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Metabolic syndrome in a sub-Saharan African setting: Central obesity may be the key determinant.

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To cite this version:

Leopold Fezeu, Beverley Balkau, André-Pascal Kengne, Eugène Sobngwi, Jean-Claude Mbanya. Metabolic syndrome in a sub-Saharan African setting: Central obesity may be the key determinant.. Atherosclerosis, 2007, 193 (1), pp.70-76. 10.1016/j.atherosclerosis.2006.08.037 . inserm-00128606

HAL Id: inserm-00128606

https://inserm.hal.science/inserm-00128606v1

Submitted on 6 Jun 2007

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Table 1: Age adjusted, gender specific rural - urban characteristics of the study population

Clinical and biological variables	WOMEN			MEN		
	Rural	Urban	p	Rural	Urban	P
N	374	513		252	414	
Age (years)	46 (13)	37 (9)	< 0.001	46 (14)	38 (9)	< 0.001
Anthropometric parameters						
Body mass index (kg/m²)	22.1 (0.2)	26.4 (0.2)	< 0.001	21.7 (0.2)	25.1 (0.2)	< 0.001
Waist circumference (cm)	81.2 (0.5)	81.3 (0.4)	0.9	79.6 (0.5)	84.4 (0.4)	< 0.001
Hip circumference (cm)	91.2 (0.5)	103.8 (0.4)	< 0.001	89.2 (0.5)	98.7 (0.4)	< 0.001
Waist hip ratio	0.90 (0.004)	0.78 (0.004)	< 0.001	0.90 (0.004)	0.85 (0.003)	< 0.001
Blood Pressure (mmHg)						
Systolic	112.4 (0.9)	114.8 (0.7)	0.007	118.1 (1.1)	123.3 (0.9)	< 0.001
Diastolic	69.9 (0.6)	74.7 (0.5)	< 0.001	72.6 (0.9)	81.8 (0.7)	< 0.001
Plasma glucose (mmol/l)						
Fasting	4.1 (0.1)	4.2 (0.1)	0.5	4.1 (0.1)	4.3 (0.1)	0.09
2 hour post load	5.1 (0.1)	4.9 (0.1)	0.2	5.2 (0.1)	5.2 (0.1)	0.8
Insulin (µU/ml)						
Fasting*	2.9 (1.0)	5.4 (1.0)	< 0.001	1.9 (1.0)	4.5 (1.0)	< 0.001
2 hour post load*	10.5 (1.0)	24.2 (1.0)	< 0.001	8.2 (1.0)	21.8 (1.0)	< 0.001
Blood lipids						
Total cholesterol (mmol/l)	2.6 (0.04)	3.6 (0.03)	< 0.001	2.5 (0.1)	3.5 (0.04)	< 0.001
Triglycerides (mmol/l)*	0.48 (1.0)	0.47 (1.0)	0.2	0.48 (1.0)	0.53 (1.0)	0.001
HOMA-IR*	0.09 (1.0)	0.20 (1.0)	<0.001	0.06 (1.0)	0.10 (1.0)	<0.001

* Variables logarithmically transformed before comparisons; non transformed values are expressed for easier interpretation.
Data are means (standard errors of the mean).

Table 2: Gender specific rural - urban characteristics (unadjusted prevalences and age adjusted odds ratios) for components of the metabolic syndrome:

Components of the metabolic syndrome	WOMEN					MEN				
	Unadjusted prevalences			Age adjusted ORs		Unadjusted prevalences			Age adjusted ORs	
	Rural	Urban	p	Rural	Urban	Rural	Urban	P	Rural	Urban
Central obesity or obesity										
WHR (M>0.90/W>0.85)	73.5	13.5	<0.001	1	0.07 (0.05-0.1)*	35.7	13.3	< 0.001	1	0.4 (0.3 - 0.7)*
BMI ≥ 30 kg/m²	2.4	20.5	<0.001	1	17 (8 - 37)*	1.2	10.9	< 0.001	1	21 (6 - 74)*
WHO definition	74.1	29.6	<0.001	1	0.2 (0.15 - 0.3)*	35.7	20.3	< 0.001	1	0.8 (0.5 - 1.1)
IDF definition	58.6	49.5	0.008	1	1.0 (0.8 - 1.4)	7.5	12.8	0.03	1	3.2 (1.7 - 6.2) ‡
NCEP-ATP III Definition	22.2	23.8	0.6	1	1.4 (0.97 - 2.0)	2.4	4.4	0.2	1	4.0 (1.3 - 11) †
High blood Pressure										
WHO definition	9.4	8.7	0.7	1	2.0 (1.1 - 3.4) †	14.3	21.6	0.02	1	2.9 (1.7 - 4.7)*
NCEP-ATP III definition	18.3	15.7	0.3	1	1.6 (1.1 - 2.5) †	29.1	35.3	0.09	1	2.0 (1.4 - 3.0)*
IDF definition	19.0	18.5	0.9	1	2.0 (1.3 - 3.0)*	29.4	37.7	0.03	1	2.3 (1.5 – 3.3)*
High glucose										
WHO definition	6.4	3.2	0.02	1	0.7 (0.6 - 1.5)	11.5	6.0	0.02	1	0.8 (0.4 - 1.4)
NCEP-ATP III definition	1.1	1.2	0.9	1	2.1 (0.5 - 8.8)	1.2	1.2	1.0	1	1.6 (0.3 - 8)
IDF definition	1.3	2.5	0.2	1	2.8 (0.9 – 8.7)	1.6	2.4	0.6	1	2.2 (0.6 - 7.9)
High lipids										
High triglycerides	0.3	0.4	1.0	1	1.1 (0.1 - 13)	0.4	1.4	0.3	1	3.6 (0.4 - 32)
High total cholesterol	0.3	2.7	0.005	1	13.0 (2 - 110) †	0.0	2.9	0.006	---	---
≥ 4th quartile HOMA-IR (%)	13.2	37.8	<0.001	1	4.1 (2.8 – 5.9)*	5.8	31.7	<0.001	1	12 (5 - 23)*
IR and/or IGR (WHO)	19.7	38.9	<0.001	1	2.7 (2.0 – 3.8)*	17.1	33.4	<0.001	1	3.7 (2.7 – 3.8)*
Prevalence of metabolic syndrome										
WHO definition	1.8	5.9	0.002	1	6.4 (2.5 - 16) †	1.9	7.3	0.001	1	13 (4 - 39) †
NCEP-ATP III definition	0.0	0.2	1.0	1	---	0.0	0.5	0.5	1	---
IDF definition	0.3	1.5	0.09	1	11 (1.3-100) ‡	0.0	1.2	0.08	1	---

P for difference: †< 0.05 ‡< 0.01 *<0.001. IR: insulin resistance; IGR: impaired glucose regulation (impaired glucose tolerance + impaired fasting glycaemia + diabetes)

Table 3: Standardised beta coefficients of the relation between each component of the metabolic syndrome and 1) waist circumference 2) HOMA-IR after adjustments, and adjusted R^2 associated with the introduction of these terms in the basic models

	Waist circumference			HOMA-IR*		
Model I†	**Standardised β**	**p**	**Δ Adjusted R^2‡**	**Standardised β**	**p**	**Δ Adjusted R^2§**
Systolic blood pressure (mmHg)	0.25	< 0.001	+ 5.7 %	0.10	< 0.001	+ 0.72 %
Diastolic blood pressure (mmHg)	0.26	< 0.001	+ 6.3 %	0.07	0.006	+0.37 %
Fasting plasma glucose (mmol/l)	0.02	0.4	- 0.01 %	0.32	< 0.001	+ 8.00 %
2 hours plasma glucose (mmol/l)	0.045	0.08	+ 0.13 %	0.25	< 0.001	+ 4.78 %
Total cholesterol (mmol/l)	0.12	< 0.001	+ 1.4 %	0.06	0.02	+ 0.23 %
Total triglycerides (mmol/l)*	0.16	< 0.001	+ 4.1 %	0.12	< 0.01	+ 2.04 %
Model II‖						
Systolic blood pressure (mmHg)	0.18	< 0.001	+ 1.16 %	0.04	0.2	+ 0.05 %
Diastolic blood pressure (mmHg)	0.16	< 0.001	+ 0.94 %	0.001	1.0	- 0.06 %
Fasting plasma glucose (mmol/l)	- 0.008	0.8	- 0.06 %	0.33	< 0.001	+ 8.09 %
2 hours plasma glucose (mmol/l)	- 0.013	0.7	- 0.06 %	0.23	< 0.001	+ 4.30 %
Total cholesterol (mmol/l)	- 0.006	0.87	- 0.05 %	0.013	0.6	- 0.04 %
Total triglycerides (mmol/l)*	0.15	< 0.001	+ 1.78 %	0.09	< 0.001	+ 1.13 %

* Variables logarithmically transformed before comparisons
Variation of adjusted R^2 when waist circumference (‡) or HOMA-IR (§) is introduced in the model.
† Model adjusted for age, place of residence, and sex
‖ Model adjusted for age, place of residence, sex and BMI