

Anthropometric thresholds to identify dysglycemia in HIV-endemic African populations

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Background

- 80% of 537 million adults with diabetes worldwide live in low- and middle-income countries¹
- In Sub-Saharan Africa, more than half of those with type 2 diabetes are undiagnosed¹
- Improved screening and diagnostic algorithms are needed²

Objectives

- To compare discriminatory capacity of anthropometrics for detection of dysglycemia
- Assess validity of traditional thresholds in a South African population
- Derive new thresholds to augment diagnostic validity of diabetes screening in South Africa

Methods

- Data from Vukuzazi Study, a community-based population cohort that enrolled adults in rural South Africa (n=17,846)
- Primary outcome:** Dysglycemia, defined as HbA1c \geq 6.5% or taking diabetic medications
- Primary explanatory variables:** body mass index (BMI), waist circumference (WC), waist-hip ratio (WHR)
- Inverse probability sampling weights were used to account for study non-attendance and estimate population-level characteristics
- Constructed ROC curves, stratified by sex, and performed weighted parametric regression analyses to compare anthropometric measures for detecting dysglycemia
- Sensitivity, specificity, and positive predictive values generated for traditional thresholds. New derived thresholds for the South African population were constructed
- Fit logistic regression models for dysglycemia and two-way interaction terms including sex, age, and HIV serostatus

Conclusions

Waist circumference outperformed BMI and waist-hip ratio for the detection of dysglycemia in rural South Africa

Traditional WC thresholds for screening women (>80cm) were reasonable but had poor sensitivity in men (>72cm). Increasing the threshold for men to >79.5cm increased the sensitivity, while maintaining adequate positive predictive value.

Results

Table 1. Estimated weighted baseline characteristics

Characteristic	Men N= 5,735	Women N=12,111
Age (years)	33.6 ± 15.1	40.2 ± 19.9
Dysglycemia (%)	4.4	10.1
Living with HIV (%)	24.6	40.2
Mean BMI (kg/m ²)	23.3 ± 4.2	29.4 ± 8.1
Mean Waist Circumference (cm)	79.3 ± 10.5	90.4 ± 18.2
Mean Waist Hip Ratio	0.856 ± 0.08	0.843 ± 0.11

Table 2: Traditional thresholds applied in our study population

Threshold Criterion	Men			Women		
	Sens. (%)	Spec. (%)	PPV	Sens. (%)	Spec. (%)	PPV
Body Mass Index (kg/m²)						
WHO [†] \geq 25	74	72.8	13.6	WHO [†] \geq 25	91	34.4
WHO [‡] \geq 30	41.3	90.7	20.4	WHO [‡] \geq 30	72.5	59.4
Waist Circumference (cm)						
IDF [‡] >94	53.5	88.5	21.1	IDF [‡] >80	91.1	31.3
NHLBI [§] >102	33.4	94.5	25.9	NHLBI [§] >88	84.1	47.6
Waist Hip Ratio						
WHO [¶] > 0.9	61.5	74.6	12.2	WHO [¶] > 0.85	75.2	56.2

[†] WHO thresholds for overweight (\geq 25 kg/m²) and obese (\geq 30 kg/m²)

[‡] International Diabetes Federation thresholds for women (>80 cm) men (>94 cm)

[§] NHLBI thresholds for women (>88 cm) and men (>102 cm)

[¶] WHO waist-hip ratio thresholds for women (>0.85) and men (>0.9)

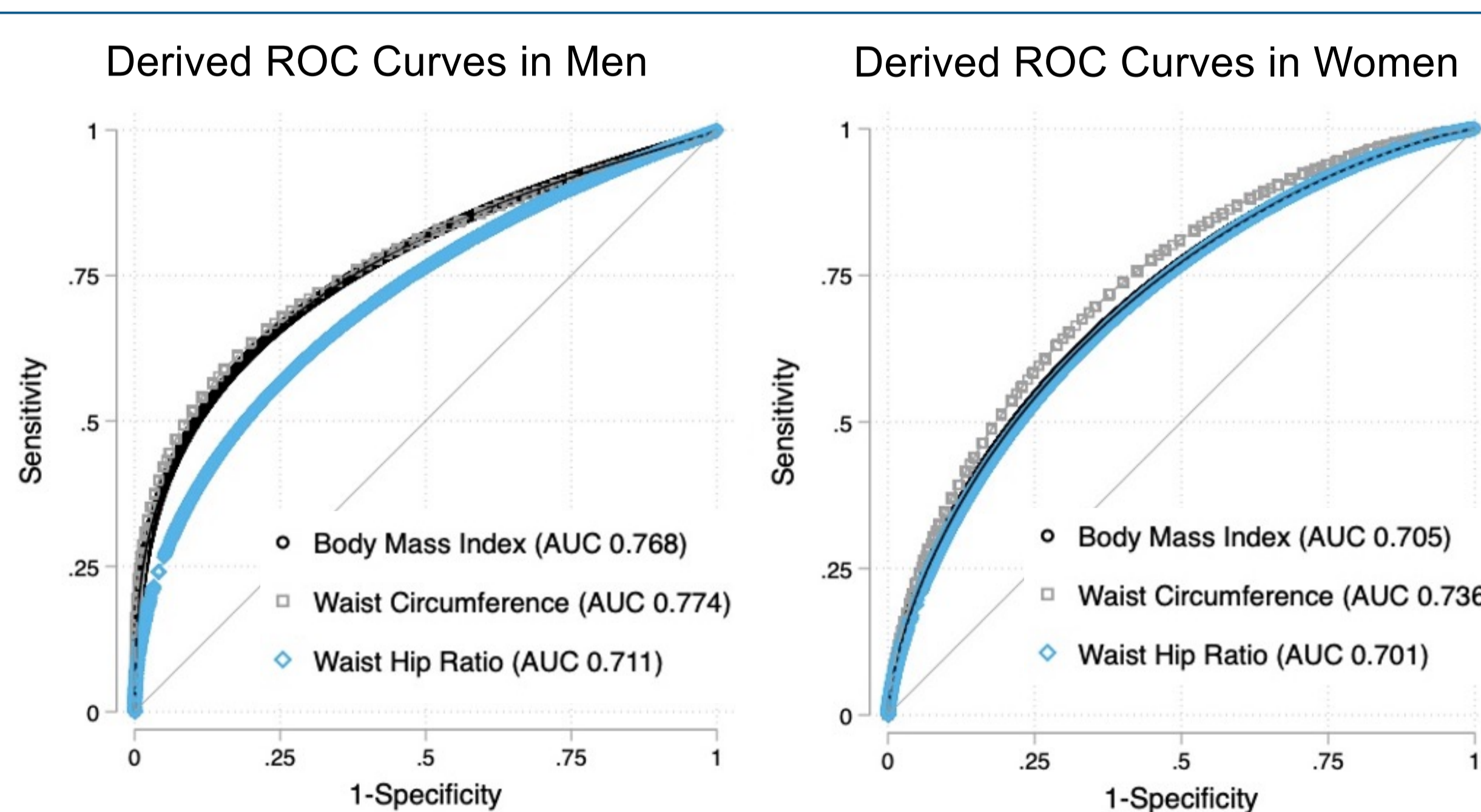


Table 3: Derived thresholds by waist circumference

Men				Women			
Threshold Criterion	Sens. (%)	Spec. (%)	PPV	Threshold Criterion	Sens. (%)	Spec. (%)	PPV
Sens 90%				Sens 90%			
> 72 cm	90.4	26.9	6.7	> 81 cm	90.5	33.4	15.2
Spec 60%				Spec 60%			
> 79.5 cm	78.0	61.1	10.4	> 93 cm	75.1	60.0	19.9
Youden Index				Youden Index			
> 85.8 cm	69.4	75.3	13.9	> 97.8 cm	67.6	69.2	22.5

