Pooled analysis from sub-Saharan African countries to define blood pressure norms and identify regional differences

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PEDIATRIC HYPERTENSION (C HANEVOLD, SECTION EDITOR)

Detecting and Managing Childhood Onset Hypertension in Africa: A Call to Action

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Purpose:

- Report the recent prevalence of childhood hypertension across Africa.
- Discuss the impact of risk factors and/or interventions associated with childhood BP; and
- current challenges and priorities surrounding childhood hypertension across Africa.

Prevalence of Childhood Hypertension in Africa

- **<u>Underreporting:</u>** 66 studies, 15 countries reported on BP in children & adolescents
- **37.9%** from Southern Africa, **23/25** from South Africa
- Hypertension prevalence (2018-2022): 0% to 38.9% (Egypt & Uganda)
- Prehypertension prevalence: 2.7%-50.5% (Egypt)
- **<u>Adiposity</u>** or body weight in early life → BP
- DRC (**n=7523**)-1st to use BP percentiles (50, 90 and 95) for age & height

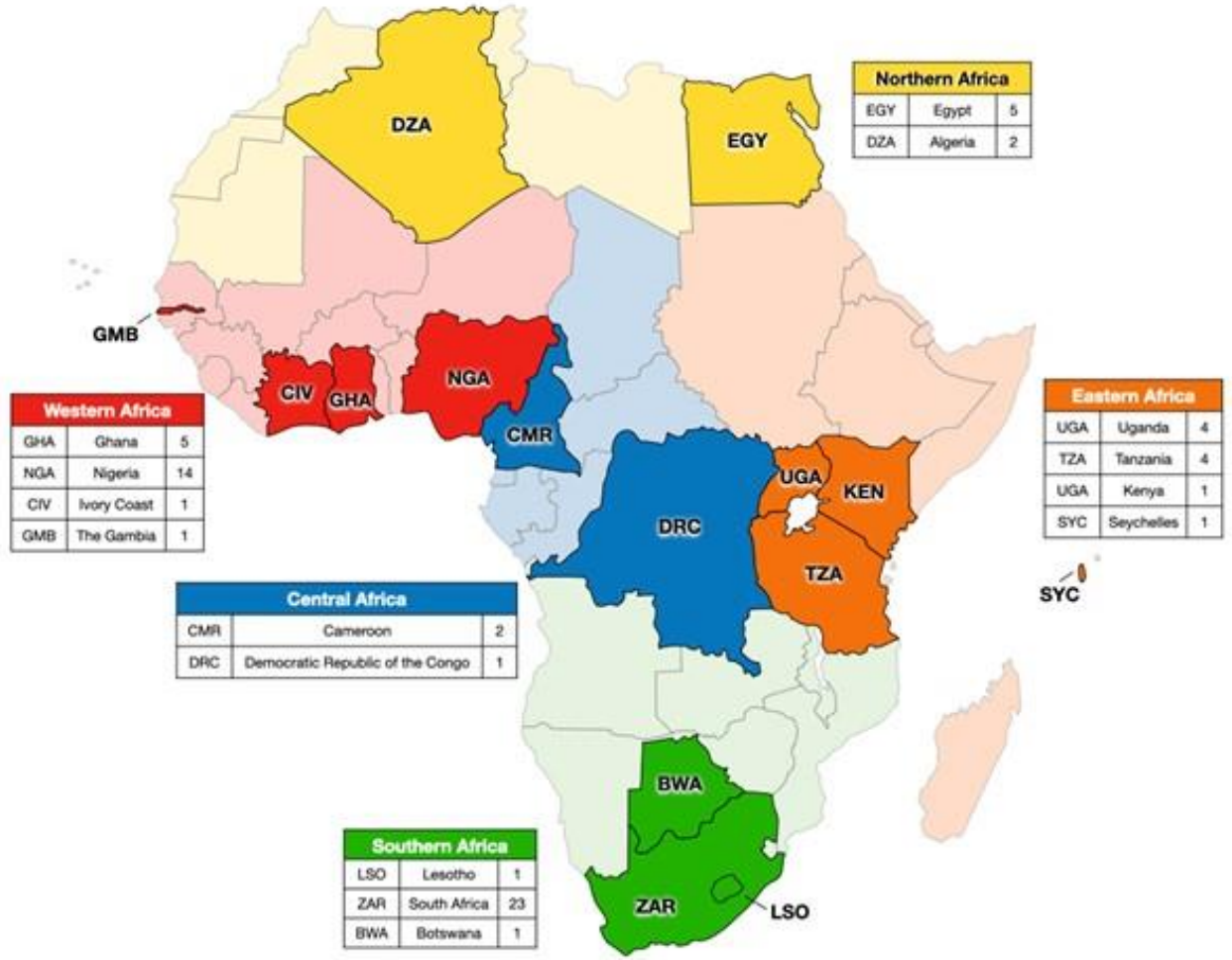


Fig. 1 Schematic illustration of the number of studies highlighting the prevalence of hypertension, pre-hypertension and elevated blood pressure across the African continent within the last 5 years

Contributing Factors to Childhood Hypertension

Risk factor	Key observations
Overweight/ Obesity	• Majority of the studies→ adverse association with pre-hypertension and/or hypertension • **2.2% to 33.0%-**highest prevalence being reported in South Africa • Largest study was a national cross-sectional study from Ghana, n= 3165
Physical inactivity	• ↑ in South Africa (39%, self-reported), 8-13 years • High sport participation linked to ↓ adiposity & hypertension risk • In Ghana, a physical activity intervention ↓ overweight/obesity risk
Diet	• **+** extra salt to a meal ↑odds →developing hypertension by 36.0% & 16.0% for pre-hypertension • ↑**Sodium and/or** ↓**potassium** than recommended levels • **39.0%** of adolescents with hypertension + table salt to prepared food • Urbanisation→ unhealthy dietary habits (↑ salt and fat intake)
Early life and maternal risk factors	• Hypertension, hypertensive disorders of pregnancy, hyperglycaemia, smoking, alcohol use, overweight/obesity, physical inactivity, and low socioeconomic status, micronutrient deficiencies • Low birth weight↔ high BP and poor kidney function • Gestational age, early term delivery, shorter breastfeeding periods

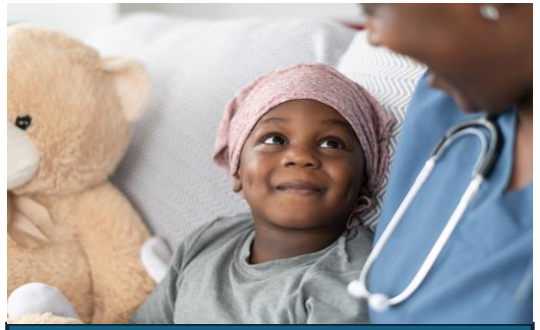
Methodological Issues

Limited access to and affordability of paediatric validated BP devices & accredited calibration centres

Lack of African specific nomograms for childhood and adolescent BP

Non-existence of proper treatment algorithms for the population diversity on the African continent

Methodological Issues



The patient

- Language
- Age
- Body size
- Mood
- Culture
- Illness/ circumstances in which BP is measured

The observer

- Managing young children
- Device preference
- Deviations from standard protocols
- Working environment

The device

- Validation- under/overestimation
- Regular calibration
- Cuff size and placement
- 24-h ABPM, home BP monitoring, cuffless measurements
- Access & connectivity

The protocol & guidelines

- Lack of nomograms & application of international guidelines
- Resource constraints
- Number of clinic visits &
- Measurements for diagnosis
- Resting period & measurement intervals
- Human errors

Current Challenges and Priorities

Challenges

- Applicability of international BP nomograms & proposed paediatric hypertension guidelines in Africa uncertain- **underrepresentation in nomograms**
- No recent data informing the use of antihypertensive agents in children and adolescents in Africa
- No appropriate data to assess the long-term effectiveness of treatment of high BP in children or adolescents with pharmacological interventions

Priorities

- Define BP nomograms in Africa and to determine the usefulness of international paediatric hypertension guidelines in the African region.
- Expert groups from all parts of the world should aim to forge globalised guidelines for the detection and management of primary hypertension in paediatrics.
- Africa-centered collaborative efforts to intensify paediatric hypertension studies is urgently needed to address this knowledge gap on the African continent.

Pooled analysis childhood blood pressure data in sub-Saharan Africa

- **Aim:** to define BP norms and identify regional differences.
- **Outcome**-developing African-specific nomograms for childhood BP and body composition.
- **Target population**
  - 3-18 years of age
  - population-based data and not clinical patients with underlying cardiovascular disease

Variables Included in the Pooled analysis

Demographic data

- Aged (years)
- Sex (0=female; 1=male)
- Ethnicity
- Rural/peri urban/urban area

Anthropometric & BP data

- Body height (cm)and weight (kg)
- Office/clinic BP (mmHg)-at least 2 measurements on the right arm
- Office/clinic heart rate (bpm)

Device details

- Manufacturer
- Model

Progress to date…

- Some countries already shared data
- Data transfer agreements in progress
- More global collaborations
- https://www.bips-institut.de/en/biomarkers4pediatrics.html

Biomarkers4Pediatrics - International Multicohort Pediatric Biomarker Collaboration

Biomarkers4Pediatrics is a recently established initiative that brings together international population-based studies in children and adolescent populations with biomarkers and anthropometric and physiological measurements collected. By pooling data from various pediatric populations across the world, we aim to address important research questions advancing primary prevention and clinical decision making in global pediatric health.

One of our initial objectives is to develop a global definition of pediatric metabolic syndrome.

Biomarkers 4Pediatrics

Conclusion

- Major barriers to tackling childhood hypertension -limited access to healthcare, inadequate resources for screening & diagnosis, & poor awareness
- Research, resources, and policies need to be dedicated to addressing this burgeoning public health concern
- Collaboration is key to addressing the growing and neglected burden of childhood hypertension in Africa

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Thank you

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