Supplementary Materials

Moderating effect of selenium intake on the association between obesity and sex hormone levels in children and adolescents: NHANES 2013-2016

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Supplementary Table 1. Distribution of selenium intake levels

Selenium intake	Male [<12 years] (n=710)	Male [≥12 years] (n=1002)	Female [<12 years] (n=698)	Female [≥12 years] (n=970)
Q1	69 μg	74 μg	60 μg	56 μg
≥Q1, n (%)	513 (75%)	749 (75%)	538 (75%)	731 (75%)
<Q1, n (%)	197 (25%)	253 (25%)	160 (25%)	239 (25%)

Supplementary Table 2. Selenium intake levels after excluding participants with selenium supplements[†]

Selenium intake	Male [<12 years] (n=707)	Male [≥12 years] (n=972)	Female [<12 years] (n=696)	Female [≥12 years] (n=947)
Q1	69 μg	72 μg	60 μg	56 μg

[†]Of the 3380 participants included in the analysis, 58 participants with selenium supplement intake were excluded, and data from the remaining 3322 participants were used for subsequent sensitivity analyses

Supplementary Table 3. The relationships of obesity and selenium intake with sex hormone levels after excluded participants with selenium supplements[†]

Outcomes	Variables	Males <12 years		Males ≥12 years		Females <12 years		Females ≥12 years	
		β (95% CI)	*p*	β (95% CI)	*p*	β (95% CI)	*p*	β (95% CI)	*p*
Testosterone levels	Obesity								
	No	Ref		Ref		Ref		Ref	
	Yes	0.2 (-0.06, 0.46)	0.130	-0.30 (-0.47, -0.13)	0.001	0.26 (0.13, 0.40)	<.001	0.10 (0.00, 0.19)	0.051
	Selenium intake								
	≥Q1	Ref		Ref		Ref		Ref	
	<Q1	0.14 (-0.17, 0.45)	0.356	-0.11 (-0.28, 0.07)	0.212	-0.01 (-0.14, 0.12)	0.873	0.06 (-0.09, 0.22)	0.407
Estradiol levels	Obesity								
	No	Ref		Ref		Ref		Ref	
	Yes	0.09 (0.03, 0.16)	0.004	0.19 (0.06, 0.32)	0.007	0.14 (-0.08, 0.36)	0.190	-0.08 (-0.29, 0.14)	0.458
	Selenium intake								
	≥Q1	Ref		Ref		Ref		Ref	
	<Q1	0.02 (-0.06, 0.09)	0.613	-0.05 (-0.15, 0.05)	0.338	0.004 (-0.26, 0.27)	0.975	0.13 (-0.16, 0.43)	0.361
SHBG levels	Obesity								
	No	Ref		Ref		Ref		Ref	
	Yes	-0.69 (-0.82, -0.57)	<.001	-0.61 (-0.69, -0.53)	<.001	-0.73 (-0.85, -0.62)	<.001	-0.61 (-0.76, -0.46)	<.001
	Selenium intake								
	≥Q1	Ref		Ref		Ref		Ref	
	<Q1	-0.16 (-0.32, 0.003)	0.054	0.06 (-0.08, 0.20)	0.405	0.10 (-0.07, 0.26)	0.249	0.01 (-0.16, 0.17)	0.956

SHBG, sex hormone-binding globulin; β, beta values; 95% CI, 95% confidence interval; Ref, reference; Q1, first quartile of the quartiles

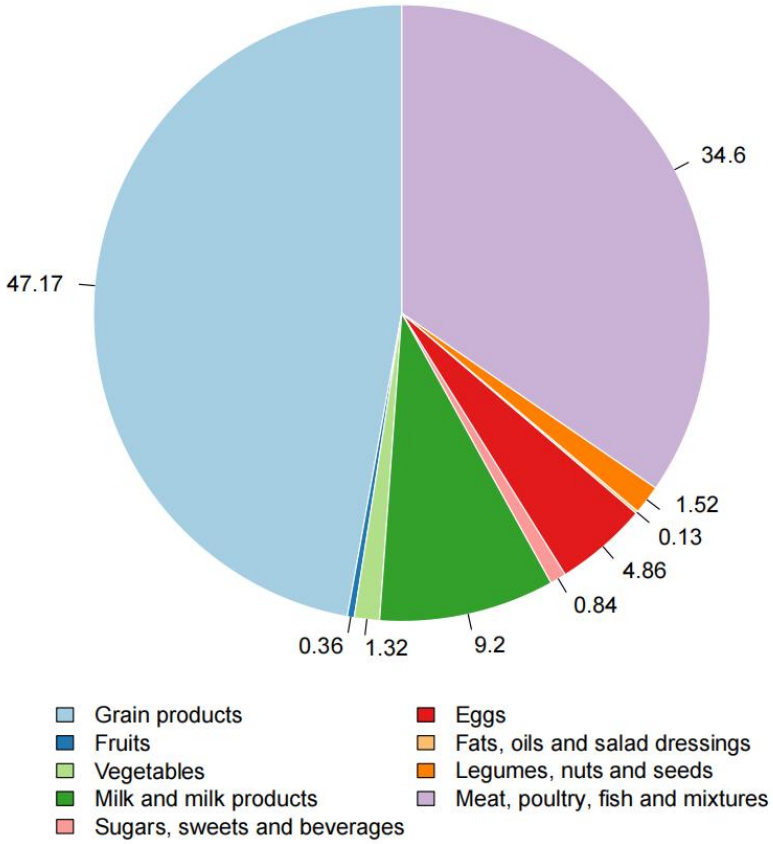
[†]All analyses were multivariable weighted linear regression model adjusted for race, PIR, physical activity, sedentary time, sex hormones use, cotinine, carbohydrate intake, protein intake, total fat intake, time of venipuncture, season of sample collection, vitamin D intake, zinc intake, copper intake, and magnesium intake

Supplementary Table 4. The trend analysis of the effects of obesity and selenium intake on sex hormone levels after excluded participants with selenium supplements[†]

Outcomes and variables	Males <12 years		Males ≥12 years		Females <12 years		Females ≥12 years	
	β (95% CI)	*p*	β (95% CI)	*p*	β (95% CI)	*p*	β (95% CI)	*p*
Testosterone levels								
Selenium ≥Q1 & non-obesity group	-	-	Ref		Ref		-	-
Selenium <Q1 & non-obesity group	-	-	-0.11 (-0.34, 0.11)	0.318	-0.04 (-0.19, 0.11)	0.627	-	-
Selenium ≥Q1 & obesity group	-	-	-0.29 (-0.48, -0.10)	0.004	0.21 (0.07, 0.36)	0.006	-	-
Selenium <Q1 & obesity group	-	-	-0.36 (-0.61, -0.10)	0.008	0.40 (0.12, 0.68)	0.006	-	-
p for trend	-		<0.001		0.007		-	
Estradiol levels								
Selenium ≥Q1 & non-obesity group	Ref		Ref		-		-	-
Selenium <Q1 & non-obesity group	-0.01 (-0.07, 0.06)	0.856	-0.07 (-0.2, 0.05)	0.242	-	-	-	-
Selenium ≥Q1 & obesity group	0.08 (0.01, 0.14)	0.019	0.18 (0.02, 0.34)	0.031	-	-	-	-
Selenium <Q1 & obesity group	0.13 (-0.02, 0.28)	0.077	0.15 (-0.04, 0.34)	0.112	-	-	-	-
p for trend	0.009		0.021		-		-	
SHBG levels								
Selenium ≥Q1 & non-obesity group	Ref		Ref		Ref		Ref	
Selenium <Q1 & non-obesity group	-0.08 (-0.22, 0.05)	0.214	0.08 (-0.04, 0.20)	0.175	0.08 (-0.08, 0.23)	0.312	0.04 (-0.10, 0.17)	0.567
Selenium ≥Q1 & obesity group	-0.66 (-0.75, -0.57)	<.001	-0.62 (-0.72, -0.52)	<.001	-0.75 (-0.87, -0.62)	<.001	-0.60 (-0.76, -0.44)	<.001
Selenium <Q1 & obesity group	-0.85 (-1.12, -0.59)	<.001	-0.51 (-0.65, -0.36)	<.001	-0.6 (-0.88, -0.32)	<.001	-0.60 (-0.87, -0.33)	<.001
p for trend	<0.001		<0.001		<0.001		<0.001	

SHBG, sex hormone-binding globulin; β, beta values; 95% CI, 95% confidence interval; Ref, reference; Q1, first quartile of the quartiles

[†]All analyses were multivariable weighted linear regression model adjusted for race, PIR, physical activity, sedentary time, sex hormones use, cotinine, carbohydrate intake, protein intake, total fat intake, time of venipuncture, season of sample collection, vitamin D intake, zinc intake, copper intake, and magnesium intake



Supplementary Figure 1. Sources of selenium in the human diet