5.87 (±0.25)	/	3.69 (±0.64)	0.13
12 months	4.47 (±0.30)	5.01 (±0.12)	0.74	4.87 (±0.65)	/	4.31 (±0.31)	0.74
Recommended daily LA/ALA ratio: 0-3 months: 8:1; 4-12 months: 7:1.							
CA: corrected age; AA: arachidonic acid; DHA: docosahexaenoic acid; LA: linoleic acid; ALA: α-linolenic acid; SE: standard error; p-adj. <0.05 were considered statistically significant and marked bold. No milk: infants that received neither human milk nor infant formula.							

3.1. Macronutrient intake comparing early and late introduction of solid foods in breastfed, formula-fed, mixed-fed infants and infants without milk-feeding

Nutrient intake was evaluated by comparing the timepoint of solid food introduction (early vs. late) in breastfed, formula-fed, mixed-fed and infants who received neither breastmilk nor formula (=no milk). To detect differences between study subgroups, students t-test or Mann-Whitney-U-test were applied. Statistical testing was not performed for breastfed infants at 12 months CA, mixed-fed infants at 9 and 12 months CA and “no milk fed” at 6 weeks - 9 months CA, due to small sample size. As an additional analysis, the p-values for between-group comparisons of the same nutrient at different timepoints were adjusted using the Bonferroni-Holm method. Standard errors and adjusted p-values were calculated to test the null hypothesis of no difference between the groups. Statistical significance was set at p-adj. < 0.05. The statistical analysis was performed using R Studio (Core Team, 2022).

Supplementary Table S11: Numbers of protocols according to type of feeding in the early and late group.

CA	EARLY					LATE				
	total	breastfed	formula	mixed	no milk	total	breastfed	formula	mixed	no milk
6 weeks	86	15 (17%)	62 (72%)	9 (11%)	0 (%)	60	23 (38%)	27 (45%)	10 (17%)	0 (%)
12 weeks	106	18 (17%)	75 (71%)	13 (12%)	0 (%)	64	18 (28%)	31 (49%)	15 (23%)	0 (%)
6 months	90	17 (19%)	66 (73%)	7 (8%)	0 (%)	66	18 (27%)	37 (56%)	11 (17%)	0 (%)
9 months	63	11 (17%)	48 (76%)	1 (2%)	3 (5%)	51	11 (21%)	35 (69%)	2 (4%)	3 (6%)
12 months	65	3 (5%)	49 (75%)	1 (2%)	12 (18%)	57	8 (14%)	35 (61%)	2 (4%)	12 (21%)

Data are presented as numbers with percentages in parentheses. Mixed: breastmilk + formula. No milk: infants that received neither human milk nor infant formula.

Supplementary Table S12: Overview of different formulas used in this observational study.

Type of formula	6 weeks CA		12 weeks CA		6 months CA		9 months CA		12 months CA	
	formula (n=87)	mixed (n=21)	formula (n=106)	mixed (n=28)	formula (n=103)	mixed (n=18)	formula (n=83)	mixed (n=3)	formula (n=84)	mixed (n=3)
Preterm Formula	19 (21.8%)	6 (28.5%)	7 (6.6%)	3 (10.7%)	1 (1%)	1 (5.6%)	0	0	0	0
Infant Formula	64 (73.6%)	11 (52.4%)	89 (83.9%)	23 (82.2%)	84 (81.6%)	16 (88.8%)	61 (73.5%)	3 (100%)	47 (55.9%)	0
Follow-on Formula	1 (1.1%)	0	3 (2.8%)	0	8 (7.6%)	1 (5.6%)	18 (21.7%)	0	30 (35.7%)	3 (100%)
More than one type of formula	1 (1.1%)*	0	2 (1.9%)*	0	4 (3.9%)	0	1 (1.2%)*	0	0	0
Other FSPM*	2 (2.3%)	4 (19.0%)	5 (4.7%)	2 (7.1%)	6 (5.8%)	0	2 (2.4%)	0	2 (2.4%)	0
Toddler Milk 1+	0	0	0	0	0	0	1 (1.2%)	0	5 (6.0%)	0

*FSPM: Food for special medical purpose; including antireflux formula, high-protein formula, energy-dense formula, formula for infants with cows-milk allergy
CA: corrected age

Supplementary Table S13: *Breastfed infants that received fortification.*

	6 weeks CA		12 weeks CA		6 months CA		9 months CA		12 months CA	
	breastfed (n=38)	mixed (n=21)	breastfed (n=36)	mixed (n=28)	breastfed (n=35)	mixed (n=18)	breastfed (n=22)	mixed (n=3)	breastfed (n=11)	mixed (n=3)
Mothers Own Milk + Fortification	7 (18%)	1 (4.8%)	2 (6%)	0	0	0	0	0	0	0

CA: corrected age.

Supplementary Table S14: *Range of nutrients of infant formulas that were additionally entered into the nutritional software due to missing data or changes in formulation over time.*

Nutrient	Unit	Preterm Formula	Infant Formula		Follow-on Formula		Antireflux Formula
			Pre Stage	Stage 1	Stage 2	Stage 3	
Energy	kcal	73-75	65-67	66-69	67-70	66-70	66-67
Protein	g	2	1.2-1.6	1.2-1.7	1.1-1.7	1.3-1.5	1.3-1.6
Carbohydrates	g	7.5-7.7	6.9-7.8	7.2-8.1	7.7-8.5	7.2-8.5	6.8-7.8
Fat	g	3.8-4.0	3.3-3.6	3.4-3.6	3.0-3.5	2.9-3.7	3.4-3.5
Linoleic Acid	g	0.46-0.7	0.4-0.6	0.4-0.6	0.39-0.70	0.39-0.7	0.5-0.7
Linolenic Acid	g	0.06-1	0.05-0.08	0.04-0.09	0.05-0.08	0.05-0.08	0.065-0.09
Docosahexaenoic Acid	mg	14.4-18.1	6.4-17	7-17	0-17	4-17	0-8
Arachidonic Acid	mg	14.4-20	6.5-17	7-17	0-9	0-9	0-12

Supplementary Table S15: Nutrient intake comparing early and late introduction of solid foods in breastfed, formula-fed, mixed-fed infants and without milk-feeding.

CA	Protein (g/kg/d)											
	Breastfed			Formula			Mixed			No milk		
	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE		
6 weeks	2.4 (±0.2)	2.1 (±0.1)	0.49	2.5 (±0.1)	2.3 (±0.2)	0.36	2.4 (±0.3)	2.8 (±0.2)	0.49	/		
12 weeks	1.8 (±0.1)	1.6 (±0.1)	0.36	2.0 (±0.1)	1.9 (±0.1)	0.49	1.9 (±0.1)	2.0 (±0.1)	0.49			
6 months	1.9 (±0.1)	1.8 (±0.1)	0.68	2.3 (±0.1)	2.0 (±0.1)	0.36	2.7 (±0.4)	1.8 (±0.2)	0.36			
9 months	1.9 (±0.1)	2.1 (±0.2)	0.52	2.4 (±0.1)	2.5 (±0.1)	0.90	3.7 (±/)	3.1 (±1.4)	/	3.8 (±1.0)	2.4 (±0.2)	/
12 months	1.9 (±0.2)	2.7 (±0.1)	/	2.7 (±0.1)	2.6 (±0.2)	0.68	1.9 (±/)	2.4 (±0.5)	/	3.1 (±0.2)	2.8 (±0.3)	0.65
CA	Energy (kcal/d)											
	Breastfed			Formula			Mixed			No milk		
	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE		
6 weeks	534 (±23)	488 (±17)	0.11	519 (±14)	473 (±19)	0.11	474 (±25)	500 (±31)	0.56	/		
12 weeks	545 (±9)	525 (±14)	0.22	550 (±13)	496 (±23)	0.11	532 (±18)	533 (±17)	0.66			
6 months	678 (±20)	621 (±22)	0.43	660 (±20)	582 (±18)	0.11	722 (±42)	592 (±22)	0.11			
9 months	664 (±42)	717 (±32)	0.11	768 (±21)	723 (±21)	0.23	855 (±/)	1023 (±229)	/	838 (±88)	627 (±7)	/
12 months	725 (±66)	893 (±37)	/	822 (±28)	801 (±30)	0.11	838 (±/)	851 (±166)	/	719 (±49)	766 (±42)	0.55
CA	Protein (% of energy)											
	Breastfed			Formula			Mixed			No milk		
	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE		
6 weeks	7.5 (±0.4)	7.4 (±0.3)	0.59	8.7 (±0.2)	8.5 (±0.4)	0.49	8.3 (±0.3)	8.5 (±0.4)	0.49	/		
12 weeks	6.8 (±0.2)	6.8 (±0.2)	0.78	8.3 (±0.1)	8.3 (±0.2)	0.59	7.4 (±0.2)	7.8 (±0.3)	0.49			
6 months	8.1 (±0.3)	7.5 (±0.3)	0.44	9.6 (±0.2)	9.4 (±0.4)	0.44	10.8 (±1.5)	8.2 (±0.3)	0.44			
9 months	9.9 (±0.4)	9.3 (±0.5)	0.52	10.5 (±0.2)	10.6 (±0.4)	0.59	10.6 (±/)	8.9 (±1.5)	/	14.2 (±1.4)	12.1 (±1.4)	/
12 months	11.0 (±0.4)	10.9 (±0.5)	/	11.7 (±0.4)	11.0 (±0.3)	0.44	8.0 (±/)	10.4 (±0.9)	/	15.3 (±0.8)	12.7 (±0.8)	0.26
CA	Fat (% of energy)											
	Breastfed			Formula			Mixed			No milk		
	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE		
6 weeks	50.5 (±0.9)	51.0 (±0.8)	0.86	47.3 (±0.2)	47.2 (±0.4)	0.66	47.3 (±1.1)	49.2 (±0.5)	0.31	/		
12 weeks	51.8 (±0.5)	52.4 (±0.5)	0.13	45.9 (±0.4)	47.2 (±0.3)	0.08	48.4 (±0.8)	49.9 (±0.4)	0.29			
6 months	44.7 (±1.3)	47.3 (±1.0)	0.30	38.0 (±0.7)	41.7 (±1.0)	0.01	39.0 (±2.2)	45.1 (±1.1)	0.08			
9 months	38.6 (±2.0)	37.5 (±1.8)	0.73	35.6 (±0.9)	36.9 (±1.0)	0.45	34.4 (±/)	38.5 (±2.4)	/	29.6 (±2.4)	38.2 (±6.3)	/
12 months	37.0 (±3.4)	33.9 (±1.5)	/	35.2 (±0.8)	35.8 (±0.64)	0.70	48.0 (±/)	36.6 (±3.8)	/	33.8 (±1.4)	31.9 (±2.0)	0.44
CA	Carbohydrates (% of energy)											
	Breastfed			Formula			Mixed			No milk		
	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE		
6 weeks	42.0 (±0.5)	41.6 (±0.4)	0.52	44.0 (±0.2)	44.3 (±0.4)	0.43	44.4 (±0.8)	42.4 (±0.4)	0.26	/		
12 weeks	41.3 (±0.3)	40.9 (±0.3)	0.39	45.8 (±0.4)	44.5 (±0.2)	0.35	44.2 (±0.7)	42.3 (±0.3)	0.20			
6 months	47.2 (±1.2)	45.2 (±0.9)	0.35	52.3 (±0.6)	49.0 (±0.9)	0.01	50.2 (±1.4)	46.6 (±1.0)	0.22			
9 months	51.5 (±1.7)	53.2 (±1.8)	0.53	54.0 (±0.9)	52.5 (±1.0)	0.39	55.0 (±/)	52.6 (±3.9)	/	56.2 (±2.7)	49.7 (±4.9)	/

12 months	52.0 (±3.0)	55.2 (±1.2)	/	53.1 (±0.9)	53.3 (±0.6)	0.88	44.0 (±/)	52.9 (±2.9)	/	50.9 (±1.7)	55.4 (±1.9)	0.26
CA	Arachidonic Acid (mg/d)											
	Breastfed			Formula			Mixed			No milk		
	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE				
6 weeks	140 (±7)	130 (±5)	0.85	109 (±5)	104 (±9)	0.85	97 (±10)	106 (±10)	0.85	/		
12 weeks	145 (±3)	141 (±5)	0.85	106 (±6)	117 (±7)	0.85	116 (±9)	121 (±10)	0.85			
6 months	127 (±6)	136 (±6)	0.85	81 (±5)	95 (±7)	0.85	117 (±9)	117 (±20)	0.98			
9 months	91.9 (±11)	102 (±8)	0.85	91 (±9)	69 (±7)	0.85	59 (±/)	92 (±4)	/	21 (±10)	49 (±35)	/
12 months	78 (±16)	82 (±10)	/	83 (±11)	75 (±7)	0.85	163 (±/)	80 (±13)	/	44 (±8)	39 (±10)	0.85
CA	Docosahexaenoic Acid (mg/d)											
	Breastfed			Formula			Mixed			No milk		
	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE				
6 weeks	95 (±7)	89 (±4)	0.76	108 (±5)	104 (±7)	0.76	79 (±8.3)	91.6 (±7.8)	0.76	/		
12 weeks	99 (±2)	97 (±3)	0.76	111 (±5)	114 (±7)	0.85	94 (±18)	110 (±10)	0.76			
6 months	101 (±6)	101 (±9)	0.76	97 (±6)	102 (±8)	0.76	108 (±16)	96 (±8)	0.76			
9 months	86 (±18)	71 (±5)	0.86	99 (±12)	91 (±8)	0.76	46 (±/)	95 (±1)	/	44 (±33)	39 (±24)	/
12 months	72 (±19)	60 (±10)	/	79 (±7)	90 (±9)	0.76	140 (±/)	59 (±11)	/	70 (±27)	30 (±8)	0.76
CA	Linoleic Acid (% of energy)											
	Breastfed			Formula			Mixed			No milk		
	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE				
6 weeks	5.18 (±0.11)	5.18 (±0.08)	0.96	6.58 (±0.11)	6.59 (±0.16)	0.96	6.05 (±0.32)	6.33 (±0.26)	0.96	/		
12 weeks	5.28 (±0.05)	5.29 (±0.05)	0.96	6.60 (±0.11)	6.48 (±0.11)	0.96	5.95 (±0.14)	5.99 (±0.22)	0.96			
6 months	5.31 (±0.21)	5.13 (±0.12)	0.96	5.70 (±0.14)	5.89 (±0.17)	0.96	5.48 (±0.50)	5.51 (±0.20)	0.96			
9 months	4.82 (±0.30)	4.66 (±0.29)	0.96	5.16 (±0.15)	5.09 (±0.18)	0.96	5.39 (±/)	6.11 (±0.15)	/	4.02 (±0.52)	3.37 (±1.30)	/
12 months	4.93 (±0.15)	4.31 (±0.40)	/	4.95 (±0.16)	5.09 (±0.16)	0.96	6.08 (±/)	4.26 (±0.38)	/	4.66 (±0.45)	3.88 (±0.37)	0.96
CA	α-Linolenic Acid (% of energy)											
	Breastfed			Formula			Mixed			No milk		
	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE				
6 weeks	0.53 (±0.05)	0.07 (±0.01)	0.61	0.85 (±0.02)	0.75 (±0.03)	0.13	0.66 (±0.05)	0.80 (±0.07)	0.81	/		
12 weeks	0.49 (±0.02)	0.47 (±0.00)	0.68	0.84 (±0.02)	0.81 (±0.03)	0.70	0.72 (±0.04)	0.66 (±0.03)	0.70			
6 months	0.68 (±0.07)	0.73 (±0.15)	0.61	0.91 (±0.04)	0.84 (±0.02)	0.92	0.88 (±0.18)	0.72 (±0.05)	0.89			
9 months	0.76 (±0.17)	0.64 (±0.06)	0.92	0.93 (±1.0)	0.80 (±0.05)	0.70	0.42 (±/)	0.68 (±0.11)	/	0.52 (±0.16)	0.75 (±0.15)	/
12 months	0.96 (±0.28)	0.59 (±0.05)	/	0.79 (±0.03)	0.74 (±0.04)	0.70	1.08 (±/)	0.47 (±0.03)	/	0.66 (±0.12)	0.62 (±0.06)	0.89
CA	LA/ALA ratio (% of energy)											
	Breastfed			Formula			Mixed			No milk		
	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.	Early	Late	p-adj.
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE				
6 weeks	10.4 (0.5)	11.1 (±0.1)	0.33	8.1 (±0.2)	9.1 (±0.4)	0.20	9.3 (±0.4)	8.4 (±0.6)	0.33	/		
12 weeks	10.7 (±0.3)	11.2 (±0.0)	0.09	7.9 (±0.2)	8.3 (±0.3)	0.39	8.5 (±0.4)	9.1 (±0.3)	0.33			
6 months	8.5 (±0.6)	9.1 (±0.6)	0.33	6.7 (±0.2)	7.1 (±0.3)	0.36	6.9 (±0.7)	7.9 (±0.4)	0.33			
9 months	7.8 (±0.8)	7.7 (±0.6)	0.96	6.30 (±0.3)	6.7 (±0.3)	0.43	12.7 (±/)	9.2 (±1.7)	/	9.5 (±3.4)	4.2 (±1.1)	/
12 months	6.0 (±1.3)	7.3 (±0.4)	/	6.7 (±0.2)	7.3 (±0.3)	0.33	5.7 (±/)	9.2 (±0.1)	/	8.3 (±1.3)	6.9 (±0.8)	0.56

CA: corrected age; SE: standard error. p-adj. <0.05 were considered statistically significant and marked bold. No milk: infants that received neither human milk nor infant formula.