

## Acute asthma treatment guidelines: Reducing morbidity and mortality in South Africa

Asthma is the commonest chronic disease in children and also affects millions of adults throughout the world, with approximately 1 in 7 of the world's population affected. Data from the International Study of Asthma and Allergies in Childhood (ISAAC) have provided a reliable method for assessing time trends in the global prevalence of asthma in children, using standard written and video-presented questionnaires. ISAAC has shown that approximately 13% of 13 - 14-year-old adolescents worldwide have symptoms of asthma, and that the global prevalence is increasing.<sup>[1,2]</sup>

The increase in prevalence is occurring particularly in low- and middle-income countries.<sup>[1,3]</sup> Moreover, such countries report more severe disease, where under-diagnosis and under-treatment are common.<sup>[1-4]</sup> Of concern, in many of these areas, more than 30% of children with severe asthma symptoms have never been diagnosed with asthma.<sup>[4]</sup> In addition, over 80% of asthma-related deaths occur in low- and middle-income countries.<sup>[1]</sup>

The magnitude of the burden of asthma is under-appreciated, in part owing to health systems that are overwhelmed by communicable respiratory diseases such as pneumonia or tuberculosis. This is especially true in South Africa (SA), where the burden of respiratory diseases such as pneumonia, tuberculosis and HIV-associated lung disease is well known but the burden of asthma is under-appreciated. Asthma is the commonest non-communicable disease in SA children, with almost 20% of adolescents reporting asthma symptoms.<sup>[3,6]</sup> Data on adults in SA are less reliable, but it is estimated that the prevalence of asthma is between 6% and 10% and is rising. Under-diagnosis and under-treatment remain problematic, as indicated by a large proportion of adolescents with asthma symptoms who have never been diagnosed or who continue to experience severe symptoms despite diagnosis.<sup>[4]</sup>

While asthma-related mortality appears to have decreased, mortality rates are still high, especially among formerly disadvantaged

racial groups,<sup>[7]</sup> with SA ranked fourth or fifth highest in the world for asthma mortality.<sup>[5]</sup> Despite the availability of medications including inhaled corticosteroids, asthma remains poorly controlled in many patients.<sup>[8,9]</sup> Doctors and patients differ markedly in their assessments of what constitutes asthma control.<sup>[9]</sup> Collectively, these data indicate that diagnosis and management of children and adults with asthma in South Africa is suboptimal.

SA has a well-developed healthcare system, an essential drugs list that includes the main drugs needed for management of acute and chronic asthma in children and adults, an active national asthma education programme, and professional societies that are closely involved in the development of evidence-based guidelines for management of childhood and adult asthma.<sup>[10]</sup> Several studies have shown that with effective management of asthma, including appropriate controller therapy and timely treatment of acute asthma exacerbations, asthma mortality and morbidity can be substantially reduced. However, as a consequence of poor recognition of asthma and inadequate use of effective controller therapy, many patients present for the first time with an acute exacerbation of asthma associated with longstanding uncontrolled airway inflammation and progressive airflow limitation. Acute asthma exacerbations and hospitalisation account for much of the economic burden of asthma. Appropriate treatment of acute exacerbations and implementation of controller medication are essential to reduce asthma-associated morbidity and mortality.

It is therefore timely that updated national guidelines for the management of acute asthma have been produced, both for children and for adults.<sup>[11,12]</sup> These guidelines are designed to ensure best practices for the care of children or adults with acute asthma, and they also recommend implementation of long-term controller medication. The guidelines emphasise better utilisation of inhaled bronchodilators (beta-2-agonists and ipratropium bromide) and

oxygen, and immediate administration of oral or intravenous corticosteroids. Administration of intravenous magnesium sulphate has proved beneficial in severe acute asthma that is refractory to usual treatment.

There is still reluctance to use a metered dose inhaler with spacer to administer relatively large doses of beta-2-agonists in mild to moderate acute asthma. This is a cost-effective method of administration that facilitates immediate implementation of treatment in primary healthcare settings. Administration of an inhaled beta-2-agonist, via a metered dose inhaler with spacer, is as effective as nebulised treatment, and is associated with fewer side-effects, making this an effective first-line therapy.<sup>[13]</sup> The guidelines continue to emphasise immediate administration of systemic corticosteroids for acute asthma, to promote rapid resolution of the exacerbation and prevent relapse.

The guidelines that appear in this edition of the *SAMJ*<sup>[11,12]</sup> are consistent with international guidelines for the treatment of acute asthma and have been simplified for ease of implementation in all healthcare settings in SA. While it is disappointing that no new or novel interventions have been developed for acute asthma, current treatment strategies are effective in the vast majority of patients, especially when initiated early in the asthma attack. Furthermore, the emphasis should always be on effective control of asthma to prevent acute attacks, for which regular inhaled corticosteroids remain the most effective first-line therapy. This has been achieved in many regions of the world and has led to a decline in mortality and reduction in intensive care admissions. But it remains a challenge in many low- and middle-income countries, including SA.

Even the best guidelines cannot impact on care, or improve outcome, if they are not disseminated or implemented. The importance of guideline dissemination and uptake has recently received greater attention.<sup>[14-16]</sup> There are a number of challenges to successful implementation, due to factors within the health system and as a result of individual behaviours of healthcare providers and of patients or caregivers.<sup>[14]</sup> Socio-economic and structural barriers that impair access to health services remain obstacles. Moreover, educational programmes for healthcare personnel and for the public that are effective in changing practice are needed for effective implementation.

Ultimately, effective implementation depends on healthcare workers who can correctly diagnose and manage asthma, access to appropriate inhaled and other therapy, environmental control of potential triggers of asthma, and education of patients and caregivers on the most effective management strategies. Educational interventions, delivered to patients, caregivers or both,<sup>[17]</sup> reduce the risk of subsequent unscheduled doctor visits, attendances at emergency facilities and requirement for admissions to hospital. Education given during admissions is effective in reducing subsequent exacerbations, emergency visits, oral steroid use and rehospitalisations.<sup>[18]</sup>

In SA, improper or inadequate implementation of guidelines is a major reason for poor asthma management. The Asthma Guidelines Implementation Project (AGIP) was established to improve implementation of the South African Guidelines for Asthma in Adults and Adolescents in primary care facilities in the Western Cape province. AGIP has highlighted several deficiencies, including inability of healthcare workers to adequately distinguish asthma from chronic obstructive pulmonary disease; lack of assessment of control of asthma as recommended by the guidelines; failure to demonstrate or assess the patient's inhaler technique; and lack of patient education.<sup>[8]</sup> Access to care is an additional important factor limiting effective implementation of guidelines. As evidence of this, low socio-economic class was closely correlated with fatal or near-

fatal asthma in a South African study; asthma mortality was highest over weekends, when access to care was poorest.<sup>[7]</sup>

Although primary care facilities are within reach of most communities, loss of income, waiting times in clinics, cost of transportation, inconvenient hours, lack of trained and qualified healthcare personnel, and lack of availability of essential asthma medicines and spacer devices (especially relevant to children) constitute potentially major barriers to care.<sup>[10,19]</sup> Future challenges include provision of educational programmes for healthcare professionals and for the public that are culturally and language appropriate, combating cultural misconceptions around asthma care, and ensuring access to and availability of new controller medications such as combination therapy.<sup>[19]</sup>

Asthma is a controllable disease – with current, available therapy, almost all those with asthma should be able to enjoy a regular lifestyle and achieve normal activity. Death or hospitalisation from asthma are preventable, and usually represent failure to implement appropriate management. The aim of producing evidence-based national guidelines for asthma management is to ensure appropriate treatment for all South Africans. Given our large burden of paediatric and adult asthma and the associated morbidity and mortality, effective implementation of such guidelines should be considered an urgent priority.

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1. Asher MI, Montefort S, Bjorksten B, et al., and the ISAAC Phase Three Study Group. Worldwide trends in the prevalence of symptoms of asthma, allergic rhinoconjunctivitis and eczema in childhood: ISAAC Phases One and Three repeat multicountry cross-sectional surveys. *Lancet* 2006;368(9537):733-737.
2. Pearce N, Ait-Khaled N, Beasley R, et al. and the ISAAC Phase Three Study Group. Worldwide trends in the prevalence of asthma symptoms: phase III of the International Study of Asthma and Allergies in Childhood (ISAAC). *Thorax* 2007;62(9):757-765.
3. Ait-Khaled N, Pearce N, Anderson HR, et al., and the ISAAC Phase Three Study Group. Global map of the prevalence of symptoms of rhinoconjunctivitis on children in Africa: The International Study of Asthma and Allergies in Childhood (ISAAC) Phase 3. *Allergy* 2009;64(1):123-148.
4. Lai CK, Beasley R, Crane J, et al. International Study of Asthma and Allergies in Childhood Phase Three Study Group. Global variation in the prevalence and severity of asthma symptoms: Phase Three of the International Study of Asthma and Allergies in Childhood (ISAAC). *Thorax* 2009;64(6):476-483.
5. Masoli M, Fabian D, Holt S, Beasley R; Global Initiative for Asthma (GINA) Program. The global burden of asthma: Executive summary of the GINA Dissemination Committee report. *Allergy* 2004;59(5):469-478.
6. Zar HJ, Ehrlich RI, Workman L, Weinberg EG. The changing prevalence of asthma, allergic rhinitis and atopic eczema in African adolescents from 1995 to 2002. *Pediatr Allergy Immunol* 2007;18(7):560-565.
7. Zar HJ, Stickells D, Toerien A, et al. Changes in fatal and near fatal asthma in an urban area of South Africa from 1980-1997. *Eur Respir J* 2001;18(1):33-37.
8. Mash B, Rhode H, Pather M, et al. Quality of asthma care: Western Cape Province, South Africa. *S Afr Med J* 2009;99(12):892-896.
9. Greenblatt M, Galpin JS, Hill C, Feldman C, Green RJ. Comparison of doctor and patient assessments of asthma control. *Respir Med* 2010;104(3):356-361.
10. Lalloo UG, Walters RD, Adachi M, et al. Asthma programs in diverse regions of the world: Challenges, successes and lessons learnt. *Int J Tuberc Lung Dis* 2011;15(12):1574-1587.
11. U G Lalloo, G M Ainslie, M S Abdool-Gaffar, A A Awotodu, C Feldman, et al. (Official Working Group of the South African Thoracic Society). Guideline for the management of acute asthma in adults: 2013 update. *S Afr Med J* 2013;103(3):189-198. [http://dx.doi.org/10.7196/SAMJ.6526]
12. S Kling, H J Zar, M E Levin, R J Green, P M Jeena, S M Risenga, et al. Guideline for the management of acute asthma in children: 2013 update. *S Afr Med J* 2013;103(3):199-207. [http://dx.doi.org/10.7196/SAMJ.6658]
13. Cates CJ, Crilly JA, Rowe BH. Holding chambers versus nebulisers for beta-agonist treatment of acute asthma. *Cochrane Database Syst Rev* 2006;3:CD000052.
14. Boulet LP, Fitzgerald JM, Levy ML, et al. A guide to the translation of the GINA strategy into improved care. *Eur Resp J* 2012;39(5):1220-1229.
15. Baiardini I, Brado F, Bonini M, et al. Why do doctors and patients not follow guidelines? *Curr Opin Allergy Clin Immunol* 2009;9(3):228-233.
16. Grol R, Grinshaw J. From best evidence to best practice: Effective implementation of change in patients' care. *Lancet* 2003;362(9391):1225-1230.
17. Boyd M, Lasserion TJ, McKean MC, et al. Interventions for educating children who are at risk of asthma-related emergency department attendance. *Cochrane Database Syst Rev*: Reviews 2009(2).
18. Espinoza-Palma T, Zamorano A, Arancibia F, et al. Effectiveness of asthma education with and without a self-management plan in hospitalised children. *J Asthma* 2009;46(9):906-910.
19. Zar HJ, Levin ME. Challenges in treating paediatric asthma in developing countries. *Pediatr Drugs* 2012;14(6):1-7.

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