Associations between objectively measured physical activity and metabolic syndrome in African-origin adults from five countries

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27 September 2024

Modeling the Epidemiologic Transition Study (METS)

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Metabolic syndrome [1-5]

Metabolic syndrome is a clustering of risk factors

- 2-to-3-fold increased risk of T2D
- 1.5-to-2-fold increased risk of CVD

- Of all NCD deaths, 77% are in low- and middle-income countries
- CVD and T2D (along with cancers and CRD) account for > 80% of all premature NCD deaths

Background

1. Physical activity – a modifiable risk factor [6-9]
   Existing research primarily focused on long-term supervised exercise interventions [10,11]

2. Self-reported MVPA which is linked to metabolic syndrome is often overestimated and misinterpreted [12-14]

3. Majority of studies exploring populations of European descent. LMICs have a higher burden of NCDs [15]

✓ Explore the association between **daily objectively-measured physical activity** and metabolic syndrome in **five diverse African-origin populations** spanning the **epidemiologic transition**, including three **LMICs**

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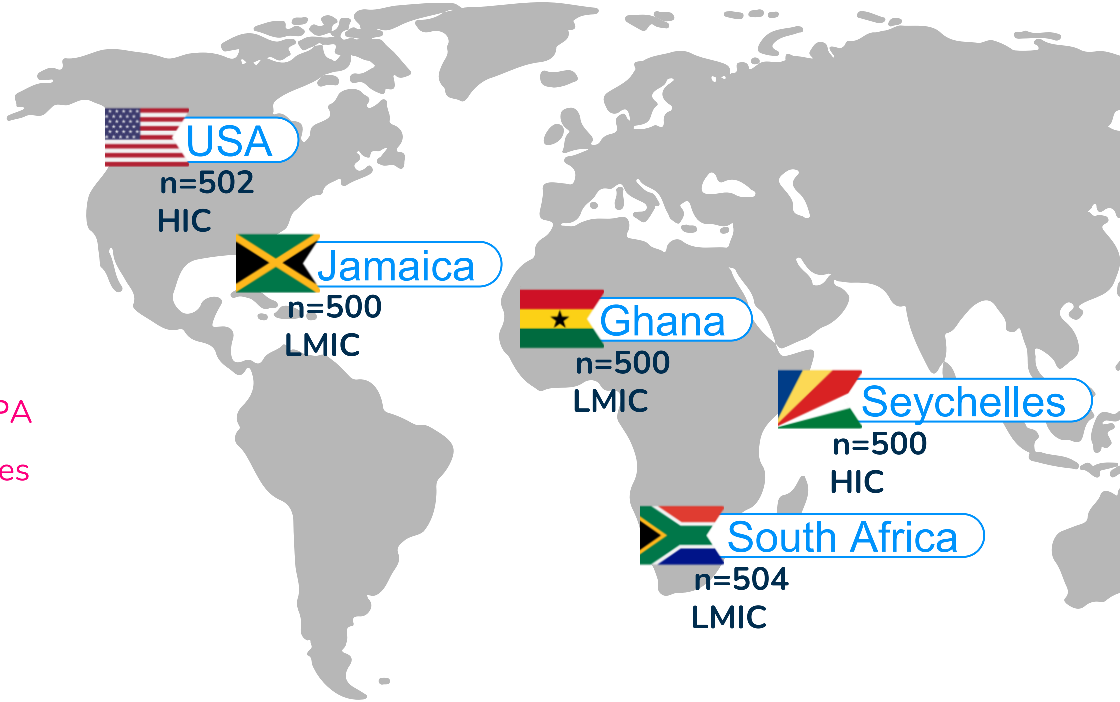
Methods

Modelling the Epidemiologic Transition Study (METS)

Recruitment between 2010 - 2011
Population-based samples appropriate to each country
N = 2506

Data collection

- Clinical and laboratory measures
- Anthropometrics
- 7-days of accelerometer-measured PA:
  - in mean minutes per day used to obtain MVPA
  - ≥ 30 MVPA duration = Meeting PA guidelines



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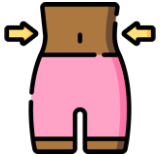
Characterizing metabolic syndrome

Characterised by presence of any three of five risk factors

Using the Harmonizing Criteria by Alberti [16]



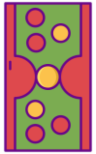
↑ Waist circumference

Population of Sub-Saharan origins
≥ 94cm for men
≥ 80cm for women

Jamaican and US populations
≥ 102cm for men
≥ 88cm for women

↑ Triglycerides

Cutoff point of ≥ 150 milligrams per decilitre (mg/dL) (8.3mmol/L)



↓ HDL-C

Cutoff point of < 40 mg/dL (2.2 mmol/L)

Or current drug treatment for reduced HDL-C

↑ Blood pressure

Cutoff points of
≥ 130 Hg systolic and/or
≥ 85 Hg diastolic

Or current treatment for hypertension

↑ Fasting glucose

Cutoff point of ≥ 100 mg/dL (5.6 mmol/L) all sites except Ghana

Ghana cutoff of ≥ 140 mg/dL (7.8 mmol/L)

Or current treatment for high glucose

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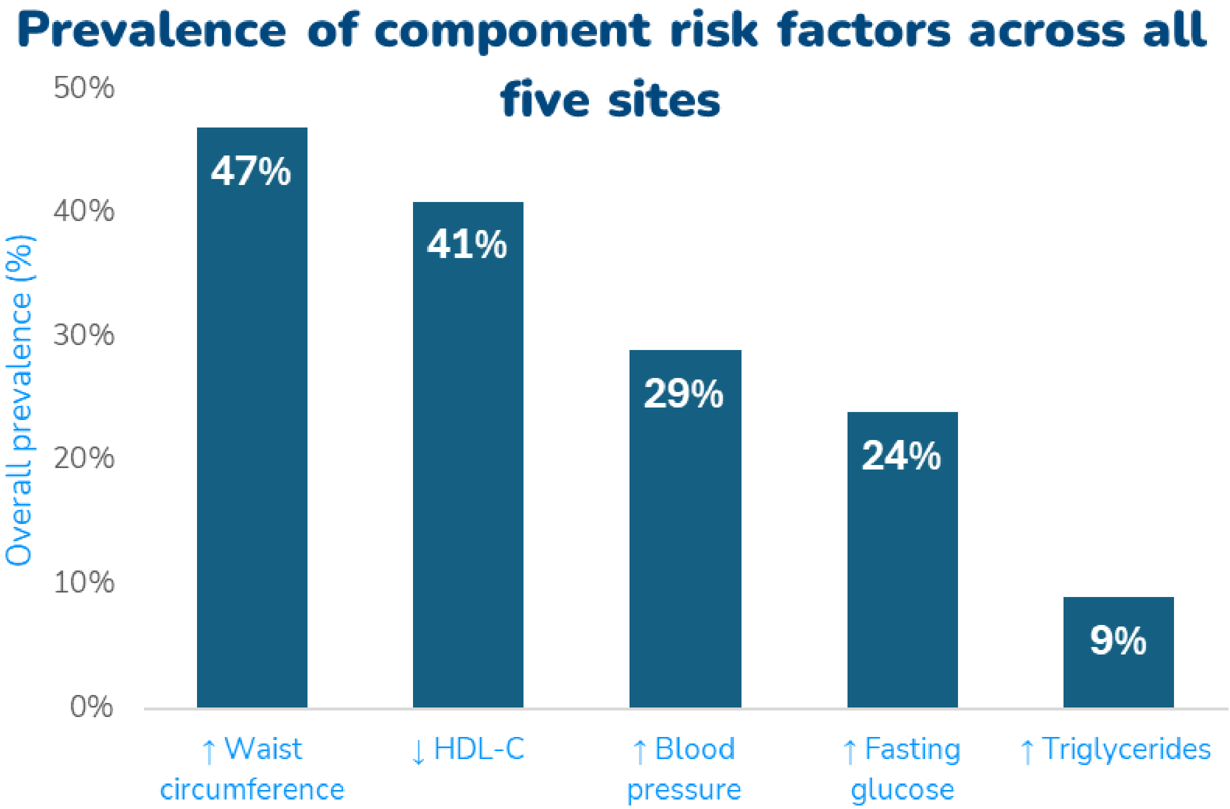
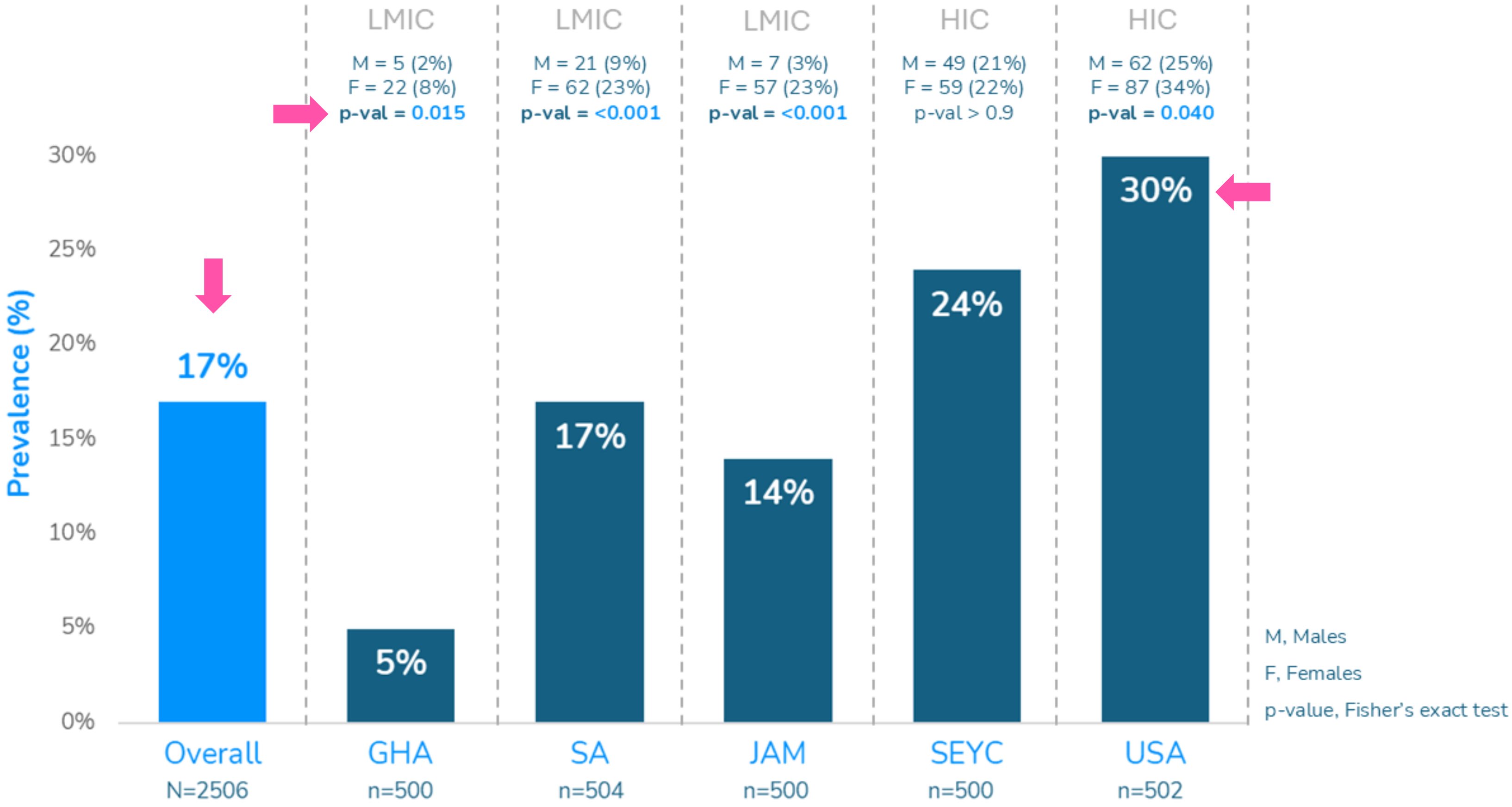
Results



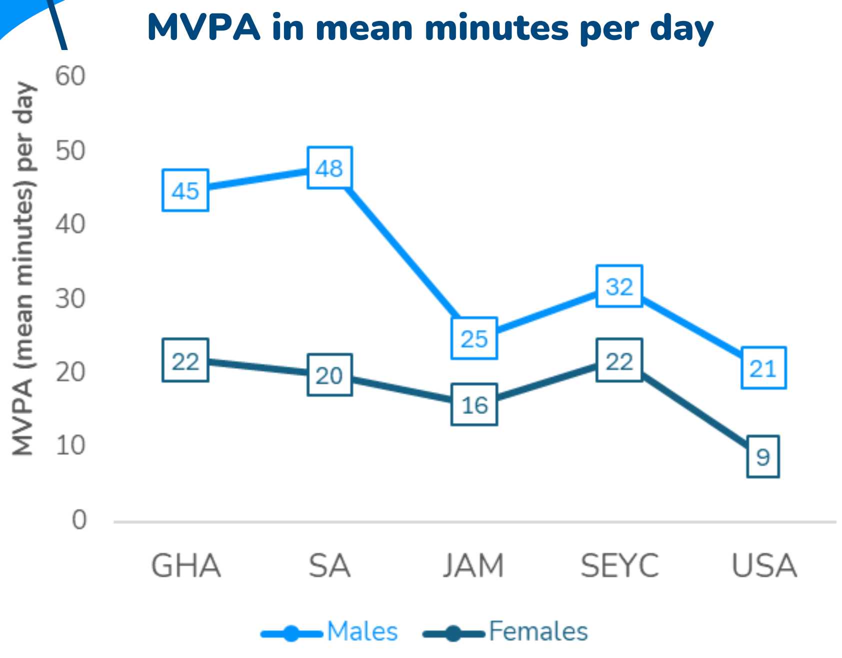
Males
n = 1 339, 53%
Median age (IQR)
35 (30-40) years

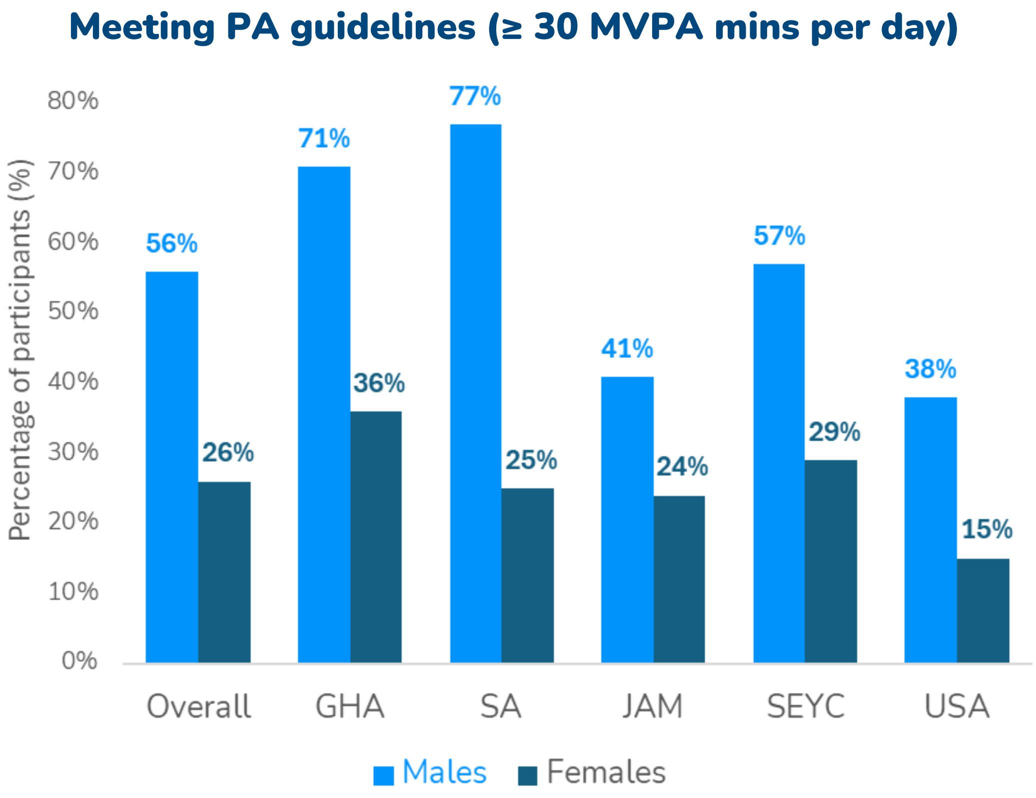
Females
n = 1 167, 47%
Median age (IQR)
35 (29-40) years

Prevalence of metabolic syndrome



Physical activity





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Association between PA and MetS

MVPA, was not significantly associated with metabolic syndrome, adjusted for lifestyle and basic demographics.

Table 1. Logistic regression model showing the association of MVPA adjusted for lifestyle factors in individuals with and without metabolic syndrome across all five sites.

	Overall	No metabolic syndrome	Metabolic syndrome	Model 1 MVPA (mins)	Model 2 Meeting PA guidelines
	N(%)	n (%)	n (%)	aOR[1] (95%, CI), p-value	
Total for all five sites	2 506	2 075 (83%)	431 (17%)		
MVPA (mean), mins	24 (11, 41)	26 (13, 43)	17 (7, 29)	1.00 (0.99, 1.00), 0.13	–
PA guidelines met (≥ 30 mins per day)	928 (37%)	828 (40%)	100 (23%)	–	0.76 (0.57, 1.01), 0.064

[1] Adjusted for alcohol use, smoking status and sleep duration), age, sex, BMI and body fat percentage.
MVPA, moderate-to-vigorous physical activity; PA, physical activity; CI, confidence interval

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Challenges and future directions

Cross-sectional biological and health data of sub-analysis presented
Different dietary patterns across five sites not adjusted for

Future studies should consider

- longitudinal study design
- diet, medial conditions and biomarkers for T2D and CVD

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Key insights

- In our study, PA was not associated with MetS
- Urbanization may be influential on MetS prevalence
- Higher prevalence of MetS among females
- Urgent need for targeted interventions aimed at women

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Acknowledgements

Thank you to the participants in the study, study staff and the following co-authors and contributors:

- Prof. Lara Dugas
- Larske Soepnel
- Candice Choo-Kang
- Dr. Pascal Bovet
- Bharathi Viswanathan
- Dr. Kweku Bedu-Addo
- Prof. Jacob Plange-Rhule
- Prince Oti Boateng
- Kingsley Apusiga
- Oscar Akunor Dei
- Prof. Terrence E. Forrester
- Marie Williams
- Prof. Estelle V. Lambert
- Dr. Dale Rae
- Nandipha Sinyanya
- Dr. Brian T. Layden
- Dr. Julia H. Goedecke
- Dr. Jack A. Gilbert
- Dr. Amy Luke

Funding: NIH grants R01-DK070853 (Luke), R01-DK111848 (Dugas) and R01-HL148271 (Dugas) and the AXA Research Fund (Dugas)

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