Quality of asthma care: Western Cape Province, South Africa

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Background. Asthma is the eighth leading contributor to the burden of disease in South Africa, but has received less attention than other chronic diseases. The Asthma Guidelines Implementation Project (AGIP) was established to improve the impact of the South African guidelines for chronic asthma in adults and adolescents in the Western Cape. One strategy was an audit tool to assist with assessing and improving the quality of care.

Methods. The audit of asthma care targeted all primary care facilities that managed adult patients with chronic asthma within all six districts of the Western Cape province. The usual steps in the quality improvement cycle were followed.

Results. Data were obtained from 957 patients from 46 primary care facilities. Only 80% of patients had a consistent diagnosis of asthma, 11.5% of visits assessed control and 23.2% recorded a peak expiratory flow (PEF), 14% of patients had their inhaler technique assessed and 11.2% were given a self-management plan; 81% of medication was in stock, and the controller/reliever dispensing ratio was 0.6. Only 31.5% of patients were well controlled, 16.3% of all visits were for exacerbations, and 17.6% of all patients had been hospitalised in the previous year.

Conclusion. The availability of medication and prescription of inhaled steroids is reasonable, yet control is poor. Health workers do not adequately distinguish asthma from chronic obstructive pulmonary disease, do not assess control by questions or PEF, do not adequately demonstrate or assess the inhaler technique, and have no systematic approach to or resources for patient education. Ten recommendations are made to improve asthma care.

S Afr Med J 2009; 99: 892-896.

Asthma is the eighth leading contributor to the burden of disease in South Africa and is the second most important chronic disease after HIV/AIDS.[1] Asthma is often not considered particularly serious, but it causes significant morbidity in young and working-age adults that adds to the number of disability-adjusted life years (DALYs) in relation to other chronic diseases. The prevalence of recent wheeze in adults is reported as 14.4% in males and 17.6% in females, with a self-reported prevalence of asthma of 3.7% and 3.8% respectively.[2] In the Western Cape the prevalence of asthma among children aged 13 - 14 years was 14.4%, slightly above the global average of 13.7%.[3,4] The prevalence of asthma in children is rising in sub-Saharan Africa.[3]

Access to essential drugs for asthma, including inhaled steroids, is better in South Africa than in other sub-Saharan countries. Because of the overwhelming HIV/AIDS epidemic and the primary health care services focus on acute episodic conditions, chronic asthma has not received priority attention. The South African Thoracic Society published new guidelines for chronic asthma in adults and adolescents[5] and funded a multifaceted dissemination and implementation strategy in the Western Cape.[6] The Asthma Guidelines Implementation Project (AGIP) developed an audit tool to assist primary care facilities with quality assessment and improvement. It aimed to elicit reflection on the quality of care and to plan improvements at facility level. As the first evaluation of the quality of asthma care at provincial level in South Africa it sets a benchmark for future audits and gives valuable insights into asthma care. As the Western Cape is better resourced than other provinces its quality of asthma care is likely to be better than elsewhere.

District health services in the Western Cape province serve 5 million people, of whom 80% are uninsured and depend on the public sector. The province is divided into six districts: Cape Town Metropole, West Coast, Winelands, Overberg, Eden and Karoo, each served by a network of mobiles, clinics, community health centres and district hospitals. First-line primary care is largely provided by clinical nurse practitioners

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supported by medical officers and pharmacists. Chronic asthma is managed by primary care providers, and acute asthma by district hospitals and, if necessary, regional or tertiary hospitals. Patients with complicated or difficult chronic asthma may be referred to specialists at regional or tertiary levels.

Methods

We audited all primary care facilities that managed adult patients with chronic asthma within all six districts of the Western Cape following the quality improvement cycle comprising the following steps:

- Set criteria and performance levels to define target standards (ideal performance)
- Collect data to measure these criteria
- Analyse the data and calculate the actual performance
- Compare ideal and actual performance, reflect and plan changes to improve the quality of care.

Development of target standards and the audit tool

The audit tool was developed by the AGIP advisory group, comprising a pharmacist, 2 nurses, 2 family physicians and 2 pulmonologists, with comments by the Provincial Deputy Director for Chronic Diseases. Criteria were developed for structure, process and outcome and performance levels were defined to create target standards. They were based on the newly published chronic asthma guidelines and literature on asthma audits. The controller/reliever ratio is the ratio of inhaled steroid to beta-2-agonist canisters dispensed over 1 year. A ratio greater than 0.5 suggests that sufficient inhaled steroid is being prescribed and has been associated with better quality of life, better control, fewer symptoms and fewer hospitalisations or exacerbations.[7] Structural criteria focused on the availability of equipment, patient education material and medication. Process criteria focused on key activities recorded in the medical record. Outcome criteria relied on interviewing patients on their level of control using the validated Asthma Control Test questionnaire and score.[8] Patients were asked about exacerbations and hospitalisations in the past year and their understanding of reliever versus controller medication. Each facility was expected to include 20 randomly or systematically selected asthma patients. The final audit tool consisted of data collection sheets, patient questionnaires in English, Afrikaans and Xhosa, reminders of how to calculate the results, a 1-page summary sheet of the final results, and a user's guide. Materials are available on the Internet at www. pulmonology.co.za.

The audit tool was piloted in a rural district before being finalised. This revealed that staff were reliable as regards collecting raw data from observation, review of the patient records and patient interviews, but poor at simple

mathematical calculations to produce results. The tool was time-efficient and the district manager was positive about its utility at district level. Once finalised the Health Information System Project (HISP) created a software package as part of the District Health Information System (DHIS) to automate the calculation of results and provide a 1-page report. The DHIS is used in at least six of the nine provinces of South Africa, although not officially in the Western Cape. The DHIS was offered to facility level staff to assist them in analysing and obtaining their results immediately.

Introductory workshops were held in the six districts, and primary care providers involved in asthma care were invited to attend. Participants were mainly nurses, but included doctors and pharmacists, and came from mobile clinics, fixed clinics, community health centres and district hospitals. They were trained to use the audit tool, the principles of the quality improvement cycle and how to collect and calculate the audit results. The AGIP project manager remained in telephonic contact with the participants and encouraged facilities to complete and return the audit data. Outreach visits were conducted on request to assist with the audit process. In the metropole data collection was more rigorously supported as part of a doctoral research project.

Data were entered into the DHIS Version 4.12 and results calculated at the facility, district and provincial level. A 1-page summary of the results was returned to facilities by fax or e-mail. Follow-up workshops were held in the second half of the year in each district at which participants were asked to reflect on their results, plan changes to improve asthma care and provide feedback on the audit tool.

Results

The key findings of the audit in 46 facilities and 957 patients are shown in Table I.

Discussion

The target was only reached for 3 of the 16 structural criteria; the availability of a height measure in the facility, oxygen and a nebuliser in the emergency room. Of 7 process criteria the target was only reached for the controller/reliever ratio. None of the outcome criteria was achieved. The Western Cape has better health worker resources than other provinces, and these results would probably be worse elsewhere.

Outcomes of care

The many deficiencies in quality of care contributed significantly to the poor outcomes. Although up to 70% of asthma patients can be well controlled when current guidelines are followed,[9] only 31.5% of patients in this audit achieved this outcome. This finding is supported by high rates of hospitalisation, with almost 1 in 5 patients having been hospitalised during the past year and 1 out of every 6 visits

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Table I. Results of asthma audit in the Western Cape province

Criteria	Target	Western Cape province
Structure		
Consulting rooms with (%):		
A functional PEFR meter	90	53.6
A reference chart for the PEFR	90	59.5
A published asthma guideline	90	78.6
A spacer for demonstration and education	90	55.4
Placebo inhalers for demonstration and education	90	32.7
Printed patient educational material	90	57.7
Facilities with (%):		
A member of staff with ongoing responsibility for asthma	90	41.7
Provision for group health education on asthma	90	35.4
Patient education materials in all languages	90	29.2
A height measure	90	97.9
A spacer in the emergency room	90	72.9
A nebuliser in the emergency room	90	100.0
Oxygen in the emergency room	90	95.8
A PEF meter in the emergency room	90	66.0
Medication in stock on day of audit (% of required med. across province)	90	81.0
Medication in stock over previous month (% of required med. across province)	90	79.5
Process		
Patients with a consistent diagnosis of asthma (%)	95	80.0
Routine visits with an assessment of asthma control (%)	80	11.5
Patients with written self-management plan (%)	80	11.2
Routine visits where the PEFR was recorded (%)	80	23.2
Patients with an assessment of inhaler/spacer technique (%)	95	14.0
Patients with record of smoking status (%)	95	30.7
Controller/reliever ratio	>0.5	0.6
Outcomes		
Patients who are totally/well controlled (%)	70	31.5
Patients who can explain the difference between reliever and controller (%)	80	60.8
Proportion of all visits for asthma emergencies/exacerbations (%)	<10	16.3
Patients who have been hospitalised (%)	<5	17.6

to the facility being for an exacerbation. Emergency visits and hospitalisation result in hugely increased health service costs. More effective routine care would improve patient quality of life and save costs.

Many patients appeared to understand the difference between their relievers and their controllers, although this was determined by the interviewer and was open to subjective interpretation. Better adherence can be expected in those who understand the difference between reliever and controller.[10]

Diagnosis of asthma

Patients were often labelled 'asthmatic' one month and 'chronic obstructive pulmonary disease (COPD)' the next. Primary care practitioners do not seem to make this distinction clear, and this is reflected in 1 in 5 patients having an inconsistent diagnostic label over the audit period. There was a significant correlation between the percentage of patients with a consistent diagnosis of asthma and the control of asthma (Spearman correlation –0.4, p=0.01), which implied that as the consistency improved the level of control deteriorated. If all the audited patients had a consistent diagnosis of asthma the percentage

that was well controlled might be as low as 24%. Practitioners must be helped to distinguish between asthma and COPD in terms of diagnostic criteria, assessment methods and treatment options. In our setting many patients develop COPD as a result of TB, exposure to the burning of biomass and mining and not only prolonged tobacco smoking. Smoking status, a key asthma trigger and pointer to the possibility of COPD, was documented in just under a third of patients.

Assessment of control

The level of control was rarely assessed, and a typical assessment would read 'known asthmatic'. If the patient appeared stable at the consultation, his or her medication was simply repeated. Health workers may not have been trained in how to assess control using simple questions and may not appreciate that variability in asthma symptoms necessitates asking about symptoms over the past 4 weeks and not just on the day the patient is seen. The AGIP adapted the 20-second asthma check provided by the National Asthma Education Programme, which is congruent with the latest guidelines (Table II).

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Table II. Five questions used to assess asthma control over the last 4 weeks
1. Do you use your reliever 3 or more times a week? (except one dose/day for exercise)
2. Do you wheeze, cough or have a tight chest during the day, 3 or more days a week?
3. Does wheezing, coughing or chest tightness wake you at night or early in the morning?
4. Have you ever stopped your usual activities because of your asthma in the last 4 weeks?
5. Have you made an emergency visit to a health worker because of your asthma in the last 3 months?
If you have 3 or more 'yes' answers, your asthma is UNCONTROLLED
If you have 1 or 2 'yes' answers, your asthma is PARTLY CONTROLLED
If you have answered 'no' to all the questions, your asthma is CONTROLLED

Use of peak flow meters

Although cheap, peak expiratory flow (PEF) meters were only available in half of the consulting rooms and PEF was only recorded in about a quarter of all visits. The need for PEF meters remains controversial, as control of asthma can be adequately assessed using questions alone (Table I). It has therefore been argued that PEF meters are not essential for prescribing inhaled steroids, in contradiction to the recommendations of the national Essential Drug List (EDL). Nevertheless the PEF gives an objective and comparable measure of airways obstruction and identifies patients who may have significant airways obstruction without symptoms.[11] Likewise there are a smaller number of patients whose symptoms are out of proportion to the objective clinical signs and PEF. The PEF has additional diagnostic benefits and is essential in managing acute asthma. Each facility should therefore have a PEF meter, and if PEF is to be recorded as part of the consultation it should be easily available.

Medication

Overall the availability of medication on the EDL was a strong point and may reflect its emphasis in provincial chronic disease policy during 2006 - 2008. Salmeterol availability was included in the assessment, although not on the primary care code, as it could be initiated by hospital-based physicians and obtained at primary care facilities. The AGIP are motivating that long-acting beta-2-agonists (LABAs) be made more accessible to patients by family physicians prescribing them within the district health services. Guidelines support the use of LABAs with low or moderate doses of inhaled steroids rather than doubling the dose of inhaled steroids.[5]

Education on spacer and inhaler technique

Effective supply of medication and appropriate prescribing is worth nothing if actual delivery of medication to the lungs is poor. A neglected area of care was educating patients on how to use their delivery devices. Assessment of individual technique was seldom recorded, and few rooms had placebo metered dose inhalers (MDIs) to facilitate demonstration of the technique. The ability of staff to demonstrate the MDI is poor even when placebos are available.[12] Local studies have confirmed poor inhaler techniques among patients[10,12] that contribute to poor deposition of medication and poor control. Although patient education is highlighted in all guidelines, including the National EDL, the pharmaceutical depot had no provision for supplying facilities with placebo MDIs. The AGIP enabled staff to demonstrate the delivery devices and developed demonstration DVDs in local languages. DVDs do not require the local staff to be proficient at demonstrating the technique, and there is evidence that they are useful.[12]

Whether all patients on inhaled steroids, or only those with a poor technique, should receive a spacer routinely, has been debated. Spacers have not been sufficiently available to provide one to each patient, and yet even in patients with a good inhaler technique they improve lung deposition considerably.[5] Spacers also require a degree of technique, but reduce the need for co-ordination of actuation and inspiration and would also be easier for staff to demonstrate correctly. A single spacer will last for at least a year with minor cost in relation to improved control. Although non-valved spacers are cheaper, the valved spacer would support tidal breathing as an effective way of using the spacer. In a non-valved spacer, if the patient exhales first the medication may be blown out of the spacer. Providing a valved spacer to every asthma patient requiring inhaled steroids is therefore likely to be cost-effective. Alternatively dry-powder devices could be made available to improve lung deposition in selected asthma patients. These are not available in the public sector.

Supporting patient self-care and health literacy

Although just over half the consulting rooms had some educational material, very few had material in all the local languages. The province had no official health education materials for asthma before the AGIP, and therefore any materials were obtained *ad hoc* by the facility. It is therefore not surprising that only a small number of patients had a written self-management plan. The AGIP patient leaflet was designed to be personalised as part of a self-management plan. Group education was an option for urban CHCs, where large numbers of asthma patients attended on specific days, but not in the rural clinics and mobiles, where they attended randomly. The potential for group education in the urban setting led AGIP to develop a flip-chart and a structured educational programme.

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Table III. Ten recommendations to improve asthma care

1. Train practitioners to distinguish between asthma and COPD and understand their different assessment and management. An AGIP desktop manual supports this decision making.
2. Train practitioners in how to assess the control of asthma.
3. Routinely provide all asthma patients on inhaled steroids with a valved spacer.
4. Make PEF meters and reference charts easy to order and available and ensure that they are available in the emergency room. A PEF meter should be available to every practitioner in their consulting room.
5. Include placebos in the provincial pharmaceutical catalogue and make them available through the pharmaceutical depot.
6. Consider the addition of dry-powder devices to the provincial pharmaceutical catalogue.
7. Provide practitioners with placebos, spacers, DVDs and the expertise they need to assess and demonstrate inhaler technique.
8. Consider making LABAs more accessible in the district health system via family physicians.
9. Improve patient education programmes by providing materials for use at individual and group level, in all local languages and available in a sustainable way through official channels.
10. Have at least one person in the facility with a specific long-term responsibility for the organisation and delivery of chronic care for non-communicable diseases.

Emergency care

Overall the provision of equipment for emergency care was good. This may reflect the historical emphasis on acute episodic health care.

Organisation of chronic care

The sustained implementation of innovations to improve chronic care depends on at least one person in the health facility having chronic care of non-communicable diseases as a long-term responsibility.[13] Frequent rotation of nursing staff to different duties impedes the development of chronic care systems, and in most facilities there is no one with designated responsibility for asthma care.

Well-trained and supported clinical nurse practitioners are as competent as doctors in providing routine chronic care and may be better at patient education.[14] However, doctors are required for the initial diagnosis, prescription of certain medication, and managing more complicated or difficult cases. Public sector pharmacists have not moved beyond dispensing to assist with educating patients on using medication and identifying those who need further assessment.[15]

Limitations

The audit facilities were not randomly selected and could therefore be biased with regard to the factors influencing their participation. In our opinion it is not very likely that these facilities are substantially different to those that did not contribute. The small number of patients sampled at facility level limits the validity of results for a specific facility, but collated at the district and provincial level should give a valid estimation of the true picture.

Conclusion

The implementation of 10 recommendations to improve asthma care (Table III) requires a co-ordinated effort between the managers of the drugs and therapeutics committees, human resources and training, chronic care and district health services at the district, provincial and national levels.

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