



Pathophysiological Mechanisms and Pattern of Dyslipidaemia Associated with Iodine Deficiency in Pregnancy

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BACKGROUND

Pregnancy simulates a metabolic syndrome-like state and predisposes to iodine deficiency and hypothyroidism through increased iodine renal loss and transplacental transfer to the fetus. Iodine deficiency is thought to predispose to dyslipidemia through elevation of serum TSH. Obesity, dyslipidemia, and hypothyroidism are established risk factors of preeclampsia. Hence, pregnant women with iodine deficiency are likely to be at increased risk of dyslipidemia and preeclampsia.

AIMS

We investigated the pattern of dyslipidemia among preeclamptic and normotensive pregnant women with and without iodine deficiency

METHODS

The pathophysiological mechanisms linking iodine deficiency and dyslipidemia were delineated using bivariate correlations, logistic regression, and exploratory factor analysis of anthropometric, lipid profile, urine iodine concentration (UIC), and thyroid function data from 240 women with preeclampsia and 120 normotensive pregnant controls at term who attended Lomo Medical Centre, Democratic Republic of Congo (DRC).

CONCLUSIONS

Insufficient iodine nutrition in pregnancy was associated with subclinical hypothyroidism and preeclampsia. Among both normotensive and preeclamptic women, subclinical hypothyroidism predisposes to elevated serum oxidized LDL-C and decreased NO. In contrast, insufficient iodine nutrition among preeclamptic women predisposed them to reduced HDL-C and increased serum Triglycerides, which are risk factors for atherosclerosis and cardiovascular disease. Iodine supplementation for women at risk of iodine deficiency in pregnancy, especially those with risk factors for preeclampsia and dyslipidemia, may help avert complications during pregnancy and future cardiovascular disease.

ACKNOWLEDGEMENT

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RESULTS

The mean chronological ages of preeclamptic and normotensive participants were 32.4 ± 6.0 and 34.0 ± 4.5 years ($P = 0.6618$), and the mean gestational ages were 30.8 ± 7.9 and 38.6 ± 2.3 weeks' gestation ($P < 0.001$), respectively, (Figure 1).

Preeclamptic participants had a higher prevalence of insufficient iodine intake ($UIC < 150 \mu\text{g/L}$ and $TSH > 3 \text{ mIU/L}$ (suggestive of hypothyroidism) than normotensive pregnant women Table 1.

Normotensive pregnant women had higher HDL, LDL, and nitric oxide, while preeclamptic participants had higher BMI, oxidized LDL, and triglycerides (Table 2).

Preeclampsia status and $TSH > 3 \text{ IU/L}$ were independent predictors of low serum HDL ($< 40.3 \text{ mg/dL}$). $UIC > 150 \mu\text{g/L}$ was protective against low HDL (Table 3).

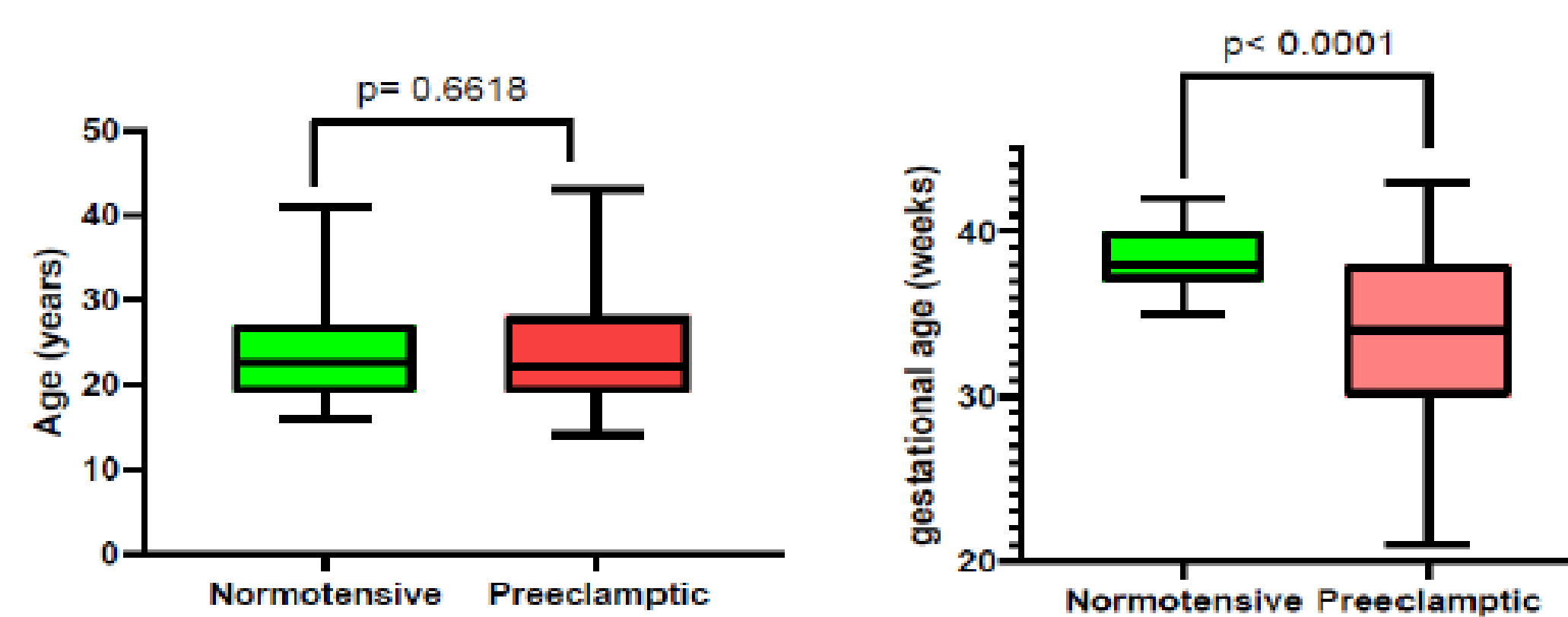


Figure 1: comparison of the chronological and gestational age of the participants

Table 3. Binary logistic regression univariable and multivariable Beta coefficients of the factors associated with HDL cholesterol below 40.3 mg/dL

Variable	Univariable Beta coefficient (95% CI)	P value	Multivariable Beta coefficient (95% CI)	P value
Preeclampsia	1.131 (0.973 – 1.309)	0.102	194.66 (55.15 – 687.09)	< 0.001
TSH > 3 UI/L	1.347 (1.191–1.524)	< 0.001	3.98 (1.89– 8.40)	< 0.001
UIC >150 $\mu\text{g/L}$	0.644 (0.566–0.733)	< 0.001	0.067 (0.032 –0.140)	< 0.001
BMI > 25 Kg/m^2	1.403 (1.212–1.610)	<0.001	1.24 (0.58–2.63)	0.580

TSH: Thyroid stimulating hormone; UIC: urinary iodine concentration; BMI: body mass index

Table 1. Proportions of participants with low UIC ($< 150 \mu\text{g/L}$) or high TSH ($> 3 \text{ mIU/L}$)

Variable	Preeclamptic women n(%)	Normotensive women n(%)	P
UIC $< 150 \mu\text{g/L}$	209 (87%)	32 (27%)	<0.0001
UIC $\geq 150 \mu\text{g/L}$	31 (13%)	88(73%)	
TSH $\leq 3 \text{ mIU/L}$	60 (25%)	55 (46%)	<0.0001
TSH $> 3 \text{ mIU/L}$	180 (75%)	65 (54%)	

UIC- urinary iodine concentration, TSH- Thyroid stimulating hormone

Table 2. The mean and medians of various biomarkers of iodine nutrition status, thyroid function, and lipid profile of the participants

Variable	Preeclamptic women Mean $\pm$ SD or Median (IQR)	Normotensive women Mean $\pm$ SD or Median (IQR)	P
UIC $\mu\text{g/L}$	109.2 $\pm$ 31.1	161.8 $\pm$ 24.1	<0.0001
TSH mIU/L	5.3 $\pm$ 2.6	4.0 $\pm$ 3.2	<0.0001
T3 ng/mL	1.46 $\pm$ 0.40	1.15 $\pm$ 0.28	<0.0001
T4 $\mu\text{g/mL}$	11.21 $\pm$ 2.56	9.70 $\pm$ 2.32	<0.0001
BMI Kg/m^2	25.3 $\pm$ 6.2	22.2 $\pm$ 5.4	<0.0001
HDL mg/dL	21.3 $\pm$ 12.7	52.6 $\pm$ 2.9	<0.0001
LDL mg/dL	45.9 $\pm$ 11.0	56.5 $\pm$ 3.1	<0.0001
OxLDL UI/L	189.0 (98.0, 222.0)	87.5 (21.2, 189.0)	<0.0001
Trigl mg/dL	30.75 (20.00, 102.72)	19.83(19.82, 19.83)	<0.0001
NO $\mu\text{mol/L}$	3.0 (2.0, 7.0)	7.0 (1.0, 32.0)	<0.0001

Trigl- Triglycerides, OxLDL- oxidized low-density lipoprotein

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