

The contribution of Maternal Malaria Exposure and Metabolic Markers to Change in Blood Pressure (BP) in Nigerian Children over the first 3 Years of Life.

Whatmore AJ¹, Farikullah-Mirza J¹, Ayoola OO¹, Omotade O², Butcher I¹, Soran H³, Cruickshank JK⁴, Clayton PE¹

1 Paediatrics & Child Health, University of Manchester, Royal Manchester Children's Hospital, Manchester 2 College of Medicine, University of Ibadan, Nigeria, 3 Institute of Cardiovascular Science, University of Manchester, 4 Cardiovascular Medicine Group, King's College, London

Background

- Malaria is endemic in Nigeria and hypertension is common.
- Exposure to maternal malaria results in smaller babies.
- These babies have lower BP at birth but a greater change (Δ) in BP to 12 months of age.

We now present BP measurements out to 3 years of age.

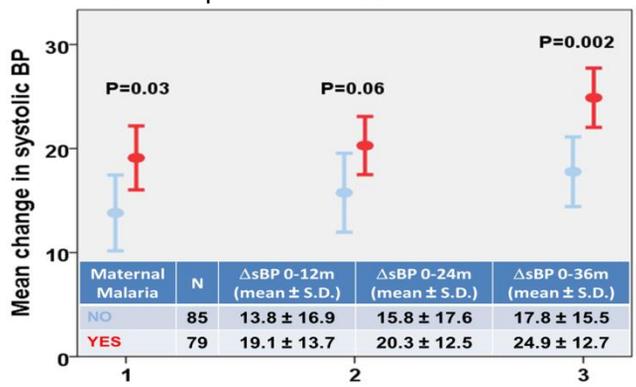
Methods

- Height, weight and BP were measured on 164 babies (75 male: 89 female) at birth, 12, 24 and 36 months.
- Blood samples collected at 12 months were analysed for IGF-I, lipids (triglyceride, high and low density lipoprotein, cholesterol, insulin, adiponectin and leptin).
- The effect of malaria on systolic BP and change in systolic BP (Δ sBP) over 0-12 and 0-36 months was compared by T-Tests.
- Backward regression analysis was used to assess the association of malarial exposure, sex and biochemical variables on Δ sBP over time (variables excluded at $p > 0.1$).

Results

Figure 1. The effect of malarial exposure in utero on change in systolic Blood Pressure (Δ sBP) over time (years).

- Δ sBP over 0-12 months was higher in babies exposed to maternal malaria.
- This effect persisted to 36 months.



Conclusion

- Changes in systolic BP are greater in children exposed to maternal malaria.
- Changes are more pronounced in females than males.
- This increased change in systolic BP is independently associated with lower leptin and LDL levels.

Table 1 Effect of Gender on Δ sBP 0-36m.

- Overall Δ sBP 0-36 months was lower in females (Δ 20mmHg) than males (Δ 23mmHg).
- However, the impact of malaria was more pronounced in females (+8.7mmHg with malaria; $p=0.003$) than males (+5.0mmHg; $p=0.15$).

Gender	Malarial exposure	N	Mean	S.D.	Malarial difference	P value
Male	no malaria	38	20.5	17.7	5.0mm Hg	0.15
	malaria	37	25.5	11.3		
Female	no malaria	47	15.6	13.3	8.7mm Hg	0.003
	malaria	42	24.3	13.9		

Table 2. Factors associated with Δ sBP 0-12m.

- Backward linear regression identified leptin and LDL as negative factors and malarial exposure and HDL as weaker positive factors.

	B Coeff	S.D.	P value
leptin (ng/ml)	-.094	.035	.008
LDL	-4.548	1.702	.009
malarial status	5.260	2.669	.052
HDL	7.938	4.448	.078

Table 3. Factors associated with Δ sBP 0-36m.

- Leptin, gender and LDL were negative factors whilst malarial exposure and IGF-I were positive.

	B Coeff	S.D.	p
malarial status	8.142	2.476	.001
leptin (ng/ml)	-.100	.032	.003
IGF-I (ng/ml)	.099	.045	.029
Gender	-5.351	2.544	.038
LDL	-2.905	1.545	.063