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RESEARCH LETTER

Africa on the Global Stage: Analyzing 30 Years of African-Led Clinical Trials in Cardiovascular Medicine

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Most clinical trials in cardiovascular medicine are conducted in developed countries by well-funded academic institutions. Africa, home to 1.4 billion people, only contributes to ≈2% of published/registered clinical trials.[1] In light of the increasing burden of cardiovascular diseases in the continent,[2] we conducted the present analysis to evaluate African-led clinical trials in cardiovascular medicine over the past 3 decades and analyze its visibility, limitations, and funding sources.

A comprehensive PubMed search was conducted to retrieve eligible trials. We included trials in which planning (eg, trial design, protocol development, and risk assessment) and management activities (handling collected data, data, and safety monitoring board activities, etc) were conducted in African centers. Data on the location of these activities was collected manually by 2 independent authors who reviewed the methods and the published protocol of every trial (if available). The data that support our findings are available from the corresponding author on reasonable request. Approval from an institutional review board was not required.

Based on this criterion, a total of 179 trials were published from African countries between 1990 and 2019; 147 (82.1%) of these trials originated from 3 countries: Egypt (n=60), South Africa (n=55), and Nigeria (n=32). Of the 54 African countries, 37 (68.5%) had not contributed to any published trial over the study period. On the upside, the number of African-led trials has increased in the past decade; 1990 to 1999 (n=41), 2000 to 2009 (n=30), and 2010 to 2019 (n=108). In parallel, African centers have contributed to the implementation of 45 multinational trials in cardiovascular medicine within the same time frame (1990–2019). The most frequent contributor was South Africa (n=16).

The dominant themes of investigation were cardiovascular disease prevention (n=90), ischemic heart disease management (n=35), as well as heart failure/transplantation (n=22); Figure. In terms of the assessed primary outcomes, the most common were biochemical/cardiometabolic (n=58; for example, troponin-I, and lipid profile), followed by hemodynamic outcomes (n=51; eg, arterial pressures). Clinical (n=32; eg, major adverse cardiovascular events) and patient-related outcomes (n=24; eg, quality of life and cost-effectiveness) came next.

In general, African trials often had small sample sizes (median, 59 [interquartile range (IQR), 31–100] individuals), few participating centers (only 22 trials (12.3%) were multicenter; median, 5 [IQR, 2–17] centers), and short follow-up periods (median, 12 [IQR, 8–25 weeks]). To compare the impact of published trials from different countries, we calculated the H-index of trial-related publications for each country. According to this measure, publications from South Africa had the highest impact score, followed by publications from Egypt and Nigeria. Only 95 trials (52.5%) were published open-access. The median journal impact factor was 3.4 (IQR, 2.6–12), and median citation count on Google Scholar was 22 (IQR, 12–51).

Only 163 of the overall 179 trials provided sufficient data for risk of bias assessment by the Cochrane ROB 2.0 tool.[3] Overall, 4 (2.5%) trials had a low risk of bias, while 79 (48.5%) and 80 (49%) studies had unclear and

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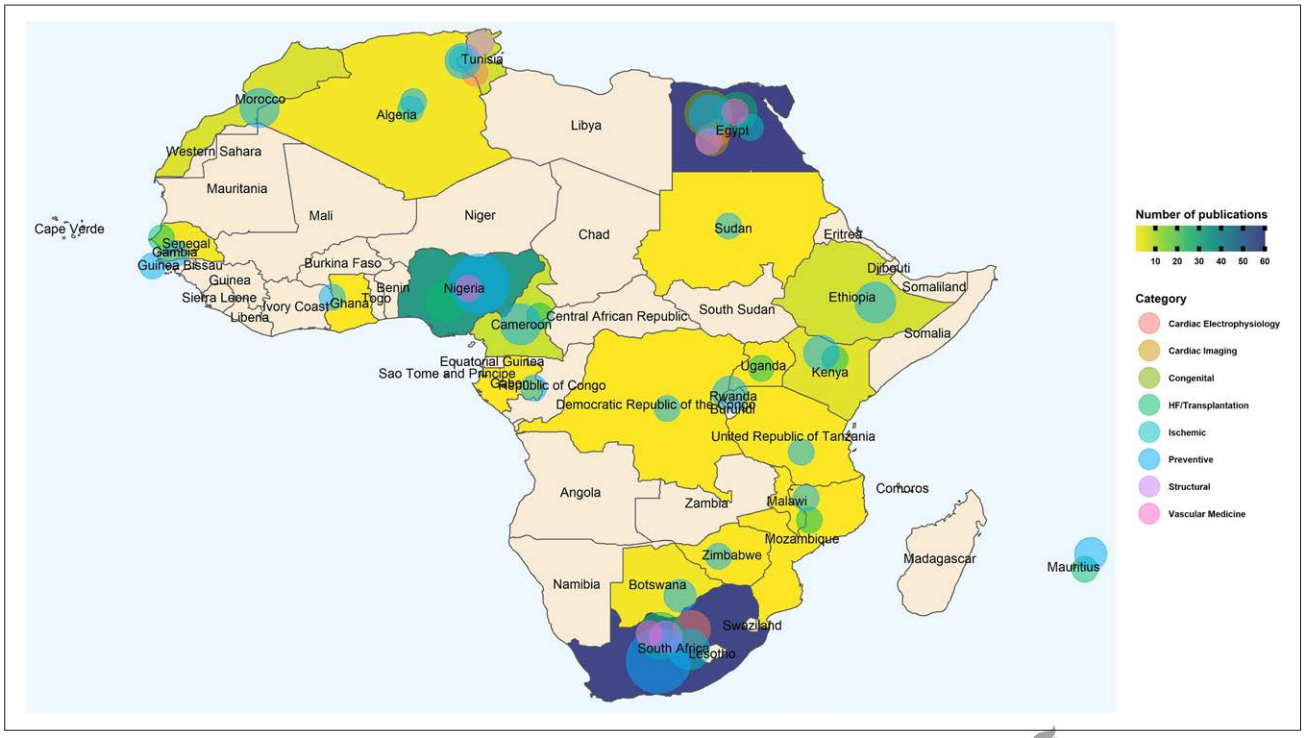

Figure. Regional variation in the output of cardiovascular clinical trials.
The country color represents the total number of publications. The circle size represents the number of publications for each category.

high risks of bias, respectively. The most common limitations were related to the randomization process and outcome reporting (89% had an unclear risk of bias due to unavailability of data on a prespecified analysis plan).

Noteworthy, 91 trials did not disclose whether they received funding and 20 disclosed no external funding. Funding for the other 68 trials came from private (35.7%), academic (28.6%), governmental (28.6%), and nongovernmental sources (7.1%). Of the 179 trials included, 54 (30.2%) were performed in collaboration with another African (n=42) or non-African center (n=33). The most common non-African collaborations were with European (n=29) and North American centers (n=15).

In summary, our results describe the low level of African-led clinical trial output in the form of publications. One factor could be the small number of cardiologists in the continent. Recent estimates suggested that only 2000 cardiologists practice in Africa (in contrast to 25 000 cardiologists in the United States).[4] This highlights the need to increase training for cardiovascular researchers that may need to move beyond cardiologists (eg, research methodologists). Another key finding was minimal funding for African trials. Only a few African countries are spending ≈1% of their budget on research and development as per the African Union recommendations.[5] Therefore, increasing local government spending on clinical research may be valuable, but this needs to be balanced against other priorities, such as access to health care and public health programs. In line with the observed epidemiological shift towards noncommunicable diseases in Africa and the current focus on disease prevention,[2] research spending should reflect the local disease burden.

Although initiatives, such as the Clinical Trials Community online platform and the Pan-African Clinical Trials Registry are steps in the right direction, multifaceted interventions are still warranted to strengthen Africa's research infrastructure (eg, more clinical research sites, standardized regulatory frameworks, and large-scale adoption of electronic medical records), foster Africa's international collaborations, and improve the visibility of African science (eg, enhancing open-access publishing and institutional partnerships). More groundwork research is needed to better characterize the barriers facing African clinical research and draw tailored recommendations for every country.

ARTICLE INFORMATION

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REFERENCES

1. Taylor-Robinson SD, Spearman CW, Suliman AAA. Why is there a paucity of clinical trials in Africa? *QJM An Int J Med*. 2021;114:357–358. doi: 10.1093/qjmed/hcab010
2. Roth GA, Mensah GA, Johnson CO, Addolorato G, Ammirati E, Baddour LM, Barengo NC, Beaton AZ, Benjamin EJ, Benziger CP, et al; GBD-NHLBI-JACC Global Burden of Cardiovascular Diseases Writing Group. Global Burden of Cardiovascular Diseases and Risk Factors, 1990–2019: Update From the GBD 2019 Study. *J Am Coll Cardiol*. 2020;76:2982–3021. doi: 10.1016/j.jacc.2020.11.010
3. Sterne JAC, Savović J, Page MJ, Elbers RG, Blencowe NS, Boutron I, Cates CJ, Cheng H-Y, Corbett MS, Eldridge SM, et al. RoB 2: a revised tool for assessing risk of bias in randomised trials. *Br Med J*. 2019;366:l4898. doi: 10.1136/bmj.l4898
4. Ozkan J. A snapshot of cardiology in Africa. *Eur Heart J*. 2018;39:2128–2129. doi: 10.1093/eurheartj/ehy263
5. Simpkin V, Namubiru-Mwaura E, Clarke L, Mossialos E. Investing in health R&D: where we are, what limits us, and how to make progress in Africa. *BMJ Glob Health*. 2019;4:e001047. doi: 10.1136/bmjgh-2018-001047