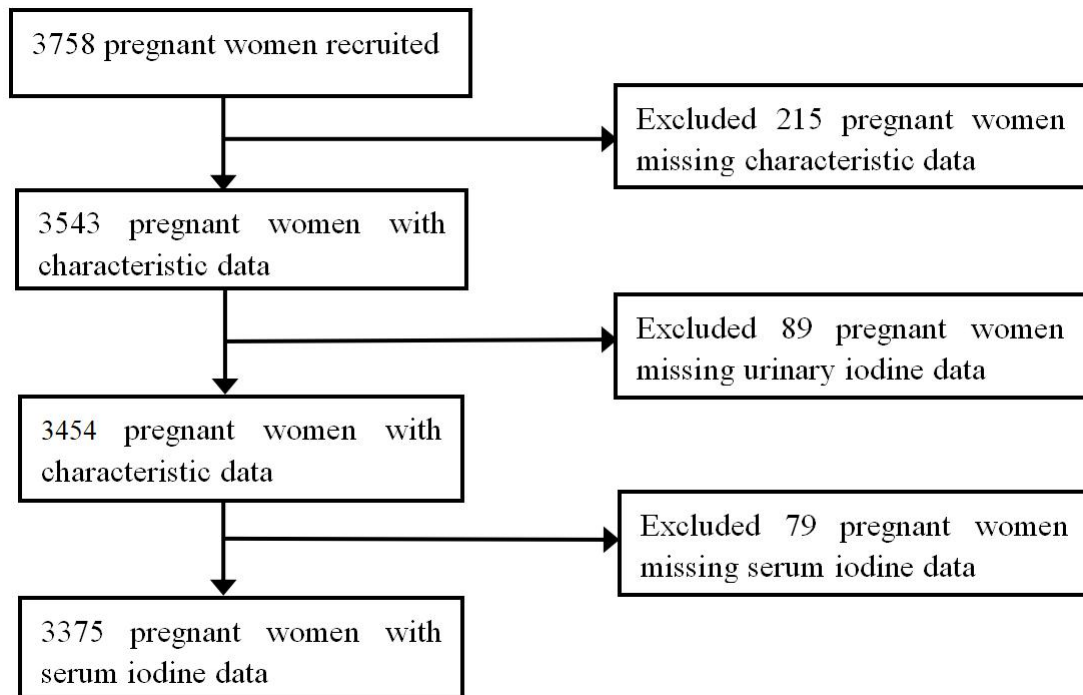


Supplementary Figure S1. The flow chart of the study



Supplementary Table S1.Thyroid function diagnostic criteria

Gestational age	TSH (mIU/L)	FT4 (pmol/L)	FT3 (pmol/L)	TPOAb (IU/mL)	TgAb (IU/mL)
1st trimester	0.03–4.51	11.8–21.0	3.57–5.61		
2nd trimester	0.05–4.50	10.6–17.6	3.55–5.25	≥50	≥40
3rd trimester	0.47–4.54	9.20–16.7	3.52–5.20		

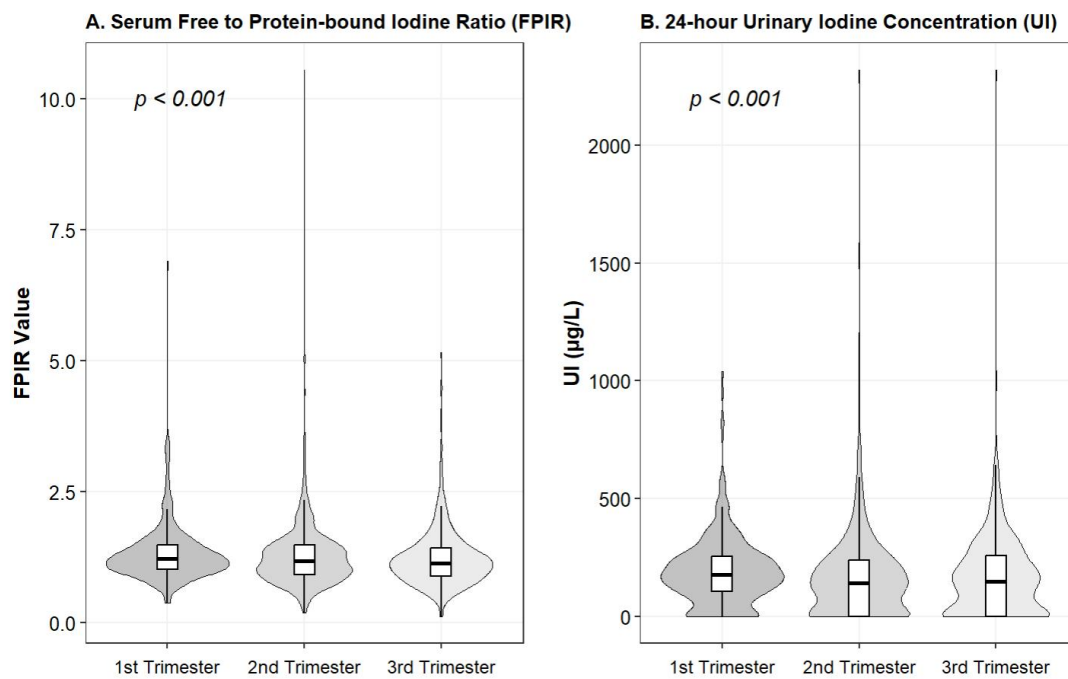
Note: FT3 , free triiodothyronine; FT4 , free thyroxine; TgAb, thyroglobulin antibody; TPOAb, thyroid peroxidase antibody; TSH, thyroid-stimulating hormone

Supplementary Table S2. Baseline characteristics of participants

Variables	Overall	1st trimester	2nd trimester	3rd trimester	<i>P-value</i>
<i>N</i>	3,375	1,001	1,333	1,041	
Age (years)	28.92 ± 4.56	29.29 ± 4.54	28.87 ± 4.61	28.63 ± 4.48	0.005
Time (day)	21.02 ± 10.35	11.07 ± 5.94	19.80 ± 5.88	31.78 ± 7.56	<0.001
Height (cm)	162.21 ± 4.92	161.63 ± 5.02	162.31 ± 4.93	162.62 ± 4.77	<0.001
Weight (kg)	62.08 ± 11.47	59.53 ± 9.70	62.36 ± 11.33	64.19 ± 12.71	<0.001
BMI (kg/m ²)	23.05 ± 4.27	22.30 ± 4.00	23.25 ± 4.07	23.52 ± 4.68	<0.001
UI(μg/L)	192.38 (126.24, 278.93)	194.36 (138.29, 268.39)	183.90 (118.13, 267.10)	196.64 (131.44, 301.64)	0.003
tSI (μg/L)	91.30 (78.70, 104.90)	90.27 (78.30, 104.00)	92.20 (78.87, 105.64)	91.89 (78.62, 105.47)	0.303
nSI (μg/L)	49.89 (41.46, 59.31)	49.79 (42.01, 58.72)	49.93 (41.49, 59.76)	49.88 (40.73, 59.36)	0.779
PSI (μg/L)	40.59 (33.01, 49.46)	39.46 (32.45, 47.81)	40.95 (33.49, 50.05)	40.95 (33.14, 50.26)	0.001
FPIR	1.22 (0.99, 1.51)	1.23 (1.04, 1.52)	1.22 (0.97, 1.52)	1.20 (0.96, 1.50)	<0.001
TSH (mIU/L)	2.02 (1.32, 2.95)	1.96 (1.26, 3.00)	2.00 (1.30, 2.93)	2.10 (1.40, 2.96)	0.092
FT3 (pmol/L)	4.54 (4.12, 5.01)	4.84 (4.45, 5.23)	4.44 (4.11, 4.89)	4.33 (3.94, 4.81)	<0.001
FT4 (pmol/L)	14.20 (12.92, 15.69)	14.83 (13.63, 16.16)	14.05 (12.64, 15.39)	13.90 (12.69, 15.42)	<0.001
Thyroid nodules (n,%)	584(17.30)	242(24.18)	198(14.85)	144(13.83)	<0.001

Note. BMI, body mass index; UI, 24-hour urinary iodine concentrations; tSI, serum total iodine concentration; nSI, serum non-protein free iodine concentration; PSI, serum protein-bound iodine concentration; FPIR, serum free to protein-bound iodine ratio; TSH, thyroid-stimulating hormone; FT3, serum free triiodothyronine; FT4, triiodothyronine; A independent samples t tests, Mann-Whitney U test, and χ^2 test were used. Values are expressed as mean $\pm$ SD or median (IQR).

Supplementary Figure S2. Gestational distribution trajectories of FPIR and UI across different trimesters



Supplementary Table S3. Sensitivity analysis of the association between the FPIR and thyroid nodules risks

Model	Variable	OR (95% CI)	P-value
1st trimester	FPIR Low (Ref)	1.000 (Reference)	
	FPIR Middle	0.985 (0.683-1.421)	0.9351
	FPIR High	1.121 (0.778-1.617)	0.5396
2nd trimester	FPIR Low (Ref)	1.000 (Reference)	
	FPIR Middle	1.791 (1.212-2.647)	0.0035
	FPIR High	1.837 (1.251-2.696)	0.0019
3rd trimester	FPIR Low (Ref)	1.000 (Reference)	
	FPIR Middle	0.82 (0.533-1.261)	0.3663
	FPIR High	0.924 (0.604-1.412)	0.7137
Excluding TAI Positive	FPIR Low (Ref)	1.000 (Reference)	
	FPIR Middle	1.16 (0.908-1.481)	0.2351
	FPIR High	1.327 (1.043-1.688)	0.0212

Note. FPIR, serum free-to-protein-bound iodine ratio; TAI, thyroid autoimmunity; OR, odds ratio; CI, confidence interval. Excluding TAI positive indicates the sensitivity analysis performed by excluding participants who tested positive for thyroid peroxidase antibody (TPOAb $\geq$ 50 IU/mL) or thyroglobulin antibody (TgAb $\geq$ 40 IU/mL).

Supplementary Table S4. Baseline characteristics of pregnant women stratified by regions of China

Variables	Overall (N = 3,758)	Tianjin (N = 1,099)	Shandong (N = 1,438)	Gansu (N = 1,221)	P-value
Age (years)	28.96 ± 4.64	28.71 ± 3.29	28.9 ± 5.21	29.25 ± 4.93	0.016
Time (day)	20.77 ± 10.16	23.41 ± 10.31	22.08 ± 8.61	16.03 ± 10.44	<0.001
Height (cm)	162.29 ± 4.92	162.6 ± 4.61	163.07 ± 4.88	161.1 ± 5.01	<0.001
Weight (kg)	62.36 ± 11.66	57.1 ± 8.89	66.84 ± 13.03	61.81 ± 9.93	<0.001
BMI (kg/m ²)	23.17 ± 4.35	21.58 ± 3.13	25.12 ± 4.75	22.31 ± 3.92	<0.001
UI (μg/L)	189.94 (124.22, 270.15)	189.09 (130.86, 260.23)	178.69 (112.43, 265.45)	201.59 (138.36, 290.45)	<0.001
tSI (μg/L)	89.88 (75.93, 104.23)	96.47 (82.07, 108.49)	83.42 (66.04, 97.24)	93.64 (79.16, 106.64)	<0.001
nSI (μg/L)	48.9 (39.96, 58.71)	52.18 (44.05, 60.93)	43.15 (31.98, 54.14)	51.19 (43.11, 60.58)	<0.001
PSI (μg/L)	39.61 (31.3, 48.81)	41.42 (34.29, 50.47)	37.87 (26.67, 47.21)	39.94 (32.14, 49.27)	<0.001
FPIR	1.22 (1.00, 1.52)	1.23 (1.03, 1.51)	1.15 (0.88, 1.48)	1.26 (1.05, 1.56)	<0.001
TSH (mIU/L)	2.01 (1.32, 2.95)	2.19 (1.4, 3.18)	1.76 (1.17, 2.54)	2.19 (1.44, 3.2)	<0.001

FT3 (pmol/L)	4.53 (4.11, 5)	4.68 (4.25, 5.13)	4.25 (3.92, 4.65)	4.69 (4.26, 5.15)	<0.001
FT4 (pmol/L)	14.2 (12.91, 15.69)	14.39 (13.14, 15.8)	13.76 (12.32, 15.18)	14.44 (13.2, 15.84)	<0.001
Thyroid nodules (n, %)	630 (16.76)	16 (1.46)	233 (16.2)	381 (31.2)	<0.001

Note. BMI, body mass index; FPIR, serum free-to-protein-bound iodine ratio; nSI, serum non-protein free iodine; PSI, serum protein-bound iodine; tSI, serum total iodine; TSH, thyroid-stimulating hormone; UI, 24-hour urinary iodine concentration.