

ASIA PAC J CLIN NUTR|中国 8 城市纯母乳喂养和非纯母乳喂养婴儿 0-5 月龄的营养状况

本文关键词：婴儿、营养状况、膳食评估、锌、铁

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建议阅读时间：1 分钟

目的

本研究旨在评估采用不同喂养方法喂养 0-5 月龄婴儿的营养状况。

方法

在中国八个城市进行了有关婴儿营养的横断面研究，共纳入 622 名 0 至 2 个月的婴儿和 456 名 3-5 个月的婴儿。混合喂养的婴儿从出生至 2 个月期间接受母乳喂养和辅食。

结果

约 38.2% 的混合喂养婴儿过量摄入维生素 A，15.6% 的婴儿锌摄入量超出了可耐受最高摄入量 (UL)。在仅接受辅食的人工喂养婴儿中，分别有约 20% 和 12.5% 的婴儿维生素 A 和锌的摄入量不足。一半的婴儿维生素 A 和锌的摄入量超出了可耐受最高摄入量。3-5 月龄婴儿的平均摄入量分布与 0-2 月龄婴儿相似。常见的维生素 A 和锌摄入量也严重失衡。此外，与母乳喂养婴儿相比，人工喂养婴儿和混合喂养婴儿有着更高的疾病发病率，和更低的年龄身高 z 评分、年龄体重 z 评分以及体重身高 z 评分。

结论

中国大部分婴儿常规营养素摄入量是充足的，但也有一部分婴儿正处于维生素 A 和锌摄入量失衡的风险当中。

Table 1. One-day nutrient intake distributions from food, beverages, and supplements for mix-fed infants who received breast milk and complementary foods from birth to age 2 months (n=225)

Nutrient	Dietary Reference Intakes			Mean/median intake percentiles					% <EAR	% >UL	
	RNI/AI	EAR	UL	10th	25th	Median	Mean±SE	75th			90th
Macronutrients											
Energy (kcal/kg·d)	95			75.5	87.4	101.3	103±1.9	115	138		
Fat (g/d)				25.3	25.9	26.4	27.4±0.3	27.5	29.9		
Carbohydrate (g/d)				55.6	56.0	56.5	59.1±0.6	58.6	62.8		
Protein (g/d)	9			10.0	10.1	10.5	11.0±0.1	11.1	12.7		
Fiber (g/d)				0	0	0	0.3±0.1	0.2	1		
Cholesterol (g/d)				5.9	36	59.8	52.4±2.3	71.1	74.9		
As percentage of total energy											
Fat (%)	45-50			46.0	46.8	47.1	46.7±0.1	47.3	48.0		
Carbohydrate (%)				43.3	44.3	45.0	45.1±0.2	45.5	46.0		
Protein (%)				8.1	8.1	8.2	8.4 ± 0.1	8.5	8.8		
Vitamins											
Vitamin A (µg/d)	400	375	600 [†]	519	524	543	662±12.8	850	987	0.4	38.2
Vitamin C (mg/d)	40		400	40.8	42.8	49.6	57.5±1.5	65.9	84.9		0
Vitamin E (mg/d)	3			0.6	0.9	1.7	2.9±0.2	4.3	6.5		
Thiamin (mg/d)	0.2			0	0.1	0.1	0.2±0.1	0.3	0.5		
Riboflavin (mg/d)	0.4			0.4	0.4	0.5	0.6±0.0	0.7	0.9		
Niacin (mg/d)	2			1.0	1.6	1.8	2.1±0.1	2.6	3.5		
Bone-related nutrients											
Calcium (mg/d)	300			241	254.3	284.1	322±7.2	356	458.4		
Phosphorus (mg/d)	150			110	119.0	134.6	158±4.1	175	240		
Magnesium (mg/d)	30			66.4	126.1	186.9	165±3.9	212	222		
Other micronutrients											
Iron (mg/d)	0.3		10	1.2	1.5	2.2	3.1±0.1	3.9	6.1		1.3
Zinc (mg/d)	1.5	1.5	4	2.3	2.4	2.7	3.1±0.1	3.4	4.5	0.4	15.6
Sodium (mg/d)	150			15.5	23.9	46.1	66.9±4.1	87.3	144		
Potassium (mg/d)	400			53.1	87.8	160.9	242±14.2	330	582		
Selenium (µg/d)	15		55	0.9	1.5	3.2	5.1±0.3	7.5	12.4		0
Copper (mg/d)	0.4			0.2	0.2	0.3	0.3±0	0.3	0.4		
Manganese (mg/d)	0.001 [†]			0	0	0	0±0	0	0.1		

[†]: the recommendations of Japanese DRIs in 2008. SD: standard deviation.

Table 2. One-day nutrient intake distributions from food, beverages, and supplements for artificially fed infants who received only complementary foods from birth to age 2 months (n=144)

Nutrient	Dietary Reference Intakes			Mean/median intake percentiles					% <EAR	% >UL	
	RNI/AI	EAR	UL	10th	25th	Median	Mean±SE	75th			90th
Macronutrients											
Energy (kcal/kg·d)	95			26.4	59.8	95.3	99.9±4.7	136.4	165.7		
Fat (g/d)				6.6	16.3	26.5	26.8±1.2	36.1	43.4		
Carbohydrate (g/d)				17.3	32.7	58.1	57.1±2.4	77.7	90.8		
Protein (g/d)	9			3.3	7.6	11.5	12.3±0.8	16	19.4		
Fiber (g/d)				0	0	0.1	0.6±0.1	0.6	2.4		
Cholesterol (g/d)				0	0	0	6.7±3.1	0	13.2		
As percentage of total energy											
Fat (%)	45-50			38.7	46.5	47.2	45.5±0.5	48	49.3		
Carbohydrate (%)				41.8	42.3	42.7	44.2±0.5	44.9	48.3		
Protein (%)				8.3	8.4	8.7	9.8±0.5	8.8	12.4		
Vitamins											
Vitamin A (µg/d)	400	375	600 [†]	172	399	644	627±26.8	856	1036	21.5	53.5
Vitamin C (mg/d)	40		400	18	41.8	73.5	76.1±3.6	107	136		0
Vitamin E (mg/d)	3			1.4	3	6.3	6.5±0.2	8.6	12.4		
Thiamin (mg/d)	0.2			0.1	0.3	0.5	0.5±0.01	0.7	0.8		
Riboflavin (mg/d)	0.4			0.2	0.5	0.8	0.9±0.0	1.1	1.4		
Niacin (mg/d)	2			0	0.7	2.7	2.7±0.2	4.2	5.4		
Bone-related nutrients											
Calcium (mg/d)	300		1000	140.7	235.1	390	424±21.3	559.1	728.1		0
Phosphorus (mg/d)	150			69.5	117.8	208	220±9.9	305.2	373.4		
Magnesium (mg/d)	30			14.3	27	43.1	40.9±1.6	51	62.6		
Other micronutrients											
Iron (mg/d)	0.3		10	1.6	3.4	5.9	6.4±0.4	7.8	9.9		9
Zinc (mg/d)	1.5	1.5	4	1.2	2.6	4.2	4.2±0.1	5.6	6.4	12.5	53.5
Sodium (mg/d)	150			35.7	86.4	153.6	154±7.5	206.5	254.7		
Potassium (mg/d)	400			140.8	348	554.4	553±24.9	735.8	908.9		
Selenium (µg/d)	15		55	1	5.1	12.2	11±0.6	15.2	18.5		0
Copper (mg/d)	0.4			0.1	0.2	0.3	0.3±0	0.5	0.6		
Manganese (mg/d)	0.001 [†]			0	0	0	0.1±0	0.1	0.1		

[†]: the recommendations of Japanese DRIs in 2008. SD: standard deviation.

Table 3. One-day nutrient intake distributions from food, beverages, and supplements for mix-fed infants who received breast milk and complementary foods aged 3 to 5 months (*n*=145)

Nutrient	Dietary Reference Intakes			Mean/median intake percentiles					% < EAR	% >UL	
	RNI/AI	EAR	UL	10th	25th	Median	Mean±SE	75th			90th
Macronutrients											
Energy (kcal/kg/d)	95			44.4	60.5	71.2	79.4±3.3	82.4	126.7		
Fat (g/d)				21.2	25.9	27.1	28.3±1	29.6	35		
Carbohydrate (g/d)				55.4	56.5	59.5	75.3±4	76	106.5		
Protein (g/d)	9			9.9	10.4	11.4	14±0.6	14.5	21.7		
Fibre (g/d)				0	0	0.2	0.7±0.1	0.8	1.8		
Cholesterol (g/d)				3.4	38.3	63.6	107±11.6	78.6	301.6		
As percentage of total energy											
Fat (%)	45-50			30.3	41	46.1	42.4±0.8	47.1	47.8		
Carbohydrate (%)				42.3	44.3	45.7	49±0.8	50.9	61.4		
Protein (%)				8	8.2	8.4	9.2±0.1	9.5	11		
Vitamins											
Vitamin A (µg/d)	400	375	600 [†]	504	524	616	709±26	905	1034	7.6	51.7
Vitamin C (mg/d)	40		400	38.7	44.1	52.7	61.5±3.4	69.3	94.2		
Vitamin E (mg/d)	3			0.9	1.6	2.8	4.3±0.5	4.8	7.8		
Thiamin (mg/d)	0.2			0.1	0.1	0.2	0.3±0.1	0.3	0.6		
Riboflavin (mg/d)	0.4			0.4	0.5	0.6	0.7±0.0	0.8	1.1		
Niacin (mg/d)	2			1.2	1.8	2.2	2.8±0.2	3.1	4.7		
Bone-related nutrients											
Calcium (mg/d)	300		1000	251	287	384	487±27.6	594	894.9		
Phosphorus (mg/d)	150			118	138	183	241±16.9	264.2	369		
Magnesium (mg/d)	30			47.6	108	169	154±5.6	207	224		
Other micronutrients											
Iron (mg/d)	0.3		10	1.5	2.1	3.4	4.8±0.4	5.6	10.3		10.3
Zinc (mg/d)	1.5	1.5	4	2.3	2.6	3.2	4.1±0.2	4.4	6.9	2.1	31.7
Sodium (mg/d)	150			23.1	41.5	74	134±16.7	129.3	274.1		
Potassium (mg/d)	400			80	115	238	340±28.9	423.8	642.1		
Selenium (µg/d)	15		55	1.2	2.4	5.1	6.9±0.6	9	12.8		
Copper (mg/d)	0.4			0.2	0.2	0.3	0.4±0.1	0.3	0.7		0
Manganese (mg/d)	0.001 [†]			0	0	0.1	0.2±0	0.1	0.6		

[†]: the recommendations of Japanese DRIs in 2008. SD: standard deviation

Table 4. One-day nutrient intake distributions from food, beverages, and supplements for artificially fed infants who received only complementary foods aged 3 to 5 months (*n*=126)

Nutrient	Dietary Reference Intakes			Mean/median intake percentiles					% < EAR	% >UL	
	RNI/AI	EAR	UL	10th	25th	Median	Mean±SE	75th			90th
Macronutrients											
Energy (kcal/kg/d)	95			18.1	30.7	68.0	71.2±4.2	100.0	135.7		
Fat (g/d)				5.8	9.1	23.8	24.7±1.5	35.1	47.5		
Carbohydrate (g/d)				14	28.3	66.6	65.9±3.9	87.1	109		
Protein (g/d)	9			3.4	6.6	12.2	13.4±0.8	18.5	26.3		
Fibre (g/d)				0	0	0.2	0.8±0.1	0.8	2.1		
Cholesterol (g/d)				0	0	0	63.5±13.9	16.9	297		
As percentage of total energy											
Fat (%)	45-50			23.9	36.3	45.6	40.7±0.9	47.3	48.8		
Carbohydrate (%)				41	42.7	46.1	49.1±1	54.3	66.5		
Protein (%)				8.1	8.4	8.8	10.1±0.3	11	13.8		
Vitamins											
Vitamin A (µg/d)	400	375	600 [†]	135	391.4	591	620±32.7	891	1020	23.8	50
Vitamin C (mg/d)	40		400	15.1	24.3	73.5	70.4±4.3	100.4	130		0
Vitamin E (mg/d)	3			1.2	2.1	5.9	6.3±0.4	9.5	11.9		
Thiamin (mg/d)	0.2			0.1	0.2	0.4	0.4±0.04	0.7	0.9		
Riboflavin (mg/d)	0.4			0.2	0.3	0.8	0.8±0.1	1.1	1.5		
Niacin (mg/d)	2			0	0.7	2.7	2.9±0.3	4.4	5.9		
Bone-related nutrients											
Calcium (mg/d)	300		1000	104	227.2	413	467±29.7	624	938		7.9
Phosphorus (mg/d)	150			63	138.1	238	278±17.7	359	525		
Magnesium (mg/d)	30			9.5	23.7	39.6	44.6±2.9	60	83.7		
Other micronutrients											
Iron (mg/d)	0.3		10	1.5	2.6	6.2	6.8±0.5	9.3	12.3		19
Zinc (mg/d)	1.5	1.5	4	1.1	1.8	4.3	4.5±0.3	6.2	7.7	19.8	54.8
Sodium (mg/d)	150			37.8	68.5	142	174±11.8	241	338		
Potassium (mg/d)	400			126	242	562	567±33.6	776	1028		
Selenium (µg/d)	15		55	1.1	3.1	11.2	16.6	22.5	18.5		0
Copper (mg/d)	0.4			0.1	0.1	0.3	0.3±0	0.5	0.6		
Manganese (mg/d)	0.001 [†]			0	0	0.1	0.2±0	0.2	0.4		

[†]: the recommendations of Japanese DRIs in 2008. SD: standard deviation.

Table 5. The differences on the energy intake, prevalence rate of different diseases, and the Z score of LAZ, WAZ, and WLZ among the three approaches to feeding

Indices	0-2 months			3-5 months		
	AFI	MFI	BFI	AFI	MFI	BFI
Mean energy/kg body weight	99.9	103.4*	95.5	71.2	79.4	72.8
Length for age	5.08*	5.27	5.40	5.02	5.21	5.28
Stunting prevalence	6.3	4.8	5.8	9.1*	6.1	4.4
Weight for age	5.28	5.28	5.39	5.24*	5.38	5.64
Underweight prevalence	2.8	3	4.5	2.1	2.4	2.3
Weight for height	4.98	4.79	4.79	5.15	5.13	5.37
Wasting prevalence	9.2*	5.3	5.0	2.8	4.2	3.9
Prevalence rate	26.3	24.1	19.2	51	45.6	41.6
Diarhea	4.5	4.2	5.1	13.1	18.7*	11.4
Respiratory system disease	13.4*	10.5	8.1	37.2	26.3	29.7
Anaphylactic disease	9.5*	8.9	5.1	6.9	9.4	7

AFI: artificially fed infants who received only complementary foods; MFI: mix-fed infants who received breast milk and complementary foods; BFI: breast feeding infants who received only breast milk. *: $p < 0.05$ comparing with that of breast feeding infants.

参考文献: Ma D, et al. Asia Pac J Clin Nutr. 2014;23(2):282-92.

文献链接: <https://www.ncbi.nlm.nih.gov/pubmed/24901099>