



Editorial

Asthma care in sub-Saharan Africa: Mind the gap!

Masekela Refiloe^{1*}, Mortimer Kevin^{2,3*}, Nantanda Rebecca⁴, Lesosky Maia^{5,6}, Meme Hellen⁷, Devereux Graham^{2,6}, Muhwa Chakaya⁸

¹Department of Paediatrics and Child Health, School of Clinical Medicine, University of KwaZulu-Natal, Durban, South Africa, ²Department of Respiratory Medicine, Liverpool University Hospitals NHS Foundation Trust, Liverpool, ³Department of Medicine, University of Cambridge, Cambridge, United Kingdom, ⁴Makerere University Lung Institute, Makerere College of Health Sciences, Kampala, Uganda, ⁵Division of Epidemiology and Biostatistics, University of Cape Town, Cape Town, South Africa, ⁶Department of Clinical Sciences, Liverpool School of Tropical Medicine, Liverpool, United Kingdom, ⁷Centre for Respiratory Disease Research, Kenya Medical Research Institute, ⁸Department of Medicine, Therapeutics, Dermatology and Psychiatry, Kenyatta University, Nairobi, Kenya.

*Joint first authors

*Corresponding author:

Mortimer Kevin,
Department of Medicine,
University of Cambridge,
Cambridge, United Kingdom.

kjm20@cam.ac.uk

Received: 09 March 2022
Accepted: 22 March 2022
Epub Ahead of Print: 20 April 2022
Published: 02 May 2022

DOI

10.25259/JPATS_12_2022

Quick Response Code:



“Closing gaps in asthma care” is the theme for World Asthma Day 2022. Nowhere are the gaps wider between reality and the ideal, than in sub-Saharan Africa in terms of diagnostics, treatment options, and the underpinning evidence for these.

Asthma is the most common chronic disease in children and adolescents globally and one of the most common chronic diseases in adults.^[1-3] The World Health Organization (WHO) and others have highlighted asthma as an underappreciated cause of poverty in low- and middle-income countries that hold back economic and social development, erode the health and well-being of those affected, and have a negative impact on families and societies.^[4-6] Asthma is a recognized cause of catastrophic health expenditure and a threat to universal health coverage.^[7] The WHO succinctly states “*that in children with asthma, poverty aggravates asthma and asthma aggravates poverty.*”^[8] Children miss out on education, adults lose days at work and the costs of medicines, emergency visits, and hospitalization are major financial burdens not only for individuals and their families but also for struggling health systems.^[4-8]

Asthma prevalence has been increasing across Africa: In 1990, about 11.7% (74 million including 34.1 million children) of the population had asthma; by 2010, this had increased to 12.8% (119 million including 49.7 million children).^[9] Despite the high prevalence, there are limited data about the burden and determinants of asthma in sub-Saharan Africa.^[10,11] Asthma morbidity in sub-Saharan Africa today is further compounded by myths and stigma; however, a positive lesson of history from high-income countries is that these can be overcome.^[12-14]

Asthma is underdiagnosed and undertreated in sub-Saharan Africa, and consequently, the burden of severe asthma symptoms and mortality rates are disproportionately high, for example, the Ugandan asthma mortality rate of 19 deaths per 1000 person-years is 90 times that of the UK:^[15]

In Uganda, a low-income sub-Saharan African country, only 33% of a cohort of people with asthma had controlled asthma, 33% were taking inhaled controller medications, and 60% had ≥ 1 exacerbations a year.^[15] In under 5-year-old children with asthma symptoms, over 90% were diagnosed with pneumonia and treated with antibiotics, thus missing opportunities to address the true underlying issues.^[16]

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, transform, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

©2022 Published by Scientific Scholar on behalf of Journal of the Pan African Thoracic Society

In Kenya, a low middle-income sub-Saharan African country, studies of children and adults with asthma have reported a reluctance to admit to a diagnosis of asthma, even within families. Only about 60% of people with asthma have asthma medication in the home and this is usually limited to salbutamol or prednisolone, with inhaled treatment only deemed necessary for those with the most severe disease. There is generally a preference for oral medications and a fear of inhaled medications (especially inhaled corticosteroids [ICS]).^[17,18]

In South Africa, a high-middle-income sub-Saharan African country, only 31.5% of children with asthma had well controlled asthma and 17.6% had been admitted to hospital in the previous year.^[19] The prevalence of asthma in adolescents has been reported at 17% and in children in more rural settings and 21% in urban settings.^[1,20] The prevalence of doctor diagnosis of asthma was 16.6%, but more than 50% of these children exhibited severe asthma symptoms.^[21] The majority of symptomatic children were over-reliant on “as required” short-acting β -agonist 81.2% and only 17% of asthmatics were on regular ICS.^[21]

The inevitable consequence of poorly controlled asthma is greatly increased morbidity, with the disability weight for controlled asthma increasing from 0.009 to 0.132 for uncontrolled asthma.^[22]

Not only is the need for acute health services for asthma in sub-Saharan Africa high but there is also an underappreciated need for outpatient services. In a cross-sectional survey of 519 adults with chronic respiratory symptoms (>8 weeks) attending hospital clinics in Kenya, Ethiopia, and Sudan (in whom TB had been excluded), the most common clinician diagnosis was of asthma (34%) but the prevalence of wheeze in the past 12 months suggestive of asthma was much higher (71%).^[23] There was also evidence of under-reporting of asthma by patients, with 29% of those with a clinician diagnosis of asthma denying they had asthma.^[23]

In high-income countries, accurate diagnosis, appropriate treatment, and long-term follow-up, especially if implemented within a national asthma strategy, have been shown to markedly and cost effectively reduce asthma mortality, hospital asthma admissions, and asthma-related disability.^[24] Safe and effective inhaled asthma treatments were developed half a century ago but the majority of children, adolescents, and adults with asthma in sub-Saharan African countries have yet to benefit, leading to ongoing preventable morbidity and mortality. This is largely attributable to lack of cost-effective and quality assured medications for asthmatics, with people with asthma having to pay out-of-pocket costs for medication due to lack of universal health coverage.^[25-28] In Uganda, for instance, only 4.4% of public hospitals had ICS and none had combination inhalers, for example, budesonide-formoterol that costs the equivalent of 17 days' wages for 1 month supply.^[28]

An important principle of asthma treatment is the stepwise approach whereby treatment is stepped up and down in response to asthma control and exacerbation risk.^[29] Until recently, international asthma treatment approaches started with reliever medication (e.g., inhaled salbutamol) used “as required” at the lowest step with the addition of regular preventer medication, for example, ICS and other therapies including long-acting β 2 agonists (LABA) at higher steps.^[29] However, patients with, so called, mild asthma on reliever medication only are still at risk of severe exacerbation (and death).^[29] Over the past decade, a considerable body of clinical trial and clinical practice evidence has emerged supporting the efficacy and safety of combination inhalers containing an ICS and a rapid-onset LABA for maintenance and reliever therapy in adolescents and adults.^[30-32] In addition, the recent SYGMA 1&2, PRACTICAL, and NOVEL START trials have demonstrated the value of “as required” budesonide-formoterol in patients with mild asthma in reducing morbidity.^[33-36] Consequently, single ICS-formoterol therapy from the outset of treatment initiation is now being used in high-income countries and the most recent Global Initiative for Asthma (GINA) guidelines recommend that the minimum treatment for asthma in adolescents and adults is either combined ICS-formoterol as reliever therapy or ICS whenever SABA is taken.^[29]

In marked contrast to the rich clinical trial data from high-income countries, there is a fundamental lack of clinical trial evidence to inform clinical care or policy and decision-making for people with asthma in sub-Saharan Africa. While there is undoubtedly scope to translate some of the findings from trials conducted in high-income countries to sub-Saharan Africa, to do so without any major clinical and cost-effectiveness trials focused on the people in sub-Saharan Africa run the risks of overinterpretation as well as a failure to adequately respect and take into consideration factors such as environment, genetics, diversity, culture, traditions, and history.

There are, thus, major gaps in the clinical trial evidence relating to the clinical and cost-effectiveness of ICS-formoterol as required, this is a major road block to informing clinical care and policy- and decision-making in sub-Saharan Africa meaning that children, adolescents, and adults with asthma do not benefit and cannot even step across the gap to the very first step of GINA recommended treatment.

Another important gap to be addressed is to improve the education of people with asthma so that they can better understand the significance of their symptoms, to have their asthma diagnosed and once diagnosed, not to be stigmatized by their family, friends, colleagues, and society. A further key gap is the poor symptom recognition and episodic management of asthma by health care workers at the primary care level and poor diagnosis.^[37] Finally, models

for comprehensive effective affordable asthma care within the Africa context have fallen into the gap.

There is an urgent need for interventions backed up by locally relevant evidence generation to close these gaps. Community-based interventions to educate people and health care workers about asthma, to reduce stigma and recognize asthma at the primary care level and offer appropriate treatments and asthma education, are essential components of a comprehensive approach to asthma in Africa.^[38] The particular needs of children and adolescents (including around diagnostics and treatment options) compared to adults with asthma should be taken into account. The single ICS-formoterol inhaler-based approach has the potential (but needs the locally generated evidence) to transform asthma care by becoming the standard of care in the sub-Saharan African region and other areas of the world where asthma management is inadequate because of the multifaceted consequences of resource limitations.

REFERENCES

1. Asher MI, Rutter CE, Bissell K, Chiang CY, El Sony A, Ellwood E, *et al.* Worldwide trends in the burden of asthma symptoms in school-aged children: Global asthma network Phase I cross-sectional study. *Lancet* 2021;398:1569-80.
2. García-Marcos L, Asher MI, Pearce N, Ellwood E, Bissell K, Chiang CY, *et al.* The burden of asthma, hay fever and eczema in children in 25 countries: GAN Phase I study. *Eur Respir J* 2022. Doi: 10.1183/13993003.02866-2021.
3. Mortimer K, Lesosky M, García-Marcos L, Asher MI, Pearce N, Ellwood E, *et al.* The burden of asthma, hay fever and eczema in adults in 17 countries: GAN Phase I study. *Eur Respir J* 2022. Doi: 10.1183/13993003.02865-2021.
4. Available from: <https://www.who.int/news-room/fact-sheets/detail/asthma>. [Last accessed on 2022 Mar 09].
5. Meghji J, Mortimer K, Agusti A, Allwood BW, Asher I, Bateman ED, *et al.* Improving lung health in low-income and middle-income countries: From challenges to solutions. *Lancet* 2021;397:928-40.
6. Mortimer K, Reddel HK, Pitrez PM, Bateman ED. Asthma management in low and middle-income countries: Case for change. *Eur Respir J* 2022. Doi: 10.1183/13993003.03179-2021.
7. Haakenstad A, Coates M, Marx A, Bukhman G, Verguet S. Disaggregating catastrophic health expenditure by disease area: Cross-country estimates based on the world health surveys. *BMC Med* 2019;17:36.
8. World Health Organization. Global Surveillance, Prevention and Control of Chronic Respiratory Diseases: A Comprehensive Approach. Geneva: World Health Organization; 2007. Available from: https://www.who.int/gard/publications/GARD_Manual/en. [Last accessed on 2022 Mar 09].
9. Adeloye D, Chan KY, Rudan I, Campbell H. An estimate of asthma prevalence in Africa: A systematic analysis. *Croat Med J* 2013;54:519-31.
10. Rylance S, Masekela R, Banda NP, Mortimer K. Determinants of lung health across the life course in Sub-Saharan Africa. *Int J Tuberc Lung Dis* 2020;24:892-901.
11. Mortimer K, Nantanda R, Meghji J, Vanker A, Bush A, Ndimande N, *et al.* Africa's respiratory "Big Five". *J Pan Afr Thorac* 2021;2:64-72.
12. Rose S, Paul C, Boyes A, Kelly B, Roach D. Stigma-related experiences in non-communicable respiratory diseases: A systematic review. *Chronic Respir Dis* 2017;14:199-216.
13. Sibbald B, Collier J, D'Souza M. Questionnaire assessment of patients' attitudes and beliefs about asthma. *Family Pract* 1986;3:37-41.
14. Snadden D, Brown JB. The experience of asthma. *Soc Sci Med* 1992;34:1351-61.
15. Kirenga BJ, de Jong C, Mugenyi L, Katagira W, Muhofa A, Kanya MR, *et al.* Rates of asthma exacerbations and mortality and associated factors in Uganda: a 2-year prospective cohort study. *Thorax* 2018;73:983-5.
16. Nantanda R, Tumwine JK, Ndeezi G, Ostergaard MS. Asthma and pneumonia among children less than five years with acute respiratory symptoms in Mulago Hospital, Uganda: Evidence of under-diagnosis of asthma. *PLoS One* 2013;8:e81562.
17. Simba J, Marete I, Waihenya R, Kombe Y, Mwangi A, Mburugu P, *et al.* Knowledge and perceptions on childhood asthma among care-takers of children with asthma at a national referral hospital in Western Kenya: A descriptive study. *Afr Health Sci* 2018;18:965-71.
18. Barakat D, Rockers PC, Vian T, Onyango MA, Laing RO, Wirtz VJ. Access to asthma medicines at the household level in eight counties of Kenya. *Int J Tuberc Lung Dis* 2018;22:585-90.
19. Mash B, Rhode H, Pather M, Ainslie G, Irusen E, Bheekie A, *et al.* Quality of asthma care: Western Cape Province, South Africa. *S Afr Med J* 2009;99:892-6.
20. Baard CB, Franckling-Smith Z, Munro J, Workman L, Zar HJ. Asthma in South African adolescents: A time trend and risk factor analysis over two decades. *Eur Respir J Open Res* 2020;7:00576-2020.
21. Mphahlele R, Lesosky M, Masekela R. The Prevalence, Severity and Risk Factors of Asthma in South African Adolescents. Unpublished Data, Personal Communication.
22. Salomon JA, Vos T, Hogan DR, Gagnon M, Naghavi M, Mokdad NB, *et al.* Common values in assessing health outcomes from disease and injury: Disability weights measurement study for the global burden of disease study 2010. *Lancet* 2012;380:2129-43.
23. Binegdie AB, Meme H, El Sony NA, Haile T, Osman R, Miheso B, *et al.* Chronic respiratory disease in adult out-patients in three African countries: A cross sectional study. *Int J Tuberc Lung Dis* 2022;26:18-25.
24. Kupczyk M, Haahtela T, Cruz AA, Kuna P. Reduction of asthma burden is possible through National Asthma Plans. *Allergy* 2010;65:415-9.
25. Kibirige D, Sanya RE, Nantanda R, Worodria W, Kirenga B. Availability and affordability of medicines and diagnostic tests recommended for management of asthma and chronic obstructive pulmonary disease in Sub-Saharan Africa: A systematic review. *Allergy Asthma Clin Immunol* 2019;15:14.
26. Wirtz VJ, Turpin K, Laing RO, Mukiira CK, Rockers PC. Access to medicines for asthma, diabetes and hypertension in eight counties of Kenya. *Trop Med Int Health* 2018;23:879-85.

27. Egere U, Shayo E, Ntinginya N, Osman R, Noory B, Mpagama S, *et al.* Management of chronic lung diseases in Sudan and Tanzania: How ready are the country health systems? *BMC Health Serv Res* 2021;21:734.
28. Kibirige D, Kampiire L, Atuhe D, Mwebaze R, Katagira W, Muttamba W, *et al.* Access to affordable medicines and diagnostic tests for asthma and COPD in Sub Saharan Africa: The Ugandan perspective. *BMC Pulm Med* 2017;17:179.
29. Reddel HK, Bacharier LB, Bateman ED, Brightling CE, Brusselle GG, Buhl R, *et al.* Global initiative for asthma (GINA) strategy 2021 executive summary and rationale for key changes. *Am J Respir Crit Care Med* 2021;205:17-35.
30. Rabe KF, Pizzichini E, Ställberg B, Romero S, Balanzat AM, Atienza T, *et al.* Budesonide/formoterol in a single inhaler for maintenance and relief in mild-to-moderate asthma: A randomized, double-blind trial. *Chest* 2006;129:246-56.
31. O'Byrne PM, Bisgaard H, Godard PP, Pistolesi M, Palmqvist M, Zhu Y, *et al.* Budesonide/formoterol combination therapy as both maintenance and reliever medication in asthma. *Am J Respir Crit Care Med* 2005;171:129-36.
32. Rabe KF, Atienza T, Magyar P, Larsson P, Jorup C, Lalloo UG. Effect of budesonide in combination with formoterol for reliever therapy in asthma exacerbations: A randomised controlled, double-blind study. *Lancet* 2006;368:744-53.
33. Beasley R, Holliday M, Reddel HK, Braithwaite I, Ebmeier S, Hancox RJ, *et al.* Controlled trial of budesonide-formoterol as needed for mild asthma. *N Engl J Med* 2019;380:2020-30.
34. Hardy J, Baggott C, Fingleton J, Reddel HK, Hancox RJ, Harwood M, *et al.* Budesonide-formoterol reliever therapy versus maintenance budesonide plus terbutaline reliever therapy in adults with mild to moderate asthma (PRACTICAL): A 52-week, open-label, multicentre, superiority, randomised controlled trial. *Lancet* 2019;394:919-28.
35. O'Byrne PM, FitzGerald JM, Bateman ED, Barnes PJ, Zhong N, Keen C, *et al.* Inhaled combined budesonide-formoterol as needed in mild asthma. *N Engl J Med* 2018;378:1865-76.
36. Bateman ED, Reddel HK, O'Byrne PM, Barnes PJ, Zhong N, Keen C, *et al.* As-needed budesonide-formoterol versus maintenance budesonide in mild asthma. *N Engl J Med* 2018;378:1877-87.
37. Mphahlele RE, Kitchin O, Masekela R. Barriers and determinants of asthma control in children and adolescents in Africa: A systematic review. *BMJ Open* 2021;11:e053100.
38. Rylance S, Chinoko B, Mnesa B, Jewell C, Grigg J, Mortimer K. An enhanced care package to improve asthma management in Malawian children: A randomised controlled trial. *Thorax* 2021;76:434-40.

How to cite this article: Refiloe M, Kevin M, Rebecca N, Maia L, Hellen M, Graham D, *et al.* Asthma care in sub-Saharan Africa: Mind the gap! *J Pan Afr Thorac Soc* 2022;3:59-62.