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Knowledge generation via publications on hypertension prevalence in population-based studies conducted in sub-Saharan Africa over 30 years: 1990 - 2019

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Hypertension prevalence in sub-Saharan Africa (SSA) is high, is rising and has emerged as the most prevalent cardiovascular disease risk factor. Research is required to provide evidence-based findings to prioritise hypertension prevention and control. This systematic review aims to describe the distribution of and trends in scientific outputs on hypertension prevalence in population-based studies in SSA over the last three decades. Relevant English-language articles documenting hypertension prevalence in population-based studies in SSA, published between 1 January 1990 and 25 April 2019, were identified through a comprehensive electronic search of MEDLINE. Of the 3 795 citations retrieved, 414 fulfilled the inclusion criteria. Scientific outputs increased incrementally per 10-year period: 1990 - 1999: *n*=32; 2000 - 2009: *n*=65; and 2010 - 2019: *n*=317. The greatest number of scientific outputs over the 30-year period originated from South Africa (*n*=81) and Nigeria (*n*=74). Increasing scientific outputs on hypertension prevalence in SSA have not translated into optimal hypertension management, which remains inadequate.

S Afr Med J 2019;109(11 Suppl 1):3-7. https://doi.org/10.7196/SAMJ.2019.v109i11b.14183

Globally, hypertension has been on the rise over the past few decades, with the number of individuals increasing from 600 million in 1980 to nearly 1 billion in 2008;[1] by 2025 the total number is estimated to increase to 1.56 billion.[2] Hypertension prevalence in ≥25-year-old adults worldwide was ~40% in 2008, with higher rates in low-income than high-income countries.[3] The greater burden in poorer regions is already imparting a profound effect on populations in low- and middle-income countries.[3,4] Approximately 80% of the hypertensive disease burden occurs in these regions and over half in people aged 45 - 69 years.[5]

Despite the high burden imposed by HIV/AIDS, tuberculosis and malaria in sub-Saharan Africa (SSA),[6] hypertension has emerged as a significant medical and public health problem.[7] Indeed, the highest prevalence of hypertension globally is in SSA (46%);[3] a dramatic increase from the early 20th century when hypertension was rare in the region.[8] Furthermore, unlike high-income countries where mean blood pressure (BP) has decreased over the last three decades, it has remained stable in Africa or increased in most countries.[9] In the latter half of the 20th century, hypertension has emerged as the most prevalent cardiovascular disease (CVD) risk factor in the region.[8]

Hypertension constitutes the foundation of the CVD epidemic in the region[10] and is regarded as one of the continent's greatest health challenges after HIV/AIDS.[11] It remains the primary cause of significant financial burden, which includes the cost of caring for stroke, ischaemic heart disease and congestive cardiac failure related to hypertensive heart disease and systolic dysfunction.[12] Notably, mortality attributable to hypertension in persons <60 years old was 25% in SSA compared with only 7% in high-income countries.[13]

There remains an urgent need for African governments, researchers, civil society and other stakeholders to highlight and curb the rampant hypertension epidemic in SSA. Research plays a significant role in highlighting key health problems, such as hypertension, by providing the necessary empirical evidence. This is done by the publication of their research in peer-reviewed scientific journals. Governments, policymakers and other stakeholders are advised to use this evidence when determining healthcare priorities and strategies. This is particularly true in resource-constrained settings, where maximum use with the greatest health benefits needs to be made of limited resources.

Nevertheless, research efforts are not always directed to regions most in need of such measures. Much of the global research tends to concentrate in wealthier regions, which leads to the inequitable distribution of research efforts. Consequently, populations suffering the world's greatest health problems, particularly in SSA, are often overlooked. Therefore, considering the high and rising burden of hypertension in SSA, and the need for hypertension research in the region, this systematic review aims to describe the distribution of and trends in scientific research outputs on hypertension prevalence in population-based studies in SSA over the last three decades, from 1990 to 2019.

Methods

Sources of information and selection of eligible studies

This review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) framework.[14] Relevant articles documenting the prevalence of hypertension in population-based studies in SSA, published between 1 January 1990 and 25 April 2019, were identified through a comprehensive electronic search of MEDLINE (via PubMed). English-language studies were obtained using key words pertaining to the 'prevalence' of 'hypertension', 'blood pressure', 'high blood pressure' and 'Africa', 'Sub-Saharan Africa' or the individual names of SSA countries and their variants.[15] Medical Subject Headings (MeSH) terms and Boolean operators, such as AND/OR/NOT, were used to string terms together.

Studies were excluded if data collection was conducted among patients at healthcare facilities or obtained from hospital or

clinic records, and if the study was a meta-analysis, review or any other form of publication that did not include primary data. Studies on self-reported prevalence of hypertension alone without measured BP were excluded. The cut-points used to define hypertension were not considered an inclusion criterion.

Data collection, extraction, assessment and synthesis

Two authors (NP, CG) conducted the literature search and sequentially (titles, abstracts and then full texts) screened these items for inclusion (Fig. 1). For inclusion in this review, a publication had to be an original study containing independent data obtained from population-based studies, documenting the prevalence of hypertension. If the prevalence of hypertension was not included in the abstract, but BP, hypertension or metabolic syndrome was mentioned, the full texts were examined for the prevalence of hypertension. In the full text, the prevalence of hypertension or enough data (number of events and sample size) to compute these estimates had to be reported for studies to be included in this review. Studies were also included if the relevant data were reported for the total sample or for subgroups such as individuals with/without diabetes or overweight/obesity or HIV infection. Population-based studies that were conducted in sociodemographic subpopulations, such as teachers, office workers and taxi drivers, were also included.

Any disagreements regarding the included articles were resolved through discussion or reviewed by the third author (APK). The reasons for excluding studies were also recorded. The data extracted from selected articles included the year and country of publication. These were collated chronologically and per 5- and 10-year intervals for the relevant timeframe. Data extraction was done by one author (NP), and another author (CG) verified the accuracy and validity of extracted data. CG rechecked the analyses done by NP and ensured that the included articles were correctly categorised by country and year.

Statistical analyses

Data analyses included simple descriptive statistics to determine the prevalence rates over time and by country and region.

Results

Overall trends: 1990 - 2019

We retrieved 3 795 citations from our searches. Based on the title or abstract, 276 of the total retrieved citations were eligible and 2 978 were not eligible for inclusion. Consequently, 541 full-text articles were reviewed and, of those, 138 citations met the inclusion criteria. Therefore, 414 published articles on hypertension prevalence in population-based studies were included in this review (Fig. 1).

Publications increased incrementally per 10-year period, with 32 publications in 1990 - 1999 (Suppl. Table 1; http://www.samj.org.za/public/sup/14183.pdf), 65 in 2000 - 2009 (Suppl. Table 2; http://www.samj.org.za/public/sup/14183.pdf) and 317 in 2010 - 2019 (Suppl. Table 3; http://www.samj.org.za/public/sup/14183.pdf). This illustrated that publications on hypertension prevalence in SSA were almost 5-fold higher in 2010 - 2019 than in 2000 - 2009, while publications in 2000 - 2009 were double those of 1990 - 1999. A similar trend is demonstrated per 5-year period between

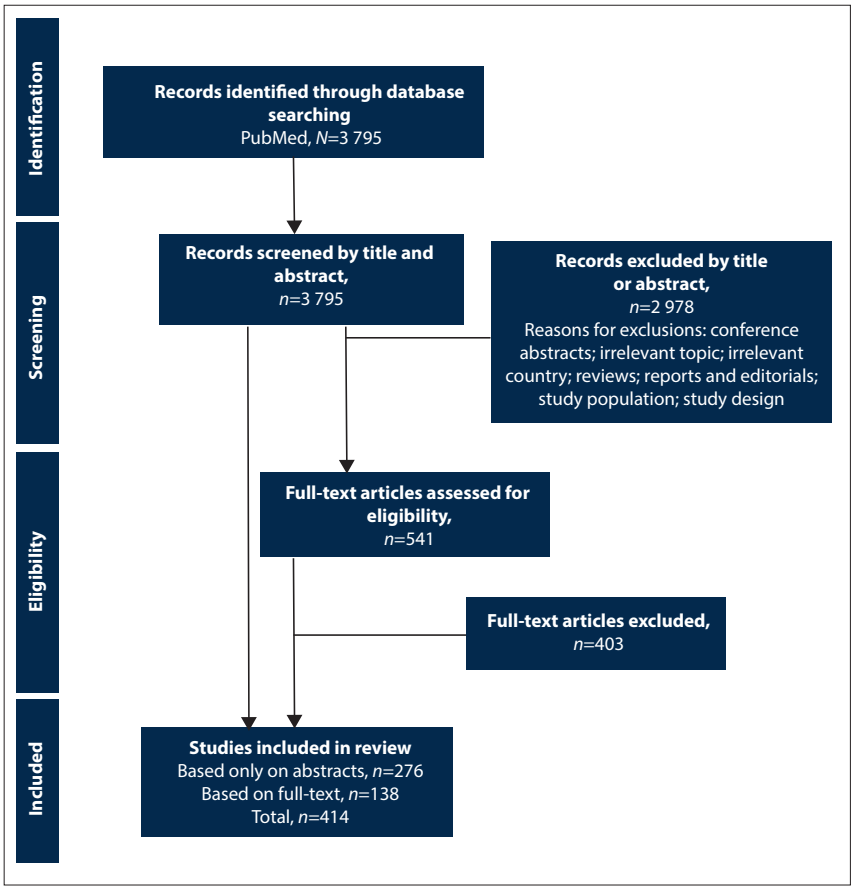

Fig. 1. Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) diagram.

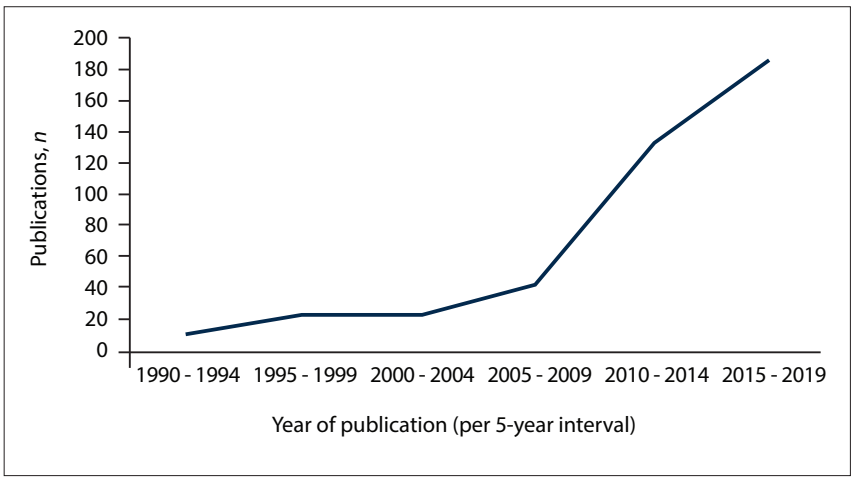

Fig. 2. Number of publications on hypertension prevalence in population-based studies in sub-Saharan Africa per 5-year interval for the 30-year period 1990 - 2019.

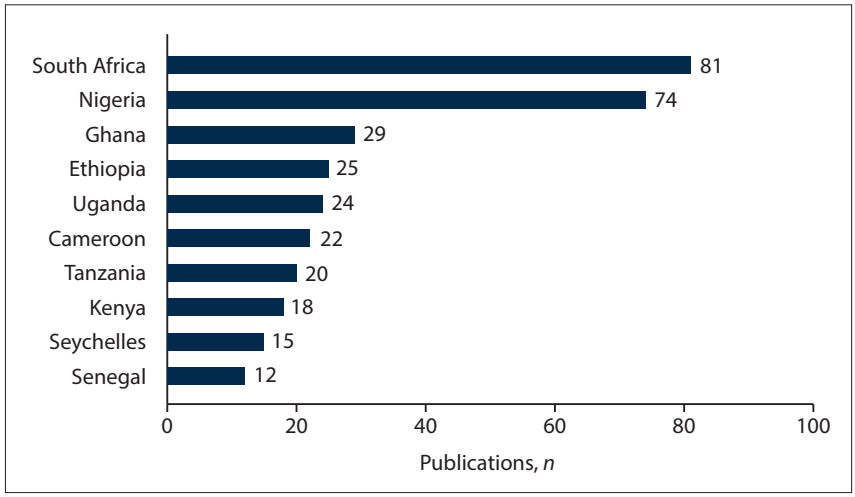

Fig. 3. Countries with >10 publications on hypertension prevalence in population-based studies in sub-Saharan Africa for the 30-year period 1990 - 2019.

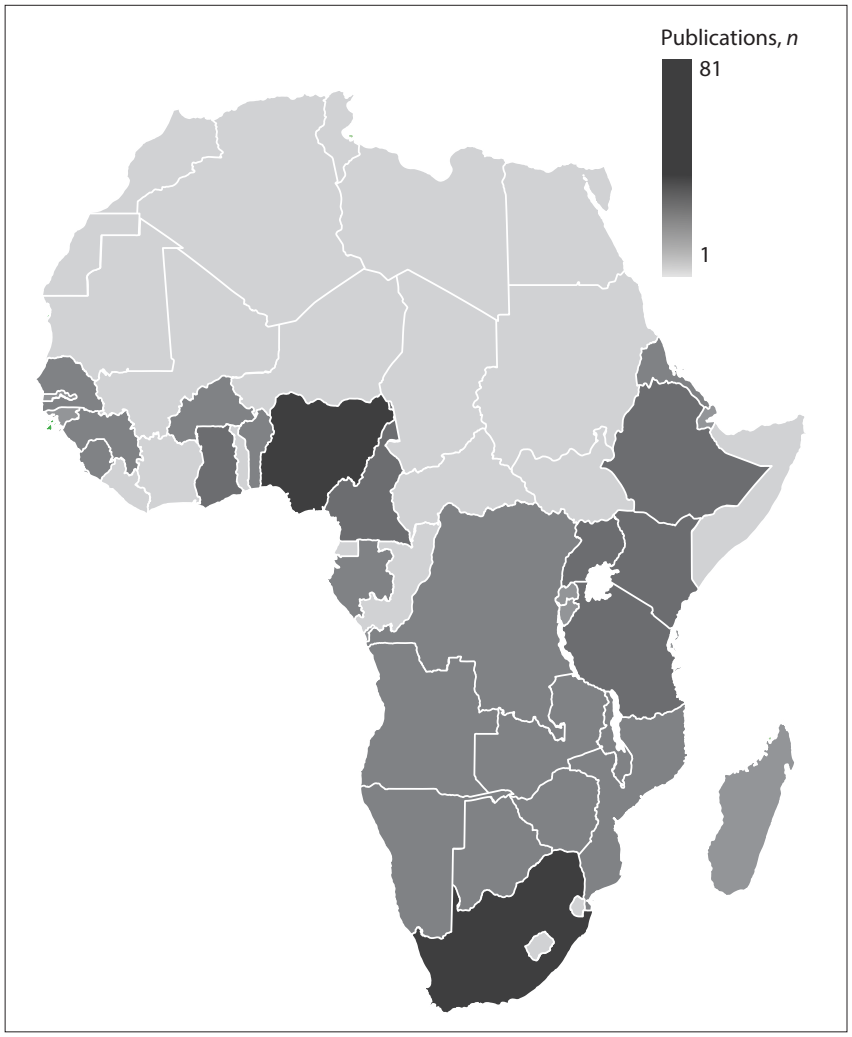

Fig. 4. Map of Africa graphically presenting the number of publications on hypertension prevalence in population-based studies in sub-Saharan Africa per 5-year interval for the 30-year period 1990 - 2019.

1990 and 2019, with sharp increases after 2010 (Fig. 2).

The greatest number of publications over the 30-year period 1990 - 2019 originated from South Africa (SA) (*n*=81) and Nigeria (*n*=74) (Figs 3 and 4). Other countries with ≥20 publications for the same interval were Ghana (*n*=29), Ethiopia (*n*=25), Uganda (*n*=24), Cameroon (*n*=22) and Tanzania (*n*=20).

Trends per 10-year interval: 1990 - 1999, 2000 - 2009 and 2010 - 2019

For the 10-year period 1990 - 1999, there were <10 publications per year, with the maximum being 8 in 1997 (Suppl. Table 1). There were 5 publications in 1996 and 4 each in 1991 and 1999. The greatest number of publications for this interval emanated from SA (*n*=7), followed by Nigeria (*n*=4). There were 4 bi-country publications, all with data from Nigeria and Cameroon. Mauritius, Seychelles and Tanzania had 3 publications each.

Of the 65 publications from 2000 to 2009, there were ≥10 in 2007 (*n*=13), 2008 (*n*=12) and 2009 (*n*=10) (Suppl. Table 2). SA had the greatest number of publications (*n*=16), followed by Seychelles (*n*=8) and Ghana (*n*=7).

In contrast to the 10-year intervals 1990 - 1999 and 2000 - 2009, publications for 2010 - 2019 numbered >30 per year, except for 2010 (*n*=9), 2011 (*n*=13) and 2019 (*n*=1) (Fig. 5; Suppl. Table 3). The greatest number of publications were in 2017 (*n*=56), followed by 2013 (*n*=47) and 2016 (*n*=46). The dearth of publications in 2019 was unsurprising, as only 4 months of the year were considered in this review.

Unlike the previous two decades, during which the greatest number of publications originated from SA, publications in 2010 - 2019 were dominated by Nigeria (*n*=66) (Fig. 6). This was followed by SA (*n*=58) and multi-country articles (*n*=25) from a diverse range of countries that are too many to mention. Other countries with ≥20 publications in 2010 - 2019 were Uganda (*n*=23), Ethiopia (*n*=22) and Ghana (*n*=22).

Discussion

This review illustrates that scientific research outputs on hypertension prevalence in SSA have increased dramatically over the past three decades, and particularly during the past 10 years. From 1990 - 1999 to 2010 - 2019 the average number of publications per year has increased 10-fold from ~3 per year in the first 10-year period examined to >30 per year in the 2010 - 2019 interval.

Considering the high hypertension prevalence in SSA, this is an important and positive finding. The incremental increase in publications on hypertension prevalence over the past 30 years may possibly reflect the rising hypertension burden and thus greater awareness of the escalating problem in the region. Moreover, the burden of hypertension in SSA is much greater; in black compared with white populations,

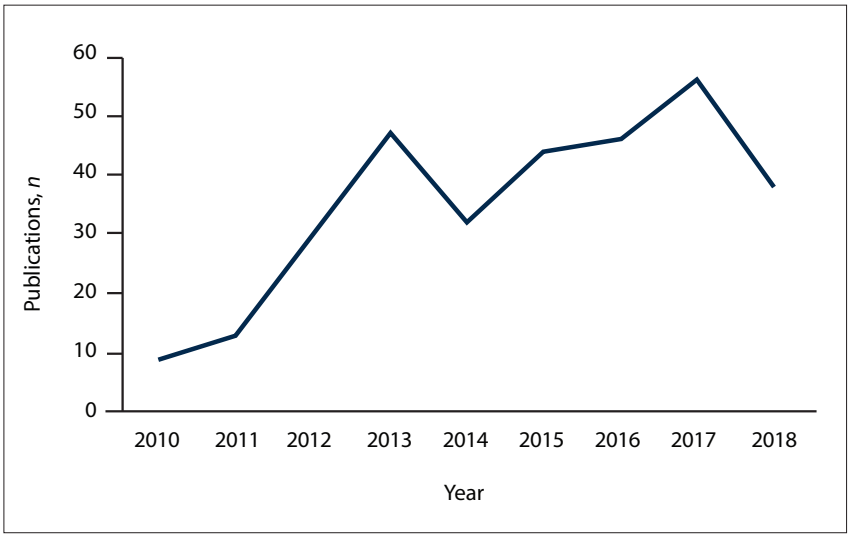

Fig. 5. Number of publications on hypertension prevalence in population-based studies in sub-Saharan Africa per year for the 10-year period 2010 - 2019.

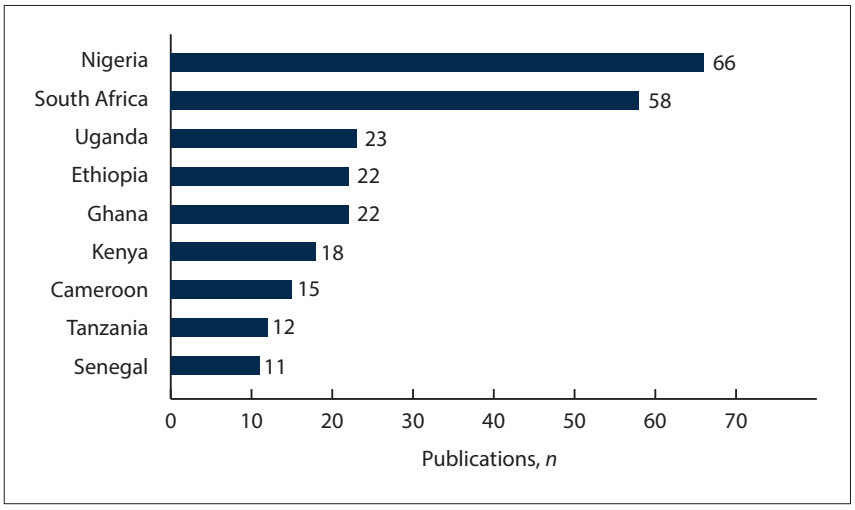

Fig. 6. Countries with >10 publications on hypertension prevalence in population-based studies in sub-Saharan Africa for the 10-year period 2010 - 2019.

hypertension occurs at younger ages and BP levels are frequently more severely elevated, leading to greater target-organ damage.[16] However, although there may be greater awareness of the hypertension epidemic in SSA, this, unfortunately, has not translated into concerted efforts to address the problem. Levels of hypertension awareness, treatment and control remain despairingly low at 27%, 18% and 7%, respectively.[17] Furthermore, healthcare systems in the region are weak, with insufficient or non-functioning BP-measuring devices, thus preventing simple and accurate BP assessment in clinics.[18] This highlights the woeful inattention paid to hypertension and the inability to manage a highly treatable condition.

Antihypertensive therapy, when optimally prescribed, is among the most efficient means for disease prevention.[19] Incidences of stroke and heart attacks are reduced by 35 - 40% and 20 - 25%, respectively.[19,20] Therefore, even in SSA, a substantial commitment of scarce resources must be considered for the management of hypertension, using the total CVD risk assessment approach.[19,21]

Furthermore, modifiable risk factors associated with hypertension, such as obesity, physical inactivity, high salt intake, and alcohol and tobacco use, are increasing or above the recommended limits in the region.[16] This illustrates inertia among SSA policymakers to tackle hypertension and other non-communicable diseases at the population level. In SSA, where healthcare resources are particularly scarce, investment in prevention strategies is likely to yield the greatest benefit[2] and should be a public health priority in the region.[4]

SA and Nigeria have the greatest number of publications on hypertension in SSA over the past 30 years. The hypertension prevalence in SA has almost doubled over nearly two decades: nationally, it increased from 23% and 25% in ≥15-year-old men and women, respectively, in 1998,[22] to 44% and 47%, respectively, in 2016.[23] Mirroring this increase in hypertension prevalence is the rise in the number of publications from 7 (1990 - 1999) to 58 (2010 - 2019).

However, a cross-sectional study conducted in Cape Town, SA, reported an increase in hypertension prevalence from 21.6% in 1990 to 35.6% in 2008/2009 in 25 - 64-year-old adults, but not an associated improvement in hypertension awareness, treatment and control in men.[24] Between 1990 and 2008/2009, among men with hypertension, these rates decreased from 29.2% to 27.1% (awareness), 19.2% to 15.6% (treatment) and 12.6% to 6.4% (control).

This highlights the need for evidence-based research to be translated into tangible action. SA is generally characterised by good policies and strategies, as shown in the Department of Health's *Controlling Non-communicable Diseases through Health System Strengthening* document.[25,26] However, the implementation of these policies needs to be prioritised and fast-tracked, and there needs to be an equivalent emphasis on the monitoring and evaluation of these programmes.[25] This can only be achieved through improved stewardship, leadership and management of the healthcare system.

Hypertension prevalence in Nigeria has increased from 11.2% in 1997, based on the former definition of hypertension (BP ≥160/95 mmHg), to the current estimate of 28.9%.[27] However, the number of individual publications on hypertension were 4 each in 1990 - 1999 and 2000 - 2009, escalating to 66 in 2010 - 2019. As in SA, the increased focus on hypertension in the literature has not translated to optimal hypertension management. An opportunistic cross-sectional survey in 2017 reported a hypertension prevalence of 36.2%; among those on antihypertensive medication, more than half (58.8%) had uncontrolled BP despite receiving treatment.[28] This highlights the need to implement rigorous evidence-based measures to improve hypertension management and control. Policymakers in SSA should seriously consider the evidence-based data in their countries and translate these into best practice public health policies. Such evidence should be used for planning current and future healthcare services, with resources allocated appropriately to develop cost-effective therapeutic strategies and programmes.

The publications for SA and Nigeria between 1990 and 2019 were >2.5-fold greater than those for Ghana, which had

the third most publications in the region. This may possibly be attributed to the strength of their economies; these two countries had the highest gross domestic product (GDP) on the continent in 2018.[29,30] Their individual GDPs were >7-fold greater than Ghana's GDP and much higher than the GDPs of the other countries with >10 publications during this period. Interestingly, these countries (not Seychelles) were listed in the top 15 SSA countries with the highest GDPs. This may reflect these countries' greater ability in terms of infrastructure and resources to support scientific research compared with their poorer counterparts. Of note, this is possibly also applicable to Seychelles; while the country features near the bottom of the list in terms of total GDP, it leads the continent in terms of GDP per capita.

Study limitations

The present study has a few limitations, most of which were beyond the scope of this review. Only a single search engine was used, and publications were limited to those in the English language. The review evaluated the number of publications and not the number of studies; therefore, multiple publications from individual studies may have been included. The quality of the study designs and the participant recruitment techniques were not assessed. Consequently, studies were equally weighted irrespective of sample representativeness, i.e. random v. convenient sampling, small v. large sample sizes, and wide v. narrow age ranges. The quality of BP measurement techniques was not appraised, and neither were the definitions of hypertension used that would allow for comparability across studies.

Conclusions

Scientific research outputs on hypertension prevalence in SSA have increased dramatically between 1990 and 2019, with the greatest number of publications over the past 10 years. SA and Nigeria had the most publications, followed by those that generally also featured in the top 15 countries by GDP in SSA. However, the increased focus on hypertension prevalence in the scientific literature has not translated into optimal hypertension management and control, which remain inadequate in the region. Stakeholders in SSA need to be more vocal in holding governments accountable and ensuring that policymakers use the available evidence-based research to implement best practice solutions to improve healthcare in their countries. The channels available to stakeholders for greater government action include raising awareness in communities, e.g. via health awareness drives or free BP screenings, as conducted by the Heart and Stroke Foundation South Africa, and persuading the media to frequently shine the spotlight on hypertension. Such measures, with a constant focus on hypertension, may pressurise governments to act.

Acknowledgements. None.

Author contributions. NP, APK: contributed to conception and design; NP, CG, APK: contributed to acquisition, analysis or interpretation; NP: drafted the manuscript; CG, APK: critically revised the manuscript; NP, CG, APK: gave final approval; and agree to be accountable for all aspects of the work, ensuring integrity and accuracy.

Funding. None.

Conflicts of interest. None.

1. Danaei G, Finucane MM, Lin JK, et al. National, regional, and global trends in systolic blood pressure since 1980: Systematic analysis of health examination surveys and epidemiological studies with 786 country-years and 5.4 million participants. Lancet 2011;377(9765):568-577. https://doi.org/10.1016/S0140-6736(10)62036-3
2. Kearney PM, Whelton M, Reynolds K, et al. Global burden of hypertension: Analysis of worldwide data. Lancet 2005;365(9455):217-223. https://doi.org/10.1016/S0140-6736(05)17741-1
3. World Health Organization. Global Status Report on Noncommunicable Diseases 2010. Geneva: WHO, 2011.
4. Sliwa K, Stewart S, Gersh BJ. Hypertension: A global perspective. Circulation 2011;123(24):2892-2896. https://doi.org/10.1161/CIRCULATIONAHA.110.992362
5. Lawes CM, vander Hoorn S, Rodgers A. Global burden of blood-pressure-related disease, 2001. Lancet 2008;371(9623):1513-1518. https://doi.org/10.1016/S0140-6736(08)60655-8
6. Hall V, Thomsen RW, Henriksen O, et al. Diabetes in Sub Saharan Africa 1999 - 2011: Epidemiology and public health implications. A systematic review. BMC Public Health 2011;11:564. https://doi.org/10.1186%2F1471-2458-11-564
7. BeLue R, Okoror TA, Iwelunmor J, et al. An overview of cardiovascular risk factor burden in sub-Saharan African countries: A socio-cultural perspective. Global Health 2009;5:10. https://doi.org/10.1186%2F1744-8603-5-10
8. Akinboboye O, Idris O, Akinkugbe O. Trends in coronary artery disease and associated risk factors in sub-Saharan Africans. J Hum Hypertens 2003;17(6):381-387. https://doi.org/10.1038/sj.jhh.1001562
9. World Health Organization. World Health Statistics 2012. Geneva: WHO, 2012.
10. Mensah GA. Epidemiology of stroke and high blood pressure in Africa. Heart 2008;94(6):697-705. https://doi.org/10.1136/hrt.2007.127753
11. Opie LH. Heart disease in Africa. Lancet 2006;368(9534):449-450. https://doi.org/10.1016/S0140-6736(06)69149-6
12. Gaziano TA. Economic burden and the cost-effectiveness of treatment of cardiovascular diseases in Africa. Heart 2008;94(2):140-144. https://doi.org/10.1136/hrt.2007.128785
13. World Health Organization. Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks. Geneva: WHO, 2009.
14. Moher D, Liberati A, Tetzlaff J, et al. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. PLoS Med 2009;6(7):e1000097. https://doi.org/10.1371/journal.pmed.1000097
15. Pienaar E, Grobler L, Busgeeth K, et al. Developing a geographic search filter to identify randomised controlled trials in Africa: Finding the optimal balance between sensitivity and precision. Health Info Libr J 2011;28(3):210-215. https://doi.org/10.1111/j.1471-1842.2011.00936.x
16. Schutte AE, Botha S, Fourie CMT, et al. Recent advances in understanding hypertension development in sub-Saharan Africa. J Hum Hypertens 2017;31(8):491-500. https://doi.org/10.1038/jhh.2017.18
17. Ataklte F, Erqou S, Kaptoge S, et al. Burden of undiagnosed hypertension in sub-Saharan Africa: A systematic review and meta-analysis. Hypertension 2015;65(2):291-298. https://doi.org/10.1161/HYPERTENSIONAHA.114.04394
18. Connor MD, Hopkins T, Tollman SM, et al. Blood pressure-measuring devices in rural South Africa: An audit conducted by the SASPI team in the Agincourt field site. Cardiovasc J S Afr 2006;17(4):192-196.
19. Volpe M, Alderman MH, Furberg CD, et al. Beyond hypertension toward guidelines for cardiovascular risk reduction. Am J Hypertens 2004;17(11):1068-1074. https://doi.org/10.1016/j.amjhyper.2004.06.017
20. Chobanian AV, Bakris GL, Black HR, et al. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: The JNC 7 report. JAMA 2003;289(19):2560-2572. https://doi.org/10.1001/jama.289.19.2560
21. Messerli FH, Williams B, Ritz E. Essential hypertension. Lancet 2007;370(9587):591-603. https://doi.org/10.1016/S0140-6736(07)61299-9
22. Department of Health. South Africa Demographic and Health Survey 1998: Full Report. Pretoria: DoH, 1999.
23. Department of Health, South African Medical Research Council. South Africa Demographic and Health Survey 2016: Key Indicator Report. Pretoria: Statistics South Africa, 2017.
24. Peer N, Steyn K, Lombard C, et al. A high burden of hypertension in the urban black population of Cape Town: The Cardiovascular Risk in Black South Africans (CRIBSA) study. PLOS ONE 2013;8(11):e78567. https://doi.org/10.1371/journal.pone.0078567
25. Coovadia H, Jewkes R, Barron P, et al. The health and health system of South Africa: Historical roots of current public health challenges. Lancet 2009;374(9692):817-834. https://doi.org/10.1016/S0140-6736(09)60951-X
26. Asmall S, Mahomed OH. Controlling Non-communicable Diseases through Health System Strengthening. Pretoria: Department of Health, 2011.
27. Adeloye D, Basquill C, Aderemi AV, et al. An estimate of the prevalence of hypertension in Nigeria: A systematic review and meta-analysis. J Hypertens 2015;33(2):230-242. https://doi.org/10.1097/HJH.0000000000000413
28. Ogah OS, Arije A, Xin X, et al. May measurement month 2017: Screening for hypertension in Nigeria – sub-Saharan Africa. Eur Heart J 2019;21(Suppl D):D86-D88. https://doi.org/10.1093/eurheartj/suz064
29. International Monetary Fund. World Economic Outlook Database. Washington, DC: IMF, 2018.
30. Statistics Times. List of African countries by GDP. 2019. http://statisticstimes.com/economy/african-countries-by-gdp.php (accessed 6 November 2019).

Supplementary Table 1. Distribution of publications on hypertension prevalence in population-based studies conducted in sub-Saharan Africa: 1990 - 1999

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
Central Africa, *n*											
Cameroon	-	-	-	-	-	-	-	-	1	-	1
Western Africa, *n*											
Gambia	-	-	-	-	-		-	1	-	-	1
Nigeria	-	-	-	-	-	-	1	2	-	1	4
Senegal	-	-	1	-	-	-	-	-	-	-	1
Sierra Leone	-	-	-	-	-	-	-	-	1	1	2
Eastern Africa, *n*											
Ethiopia	-	-	-	-	-	-	-	1	-	-	1
Mauritius	-	1	-	-	1	1	-	-	-	-	3
Seychelles	-	2	-	-	-	-	-	-	1	-	3
Tanzania	-	1	-	1	-	-	-	1	-	-	3
Southern Africa, *n*											
Lesotho	-	-	-	-	1	-	-	-	-	-	1
South Africa	1	-	-	-	-	1	2	2	-	1	7
Zimbabwe	-	-	-	1	-	-	-	-	-	-	1
Multi-country studies	-	-	-	-	-	-	2	1	-	1	4
Total, *n*	1	4	1	2	2	2	5	8	3	4	32

Supplementary Table 2. Distribution of publications on hypertension prevalence in population-based studies conducted in sub-Saharan Africa: 2000 - 2009

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
Central Africa, *n*											
Angola	-	-	-	-	-	-	-	-	-	-	-
Cameroon	-	2	1	1	-	-	-	2	-	-	6
Democratic Republic of Congo	-	-	-	-	-	-	-	-	2	1	3
Western Africa, *n*											
Benin	-	-	-	-	-	-	-		1	1	2
Burkina Faso	-	-	-	-	-	-	-	1	-	-	1
Gambia	1	-	-	-	-	-	-	-	-	-	1
Ghana	-	-	-	1	-	-	3	2	-	1	7
Guinea	-	-	-	-	-	-	-	1	-	-	1
Nigeria	-	1	1	-	-	-	-	1	1	-	4
Eastern Africa, *n*											
Ethiopia	-	-	-	-	-	-	-	1	-	1	2
Eritrea	-	-	-	-	-	-	2	-	-	-	2
Madagascar	-	-	-	1	-	-	-	-	-	-	1
Mauritius	1	-	-	-	-	-	-	-	-	-	1
Seychelles	1	-	1		1	-	1	1	2	1	8
Tanzania	1	2	-	2	-	-	-	-	-	-	5
Uganda	-	-	-	-	-	-	-	-	-	1	1
Southern Africa, *n*											
Botswana	-	-	-	-	-	1	-	-	-	-	1
Mozambique	-	-	-	-	-	-	-	-	-	1	1
South Africa	-	2	-	-	-	1	-	4	6	3	16
Zimbabwe	2	-	-	-	-	-	-	-	-	-	2
Multi-country studies	-	-	-	-	-	-	-	-	-	-	-
Total, *n*	6	7	3	5	1	2	6	13	12	10	65

Supplementary Table 3. Distribution of publications on hypertension prevalence in population-based studies conducted in sub-Saharan Africa: 2010 - 2019

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Central Africa, *n*											
Angola	-	-	-	3	-	-	1	2	-	-	6
Cameroon	1	1	1	-	1	5	1	2	3	-	15
Democratic Republic of Congo	-	-	1	-	-	1	-	3	-	-	5
Gabon	-	-	1	-	-	-	-	-	-	-	1
Western Africa, *n*											
Benin	-	-	1	1	-	1	-	1	1	-	5
Burkina Faso	-	-	1	-	2	-	-	1	-	-	4
Ghana	-	1	2	2	4	2	4	3	4	-	22
Guinea	-	-	-	-	-	-	1	-	-	1	2
Nigeria	3	3	5	16	2	9	13	9	6	-	66
Senegal	-	-	3	2	3	-	2	1	-	-	11
Togo	-	-	1	-	-	-	-	-	-	-	1
Eastern Africa, *n*											
Comoros Archipelago	-	1	-	-	-	-	-	-	-	-	1
Ethiopia	1	1	2	-	5	2	1	6	4	-	22
Kenya	1	1	1	3	2	1	4	2	3	-	18
Madagascar	-	-	-	-	-	1	-	-	1	-	2
Malawi	-	1	-	1	-	-	-	-	1	-	3
Mauritius	-	-	1	-	-	-	-	-	-	-	1
Rwanda	-	-	-	-	-	-	-	1	-	-	1
Seychelles	-	1	1	1	-	-	-	1	-	-	4
Somaliland	-	-	-	-	-	1	-	-	-	-	1
Tanzania	1	-	1	1	1	-	4	3	1	-	12
Uganda	-	2	2	5	1	5	4	3	1	-	23
Southern Africa, *n*											
Mozambique	-	-	-	2	-	-	-	-	-	-	2
Namibia	-	-	1	-	-	1	-	-	1	-	3
South Africa	1	1	4	7	8	7	8	14	8	-	58
Zambia	-	-	-	1	-	1	-	-	1	-	3
Multi-country studies	1	-	2	2	3	7	3	4	3	-	25
Total, *n*	9	13	31	47	32	44	46	56	38	1	317