ONLINE SUPPLEMENT

Effect of salt reduction on iodine status assessed by 24h urinary iodine excretion in children and their families in northern China: a sub-study of a cluster randomised controlled trial

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Supplement Table 1. Baseline characteristics of the participants*

Parameters	Control	Intervention	All
Children			
Number of schools	14	14	28
Number of children	138	141	279
Boys, N (%)	67 (48.6)	67 (47.5)	134 (48.0)
Age (year)	10.2 (0.5)	10.0 (0.5)	10.1 (0.5)
Weight (kg)	33.3 (7.2)	33.4 (7.8)	33.3 (7.5)
Height (cm)	140.7 (6.6)	139.2 (6.2)	140.0 (6.5)
Body mass index (kg/m^2)	16.7 (2.7)	17.1 (3.2)	16.9 (3.0)
Adults			
Number of adults	275	278	553
Men, N (%)	133 (48.4)	135 (48.6)	268 (48.5)
Parents, N (%)	208 (75.6)	203 (73.0)	411 (74.3)
Grandparents, N (%)	67 (24.4)	75 (27.0)	142 (25.7)
Age (year)	43.6 (11.8)	43.9 (12.5)	43.8 (12.2)
Weight (kg)	66.2 (12.9)	66.1 (11.6)	66.2 (12.3)
Height (cm)	162.8 (8.7)	162.4 (8.0)	162.6 (8.4)
Body mass index (kg/m^2)	24.9 (3.6)	25.0 (3.4)	24.9 (3.5)

*Data are means (SD) unless otherwise specified.

Supplement Table 2. Sensitivity analysis for salt and iodine intake as calculated from 24h urinary sodium and iodine excretion

Outcome	Number of participant Control /Intervention	Control		Intervention		Adjusted difference‖ (intervention vs control)	P value
		Baseline‡	Change from baseline‡	Baseline‡	Change from baseline‡		
Population excluding possibly incomplete 24h urine							
Children							
Salt (mean, 95%CI) (g/d)	138/140	7.0 (6.4─7.6)	1.2 (0.7─1.6)	7.5 (6.9─8.1)	-0.7 (-1.1 ─ -0.2)	-1.9 (-2.6─ -1.2)	<0.0001
Iodine (geometric mean, 95%CI) (μg/d)	138/140	170.8 (155.0─188.2)	112.9% (102.7%─124.2%)	180.0 (163.6─198.1)	95.4% (86.9%─104.8%)	-16.5% (-26.9%─ -4.6%)	0.008
Iodine (median, IQR) (μg/d)	138/140	166.5 (119.0─220.4)	27.3 (-20.6─79.0)	175.4 (131.3─228.7)	-9.3 (-52.4─39.0)		
Adults							
Salt (mean, 95%CI) (g/d)	273/275	11.6 (10.8─12.3)	0.8 (0.3─1.4)	12.8 (12.1─13.6)	-2.1 (-2.6─-1.6)	-3.0 (-3.7─ -2.2)	<0.0001
Iodine (geometric mean, 95%CI) (μg/d)	273/275	280.7 (255.0─308.9)	104.6% (97.1%─112.7%)	298.0 (270.9─327.7)	95.6% 88.8%─102.9%)	-9.5% (-18.3%─0.2%)	0.055
Iodine (median, IQR) (μg/d)	273/275	275.7 (201.9─360.1)	15.1 (-78.3─105.3)	300.5 (219.2─392.5)	-30.2 (-117.7─ 90.2)		
Completers*							
Children							
Salt (mean, 95%CI) (g/d)	135/139	6.8 (6.2─7.4)	1.2 (0.8─1.7)	7.2 (6.6─7.9)	-0.7 (-1.2─ -0.2)	-1.9 (-2.6─ -1.3)	<0.0001
Iodine (geometric mean, 95%CI) (μg/d)	135/139	162.0 (146.0─180.0)	115.4% (104.9%─126.9%)	173.5 (156.4─192.4)	94.0% (85.6%─103.2%)	-19.3% (-29.4%─ -7.8%)	0.002

Iodine (median, IQR) (μg/d)	135/139	160.9 (117.7─208.1)	27.4 (-18.3─76.7)	169.6 (128.5─221.6)	-13.1 (-54.5─37.8)		
Adults							
Salt (mean, 95%CI) (g/d)	261/271	11.4 (10.6─12.1)	0.8 (0.2─1.3)	12.7 (11.9─13.5)	-2.2 (-2.7─ -1.6)	-3.0 (-3.7─ -2.2)	<0.0001
Iodine (geometric mean, 95%CI) (μg/d)	261/270	272.1 (245.3─301.7)	104.7% (96.9%─113.1%)	292.6 (264.1─324.3)	93.1% (86.3%─100.4%)	-11.1% (-20.1%─ -1.1%)	0.030
Iodine (median, IQR) (μg/d)	261/270	261.8 (197.8─348.8)	10.7 (-72.8─105.3)	297.7 (213.2─391.8)	-36.5 (-128.4─ 88.9)		
Per protocol population†							
Children							
Salt (mean, 95%CI) (g/d)	132/137	7.0 (6.4─7.6)	1.2 (0.7─1.7)	7.5 (6.9─8.1)	-0.7 (-1.1─ -0.2)	-1.9 (-2.6─ -1.3)	<0.0001
Iodine (geometric mean, 95%CI) (μg/d)	132/137	169.5 (154.1─186.4)	114.1% (103.7%─125.5%)	179.6 (163.5─197.2)	95.9% (87.3%─105.3%)	-16.8% (-27.2%─ -4.9%)	0.007
Iodine (median, IQR) (μg/d)	132/137	166.5 (120.3─216.8)	27.3 (-20.6─79.0)	178.8 (131.3─228.7)	-9.3 (-52.4─39.0)		
Adults							
Salt (mean, 95%CI) (g/d)	249/256	11.6 (10.8─12.3)	0.9 (0.3─1.4)	12.9 (12.2─13.7)	-2.1 (-2.6─ -1.6)	-3.0 (-3.7─ -2.3)	<0.0001
Iodine (geometric mean, 95%CI) (μg/d)	249/255	282.4 (256.5─311.0)	104.3% (96.7%─112.5%)	296.3 (269.3─326.0)	96.1% (89.2%─103.6%)	-8.3% (-17.3%─1.7%)	0.102
Iodine (median, IQR) (μg/d)	249/255	275.8 (203.1─360.1)	15.1 (-78.3─105.3)	300.1 (218.3─391.8)	-30.2 (-117.7─ 90.2)		

***** Completers refer to the participants who had 24h urine collections both at baseline and end of the trial. † Per protocol population refers to completers with complete 24h urine collections. ‡ Mean and geometric mean were adjusted for stratification variables at randomisation (school location and class size). ‖Adjusted for age, sex, body mass index, stratification variables at randomisation (school location and class size), and indoor and outdoor temperature.

Supplement Table 3. Iodine status assessed by 24h urinary iodine concentration using WHO's criteria, and median 24h urinary iodine concentration and 24h urinary iodine excretion for each category

Urinary iodine (µg/L)	Control						Intervention					
	Baseline			End of trial			Baseline			End of trial		
	N (%)	Iodine (median)		N (%)	Iodine (median)		N (%)	Iodine (median)		N (%)	Iodine (median)	
		(µg/L)	(µg/24h)		(µg/L)	(µg/24h)		(µg/L)	(µg/24h)		(µg/L)	(µg/24h)
Children												
<100 (Iodine deficient)	10 (7.25)	85.07	94.93	10 (7.41)	84.26	114.51	5 (3.55)	86.17	89.84	11 (7.91)	86.65	113.78
100-199 (Adequate)	55 (39.86)	155.60	139.77	40 (29.63)	152.39	143.31	54 (38.30)	156.60	152.99	48 (34.53)	153.87	125.17
200-299 (Above requirement)	48 (34.78)	235.92	172.93	52 (38.52)	243.06	184.82	43 (30.50)	248.98	173.10	41 (29.5)	238.24	165.24
≥300 (Excessive)	25 (18.12)	430.84	249.11	33 (24.44)	371.52	279.42	39 (27.66)	357.28	236.15	39 (28.06)	411.03	260.88
ALL	138	204.55	161.73	135	222.49	175.98	141	225.32	166.98	139	217.09	154.82
Adults												
<100 (Iodine deficient)	32 (11.64)	81.31	137.25	38 (14.56)	72.84	149.13	31 (11.19)	79.49	140.35	48 (17.71)	74.71	164.03
100-199 (Adequate)	121 (44.00)	152.37	240.44	108 (41.38)	147.78	246.58	103 (37.18)	150.95	281.83	116 (42.80)	142.55	250.69
200-299 (Above requirement)	68 (24.73)	239.54	280.75	72 (27.59)	243.17	353.36	79 (28.52)	246.73	326.61	56 (20.66)	240.86	293.21
≥300 (Excessive)	54 (19.64)	372.08	420.86	43 (16.48)	351.76	460.61	64 (23.10)	372.21	423.84	51 (18.82)	364.22	535.18
ALL	275	188.78	262.11	261	183.55	281.33	277	209.39	297.37	271	176.18	258.54

Supplement Table 4. Comparison of iodine levels observed from 24h urinary iodine with that predicted from salt intake and iodine content in salt

	Control		Intervention	
	Baseline	**End of trial**	**Baseline**	**End of trial**
Children				
Observed from 24h urinary measurements				
Mean salt (g/d)*	6.8	8.0	7.3	6.6
Median iodine (µg/d)	161.7	176.0	167.0	154.8
Iodine/salt ratio, median (µg/g)	23.8	24.4	25.0	24.9
Predicted iodine based on salt intake and iodine content in salt using the minimum level of 18 mg/kg				
Predicted iodine (µg/d)	122.4	144.0	131.4	118.8
Ratio (predicted/observed)	0.8	0.8	0.8	0.8
Adults				
Observed from 24h urinary measurements				
Mean salt (g/d)*	11.3	12.1	12.6	10.4
Median iodine (µg/d)	262.1	281.3	297.4	258.5
Iodine/salt ratio, median (µg/g)	24.8	24.8	24.6	26.7
Predicted iodine based on salt intake and iodine content in salt using the minimum level of 18 mg/kg				
Predicted iodine (µg/d)	203.4	217.8	226.8	187.2
Ratio (predicted/observed)	0.8	0.8	0.8	0.7

*adjusted for stratification variables at randomisation (school location and class size).