

PLOS ONE | 哺乳期妇女膳食矿物质摄入不足和过量摄入的营养问题：中国三个城市的横断面研究

本文关键字：哺乳期妇女、矿物质、膳食、摄入不足、摄入过量

影响因子：2.766

建议阅读时间：2 分钟

目的

研究目的：1) 调查我国哺乳期妇女的矿物质摄入量；2) 探讨矿物质的膳食来源；3) 不同膳食矿物质之间的比例。

方法

研究共纳入 468 名产后 5-240 天的哺乳期妇女，采用 24 小时膳食回顾法得到了参与者的食物摄入量，同时以《中国食物成分表》第二版为基础来计算食物中的矿物质含量。

结果

产后妇女的食物摄入情况不佳，有 81.0% 的妇女每日奶制品摄入量低于 300 克，97.1% 的妇女每日盐摄入量超过了 6g。而在矿物质摄入方面，分别有 81.8%、59.0%、47.6%、45.7% 和 66.8% 的妇女，钙、镁、铁、锌和硒的摄入量低于估计的平均要求量，而有 91.7% 的妇女出现钠摄入量过多。钙磷比和钠钾比分别为 $0.41 \pm 0.26: 1$ 和 $3.13 \pm 2.89: 1$ 。在矿物质的膳食来源方面，分别有 27.3%、25.3% 和 30.1% 的铁、锌和钙来源于动物性食物，有 60.3%、66.1% 和 58.0% 的铁、锌和钙来源于植物性食物。磷蛋白比为 $0.014 \pm 0.003: 1$ 。哺乳阶段与营养素摄入量息息相关，产后 30 天内的妇女以及居住于广州地区的妇女某些矿物质摄入量明显较低，而具有较好教育背景的女性，其钙、钾、铁和锌的摄入量更高。生产年龄，是否肥胖及分娩方式与矿物质摄入量无显著相关性 (P 均 > 0.05)。

结论

研究显示，我国城市妇女食物摄入量不适当，可能会造成某些矿物质的过度摄入或摄入不足。

Table 1. Comparison of demographic characteristics of lactating women among three cities of China.

Variables	Total	Area			P	
		Beijing	Suzhou	Guangzhou		
Productive age						
	Mean±SD y*	27.7±4.0	28.4±3.3	26.9±4.2	27.6±4.3	0.023
	< 25 y	126(56.8)	26(15.8)	55(37.2)	45(30.6)	0.001
	25–30 y	106(23.0)	95(57.6)	61(41.2)	65(44.2)	
	>30 y	93(20.2)	44(26.7)	32(21.6)	37(25.2)	
BMI						
	Mean±SD kg/m ² *	23.2±3.1	24.1±3.2	23.3±3.0	22.2±2.9	<0.001
	Under weight	24(5.1)	8(4.8)	7(4.7)	9(6.0)	<0.001
	Normal weight	255(54.6)	74(44.3)	77(51.3)	104(69.3)	
	Over weight	152(32.5)	63(37.7)	58(38.7)	31(20.7)	
	obesity	36(7.7)	22(13.2)	8(5.3)	6(4.0)	
Nationality						
	Han	448(95.7)	158(94.0)	148(98.7)	142(94.7)	0.094
	Others	20(4.3)	10(6.0)	2(1.3)	8(5.3)	
Delivery ways						
	Caesarean section	217(46.7)	91(54.2)	74(49.3)	53(35.3)	0.003
	Vaginal delivery	248(53.3)	77(45.8)	76(51.7)	97(64.7)	
Education experience						
	Senior high or under	262(56.8)	26(15.8)	55(37.2)	45(30.6)	<0.001
	Bachelor degree	106(23.0)	95(57.6)	61(41.2)	65(44.2)	
	Master or above	93(20.2)	44(26.7)	32(21.6)	37(25.2)	

* Presented as Mean±SD and analyzed with ANOVA and other data were presented as N,% and analyzed with the method of Chi-square.

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Table 2. The daily intake of different food groups by lactating women in three cities of China.

Food categories	N	Intake amount(g) Median(25 th ,75 th)	Low intake (%) ^a	Appropriate intake (%) ^a	High intake (%) ^a
Grains	449	320.0(241.5,431.4)	61.2	15.6	23.2
Vegetables	448	390.0(200.0,500.0)	44.6	34.8	20.5
Fruits	440	200.0(100.0,400.0)	43.2	35.5	21.4
Meat, fish & eggs	449	188.6(118.0,290.0)	53.7	22.9	23.4
Dairy products	342	200.0(71.4,250.0)	81.0	15.8	3.2
legumes & nuts	360	10.0(4.0,21.4)	83.9	8.9	7.2
Oils	446	28.0(21.0,35.0)	37.7	34.8	27.6
Salt	444	19.0(6.0,10.0)	2.9		97.1

a In comparison of food consumptions with Chinese Balanced Dietary Pagoda for lactating women, low intake, appropriate intake, and high intake for each food group are defined as: <350g, 350–450g, and >450g for grains; <300g, 300–500g, and >500g for vegetables; <200g, 200–400g, and >400g for fruits; <200g, 200–300g, and >300g for meat, fish and eggs; <300g, 300–500g, and >500g for dairy products; <40g, 40–60g, and >60g for legumes and nuts; <25g, 25–30g, and >30g for oils. For salt, ≤6g defined as appropriate intake, while >6g defined as high intake.

Table 3. Dietary minerals intake by lactating women in three cities of China and comparison with Chinese Dietary Reference Intakes (estimated average requirement, EAR; recommended nutrient intake, RNI; adequate intake, AI, tolerable upper intake level, UL and proposed intakes for preventing non-communicable chronic disease, PI-NCD; N = 468).

Minerals	Mean	SD	25th	Media (50th)	75th	<EAR ^a %	<RNI/AI ^b %	>UL/PI-NCD ^c %
Calcium (mg)	512.6	416.6	246.6	391.5	661.7	81.8	89.5	1.1
Phosphorus (mg)	1076.9	541.0	682.2	964.4	1363.5	16.0	29.1	0.2
Potassium (mg)	1881.7	1070.4	1106.2	1682.2	2374.1	-	75.9	7.3
Sodium (mg)	4462.8	3275.0	3178.2	3854.7	4972.8	-	6.4	91.7
Magnesium (mg)	290.7	185.7	169.7	247.1	366.1	59.0	68.6	-
Iron (mg)	22.1	14.4	13.4	18.9	26.1	47.6	69.0	7.1
Zinc (mg)	11.6	6.1	7.2	10.5	14.0	45.7	61.9	0.4
Selenium (µg)	61.2	49.1	31.3	48.1	75.3	66.8	76.5	0.0
Copper (mg)	1.95	1.46	1.08	1.50	2.42	25.9	42.4	1.1
Manganese(mg)	5.19	5.83	2.99	4.10	6.04	-	60.2	4.3

a The EAR of calcium, phosphorus, magnesium, iron, zinc, selenium and copper were 810mg/d, 600mg/d, 280mg/d, 18mg/d, 9.9mg/d, 65µg/d and 1.1mg/d respectively.

b The RNI of calcium, phosphorus, magnesium, iron, zinc, selenium and copper were 1000mg/d, 720 mg/d, 330 mg/d, 24 mg/d, 12 mg/d, 78 µg/d and 1.4 mg/d respectively. The AI of manganese, sodium and potassium were 4.8mg/d, 1500mg/d and 2400mg/d respectively.

c The UL of calcium, phosphorus, potassium, iron, zinc, selenium, copper and manganese were 2000 mg/d, 3500 mg/d, 3600 mg/d, 42 mg/d, 40 mg/d, 400 µg/d, 8.0 mg/d and 11 mg/d, respectively. The PI-NCD of sodium was 2000mg/d.

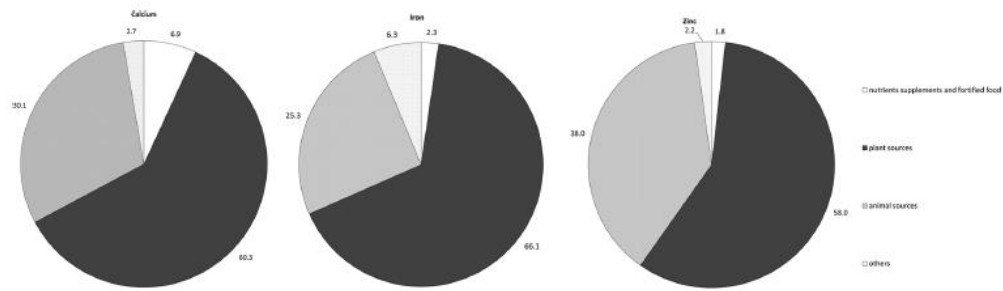


Fig 1. The dietary sources of calcium, iron and zinc in Chinese Lactating women (N = 468, Others included condiments and drinks). Calcium The percentage of each source of calcium intake; Iron The percentage of each source of iron intake; Zinc The percentage of each source of zinc intake.

Table 4. Linear regression of factors associated with minerals intake.

Minerals	Area		Lactation Stage		Productive age		BMI		Delivery ways		Education experience	
	t	P	t	P	t	P	t	P	t	P	t	P
Calcium	-3.299	0.001	4.881	<0.001	0.903	0.182	-0.434	0.664	0.218	0.827	3.092	0.002
Phosphorus	-1.122	0.262	3.990	<0.001	0.074	0.818	0.613	0.541	-1.195	0.233	2.072	0.039
Potassium	-2.150	0.032	5.265	<0.001	0.917	0.209	-0.404	0.686	-0.602	0.548	2.812	0.005
Sodium	-0.958	0.338	1.933	0.054	-0.862	0.534	0.195	0.846	-1.110	0.268	1.314	0.190
Magnesium	-2.825	0.005	4.626	<0.001	0.704	0.367	0.347	0.729	-0.298	0.776	1.447	0.149
Iron	-2.143	0.033	2.263	0.024	-0.128	0.797	0.624	0.533	0.752	0.452	2.671	0.008
Zinc	0.585	0.559	3.593	0.001	0.279	0.538	0.076	0.939	0.241	0.809	2.429	0.018
Selenium	-1.086	0.278	-0.075	0.940	0.240	0.995	0.682	0.496	-0.456	0.649	0.144	0.885
Copper	-3.352	0.001	3.854	<0.001	1.233	0.147	-1.018	0.309	1.271	0.204	1.499	0.135
Manganese	-1.347	0.179	2.791	0.005	0.565	0.561	-0.986	0.325	0.523	0.601	-0.038	0.970

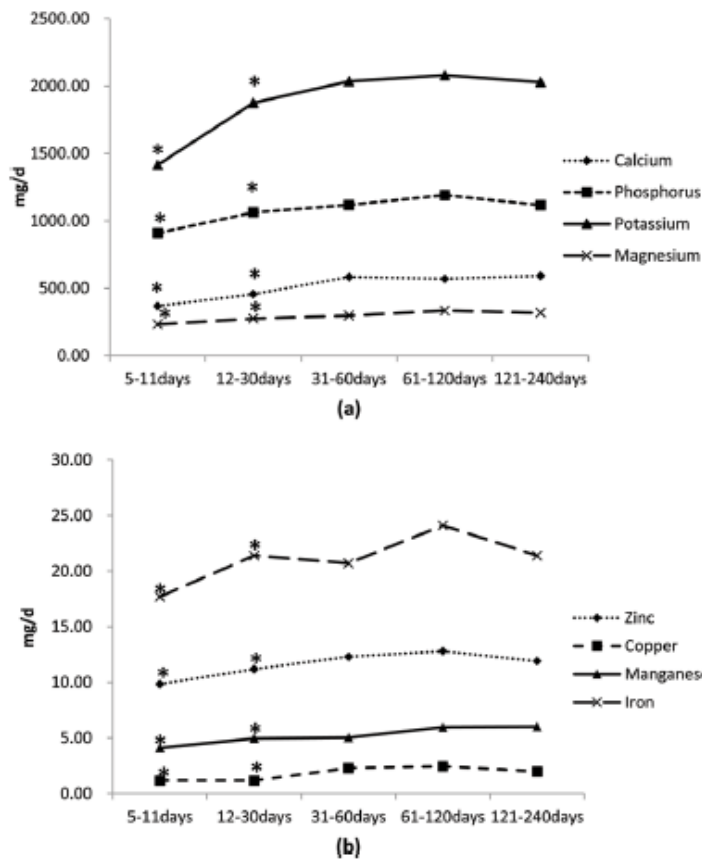


Fig 2. The changes of minerals intake of lactating women through different lactation stages (N = 468, * significant differences compared with other lactation stages). (a) Lactating women in 5–11days and 12–30days postpartum had a significant lower intake of calcium, phosphorus, potassium and magnesium comparing women in the 31–60day, 61–120days and 121–240days post-partum. (b) Lactating women in 5–11days and 12–30days postpartum had a significant lower intake of zinc, copper, manganese and iron comparing women in the 31–60day, 61–120days and 121–240days post-partum.

Table 5. Differences of minerals intake of lactating women among different cities in China.

	Minerals intake		
	Beijing N = 168	Suzhou N = 150	Guangzhou N = 150
Calcium (mg)	553.9±426.4	592.5±469.9	386.4±308.1*
Phosphorus (mg)	1050.4 ±496.6	1234.8±580.2	948.7±511.7
Potassium (mg)	1868.7±959.5	2203.5±1148.2	1574.3±1020.3*
Sodium (mg)	4922.9±4351.9	3872.3±2737.9	4538.0±2073.0
Magnesium (mg)	299.4±214.7	337.0±162.4	234.6±156.9*
Iron (mg)	23.3±16.0	24.3±15.2	18.7±10.8*
Zinc (mg)	10.8±5.1	13.3±6.8	10.9±9.2
Selenium (µg)	59.6±39.7	74.1±57.4	50.2±46.7
Copper (mg)	2.09±1.56	2.19±1.54	1.56±1.16*
Manganese(mg)	4.93±6.42	6.37±7.19	4.32±2.53

*Post hoc LSD test shows lower intake of minerals compared with other cities.

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文献链接:

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