PATIENT EDUCATION IN ALLERGY — ROLE OF THE ALLERGY/ASTHMA NURSE AND THE PRACTICALITIES OF TAKING CARE OF THE ALLERGY CLINIC

Geraldine Brown, Chief Professional Nurse, NAEP accreditation
NAEP, Rondebosch, Cape Town, South Africa

Sheila Baker, BSc Nursing, MSc Med, NAEP accreditation
Allergy Diagnostic and Clinical Research Unit, UCT Lung Institute, Cape Town, South Africa

A National Asthma Education Programme (NAEP)-accredited asthma educator nurse can play a vital role in the holistic care of the allergy patient.

RESOURCES NEEDED

In order to work effectively together with a team, the nurse in the allergy clinic has to be up to date and knowledgeable about asthma (lung functions and asthma education), atopy, allergen avoidance, tests (skin-prick tests and blood tests for allergies, Phadiatop and Immunocap radio-allergosorbent tests (RASTI), eczema (wet wraps), urticaria and angio-oedema. The position also requires her to be competent to deal with emergencies including anaphylaxis and acute severe asthma.

Patient education pamphlets and charts (in most common languages) are essential and readily available through NAEP (naep@netactive.co.za) and AGRIP (Asthma Guidelines Implementation Project), and patient education leaflets are available in English, Afrikaans and Xhosa (www.pulmonology.co.za) and in English from ALLSA (www.allergyrsa.org). Devices are available from drug companies. In addition, emergency equipment (adrenaline, short-acting β2-agonists (SAB2), intravenous (IV) infusions), nebuliser, different peak flow meters (for adults and children), spacers, disposable mouth pieces, placebos, etc. should be readily available. Oxygen, spirometers for lung function tests and allergen extracts within their expiry date clearly also need to be at hand. A 2011 medication identification chart of asthma therapy is available at www.asthma.co.za

THE NURSE’S ROLE IN ASTHMA CARE

Asthma and allergies are on the increase, coupled with the facts that all too frequently patient adherence and inhaler use are less than optimal. Therefore, it stands to reason that a well-trained allergy nurse is an important member of the health team, and the following should be considered absolute norms of standards:

- Guidelines for the management of both adults and adolescents (published in South African Family Practice)¹
- Guideline for the management of chronic asthma in children — 2009 update.²

Clinical assessment and administering of bronchodilator

Assess the patient on arrival. A severe acute asthma attack should be recognised, treated and a doctor informed.

Be aware of a clearly distressed patient with hunched shoulders, together with inability to speak full sentences (or inability to feed if a small child). In addition, children with severe attacks may well not appear distressed and assessment in the very young may be difficult. Record baseline peak flow, respiratory rate, heart rate and O₂ saturation, the latter (saturation) while the patient is not receiving O₂. On doctor’s orders give a high-dose bronchodilator by oxygen-driven nebuliser (use a mouthpiece rather than a mask wherever possible), followed by oral corticosteroids. There is good evidence that giving a rapidly acting β₂-agonist with a metered dose inhaler (MDI) via a spacer is as effective as giving it by nebulisation (particularly a non-oxygen-driven nebuliser).

Adults need 6-20 puffs into spacer (in mouth), using 1 puff at a time, and allowing the child to breathe 4-5 times with 30-second rest period in between.

Should reversing the patient with MDI plus spacer be decided upon, it must be ascertained that adequate numbers of spacers are available in the busy clinic. Removing a spacer directly from a strong-smelling disinfectant in order to administer SAB2 via a spacer could well trigger further symptoms.

Identification of the severe attack and further management

The criteria for hospital admission include any life-threatening features, and/or any features of a severe attack which persists after initial treatment. Danger signs could include a history of previous ICU admissions, an attack that lasts longer than 12 hours, patient remains ill in spite of having taken oral steroids for a period of time, and if the patient’s asthma is more brittle than previously evaluated.

Once clinical symptoms have settled (observe for 1 hour), patient education should include assessing why this occurred: possible empty/expired inhaler, incorrect technique, non-adherence, new triggers (e.g. new home, new job, new medication). The educator would then proceed to refine the patient’s self-management, supply necessary prednisolone tablets/or script for same, check inhaler technique and ascertain adherence, discuss what to do and where to go in future, question as to whether this patient is more brittle than previously mentioned (or needs a referral to a specialist), make a follow-up appointment and discuss warning signs of asthma. These include noting a fall in peak flow values with wide variations (more than 15% per day), inability to achieve optimum peak expiratory flow (PEF) level even after SAB2, increased symptoms of sleep disturbance, fall in exercise tolerance, increased need for bronchodilators with decreased effectiveness of same. See the article “Treatment of acute asthma in children”.³

Management of a new patient and follow-up appointments

Weight, height and blood pressure are recorded on each visit, and in the case of children, percentile charts
should be used in order to plot growth. Ascertain frequency of symptoms: recurrent cough, particularly at night, wheeze, shortness of breath and tight chest. Be aware of symptoms that are worse or prolonged in the presence of triggers, and patient history (or family history) of eczema, rhinitis, allergies, etc. Exacerbations – note frequency and duration. Finally, observe for obvious signs of allergy, eczema, allergic salute.

**Conducting lung function tests (LFTs) in the clinic**

**Peak expiratory flow.** Compare PEF with best personal or charts of predicted value for age/height (adults) or height (children) and record. Patient should stand. Take 3 readings, and record the highest of these. Always demonstrate carefully to new patients. The educator should be aware of the following: use the same type of peak flow; under 4 years the readings may not be accurate. Factors which affect PEF include chronic obstructive pulmonary disease (COPD), technique, time of day, recent use of bronchodilator, and false teeth. If PEF is less than expected, give an adequate dose of SAB2, wait 10 minutes and then redo the LFTs. Work out peak flow variability. Subtract the lowest reading from the highest reading, divide by the highest reading, multiply by 100% and this will then give you the percentage variability. More than 15% diurnal or variation on bronchodilator reversibility testing, exercise testing or steroid trial testing may indicate or confirm asthma.

**Flow volume loop, forced expiratory volume after 1 second (FEV1) and forced vital capacity (FVC).** These lung volumes and capacities are measured with spirometers. Correct blowing technique and evaluation of normal and abnormal should be carried out. The educator should be knowledgeable regarding normal and abnormal curves (possibly due to insufficient cooperation as opposed to irritable airways). Most modern LF equipment will show pre- and post-bronchodilation, with percentages, readily and easily. Print and attach for doctor in the folder.

It is a good idea to encourage patients to bring their devices (including spacers) to the clinic visit every time.

After the doctor has seen the patient and taken a full detailed history (current and past medical, asthma, smoking history, occupation, previous and current asthma medication, over-the-counter meds, etc), the nurse might be asked to conduct or explain one of the following tests to the patient, in order to confirm his/her suspicions of asthma, in spite of normal LFTs.

**Use of diary cards**

Keeping and recording peak flow at home for 2 weeks. Give a patient a peak flow meter and peak flow diary chart, so that they can record their peak flow. Advise patient to carry out PEF at the same time of day, every morning and every night, prior to medication, and to record treatment (inhaled corticosteroid, SAB2 and long-acting β2-agonists), and to administer SAB2 when necessary. Patient should record pre and post values.

When patients return for a follow-up appointment, the educator will calculate the PEF variability and be aware that a greater than 15% diurnal variation indicates asthma (very often an early morning dip), and that a stable PEF recording within normal range indicates that asthma (if present) is well controlled. Patients should be encouraged never to stop medication until they have seen the doctor.

**Conducting an exercise test**

Measure peak flow (highest of 3 readings). Patient then takes vigorous continuous exercise for 6 minutes, repeat the PEF immediately, and repeat at 5-minute intervals for 15 minutes. A fall of 15% or more is positive. Administer SAB2 if necessary. Always bear in mind that the greater the variability, the more hyperresponsive the airways.

**Skin-prick tests**

Having taken a good history, the doctor will identify which allergens he/she wishes to be tested. The patient must not have taken any antihistamines for the previous 72 hours. If excema is widespread on the arms, the back may be used. A full and comprehensive explanation can be found in the *ALLSA Handbook*. Patients need to give consent (sign and date the form), and the person performing the skin-prick test must sign as well. Be aware of dermatographism and pseudopodia and record them in the notes. Blood tests may be ordered.

**Education and treating specific allergies**

Identify the allergens and proceed with allergen avoidance information. Provide patient with information sheets. Should any history prove that a trigger is potentially life-threatening, discuss the need for a Medic Alert bracelet. A clearly marked action form should state what to do and when. In a mild reaction antihistamines may suffice, but if there are any respiratory symptoms, then 4 puffs of SAB2 should be administered. Should the reaction be major with breathing difficulties or change in consciousness, then adrenaline should be given intramuscularly. A small pack should be given to take home, with either a vial of adrenaline (check expiry date), or Epipen, with instructions on how to give the adrenaline. The usual dose for an adult is 0.5 ml intramuscularly and for a child over 3 years 0.3 ml intramuscularly immediately. The injection must be repeated if no response in 5 minutes and the patient must be brought to the emergency room.

Most common inhalant allergens tested are: house-dust mite (HDM), grass, moulds, dog, cat, tree – seasonal changes will determine further requests. Skin-prick tests are also available for a range of food allergens and their negative predicted value is very good.

**Practical tips on how to avoid HDMs** (the most common allergen). While this can be time-consuming, it is of vital importance, because together with appropriate pharmacotherapy, you can improve the control of a patient with asthma. Mattress, duvet and pillow cases should be encased in high-quality, mite-impermeable covers. Hot water (>60°C) is effective in killing HDM. Rooms should not be vacuumed while the patient is in the room, and soft toys should be placed in the freezer overnight once a month.

**Treating concomitant rhinitis.** Unless the often concomitant allergic rhinitis is treated, asthma can remain uncontrolled in spite of optimal treatment. Rhinitis education should include: using the nasal spray as often as prescribed by the doctor. There may well not be an apparent immediate effect, but continuous use is essential. Blow the nose gently (most rhinitis sufferers will be more prone to nose bleeds than the general population). These patients will also have more mucus and sneezing than others. Shake the medicine, and then insert into the nose, turning the end of the canister on the right side in the direction towards the right ear and left towards the left ear. Try not to blow the nose for some time thereafter. Depending on the severity of the symptoms, drug therapy will involve antihistamine tablets and/or nasal corticosteroids. In cases of severe seasonal allergic rhinitis to grass and other mono-allergens, allergen injection or sublingual administration of immunotherapy may be used. This can be effective and needs adherence for 3 years, so the doctor needs to identify appropriate patients.
Atopic dermatitis or eczema. All allergy nurses should be able to teach and demonstrate wet wrapping, especially for infants. This involves applying stockinette bandages to the body and limbs. After bathing the child, apply emulsifying ointment in place of soap. Pat the child dry with a clean towel and immediately apply a layer of ointment (and topical steroid cream if so ordered). Place one bandage in warm tap water and apply to the area, followed by a second dry bandage. Encourage parents to keep this on while the patient is sleeping. No occlusive bandaging should be applied to an infected skin.

Education should also include avoidance of irritants, e.g. heat, wool and soap. Avoid allergens (HDM, animal, food). Apply emollients as frequently as possible, with intermittent or when necessary topical steroid (as per prescription) application, when the eczema is active. Encourage the patient to stop after 7 continuous days of use, to take a break for a few days, then if not improved, to recommence. The aim is to use the weakest steroid for the shortest time needed, in order to control active disease. Do not apply 10% steroid to the face. Keep the patient’s fingernails short and recognise and treat infections. Patients often undertreat with topical steroids.

Parents should also be told that eczema is not contagious or infectious. The school teacher could be informed. However, as eczema skin often dries, cracks and breaks, it puts the sufferer at a greater risk of contracting skin infections. Treat these immediately.

Advice includes: moisturise 4-hourly, apply ice (in a wrapping, it cools and can help ease itching), wear 100% cotton clothing, remove labels from clothes, and place cotton sheets on the patient’s chair to avoid itching and burning at the back of the legs.

**Table I. Asthma devices**

<table>
<thead>
<tr>
<th>Device</th>
<th>Technique</th>
<th>Care</th>
<th>Age</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDI</td>
<td>Requires co-ordination. Practice in front of mirror, Any questionable technique should prompt the use of a spacer or dry powder device</td>
<td>Keep dry and cool. Do not immerse in water. Shake before use and replace cap after use</td>
<td>Children/certain adults use spacer for enhanced deposition (Fig. 1)</td>
<td>Patient to keep reliever with them at all times. Rinse sieve if blocked. Rinse mouth after ICS. Only actuate one dose at a time. Slow, deep inspiration is best.</td>
</tr>
<tr>
<td>Turbuhaler</td>
<td>Twist anti-clockwise till the click is heard. No sound, taste or feel. Long slow suck necessary.</td>
<td>Check dose counter, red marker indicates last few doses</td>
<td>Not suitable for the young child</td>
<td>Symbicord can be used when necessary in acute asthma. No refill available. Rinse mouth after ICS.</td>
</tr>
<tr>
<td>DP Caps, used with either DP inhaler or Revolizer</td>
<td>Long slow thirsty suck. Easy to identify if dose has been taken.</td>
<td>Clean mouthpiece. Keep capsules in dry and cool conditions</td>
<td>Not for the young or tight patients</td>
<td>Rinse mouth after use. One blue capsule of SAB2 contains 200 μg.</td>
</tr>
<tr>
<td>Novolizer</td>
<td>Shows green strip which changes to red when dose has been taken. Has dose counter</td>
<td>When empty replace with new refill. Clean device PRN</td>
<td>Not for the very young or elderly</td>
<td>Suck through the click (release of medication). Rinse mouth after use. Check dosage</td>
</tr>
<tr>
<td>Accuhaler</td>
<td>Easy to use, no refill available. Long thirsty suck.</td>
<td>Keep cool and dry.</td>
<td>Not suitable for the very young or elderly</td>
<td>Colour will indicate type of asthma medication – use as prescribed.</td>
</tr>
<tr>
<td>Gentlehaler</td>
<td>L-shaped sleeve which may be used with both Asthavent and Budeflam</td>
<td>Rinse sleeve when necessary and keep medicine canister cool and dry</td>
<td>Difficult to depress and not easy to use for the very young or elderly</td>
<td>Speed at which the medication leaves the device is much less than normal MDI: enhanced deposition results</td>
</tr>
</tbody>
</table>

MDI - metered dose inhaler, ICS – inhaled corticosteroids, SAB2 – short-acting β2-agonist, PRN – as required

**OTHER CIRCUMSTANCES**

The allergy nurse should also be familiar and knowledgeable about asthma in special circumstances, e.g. in the elderly who may sometimes need higher than normal doses in order to successfully reverse the bronchospasm. Ipratropium bromide bronchodilator reversibility testing can be carried out in the same way, with PEF before and 30-45 minutes after administration.

**Pregnancy:** Asthma is one of the most common chronic illnesses that can complicate pregnancy. It may occur for the first time or it may be altered by it. About one-third of women are worse, one-third remain the same and one-third improve.

**Occupational asthma (OA):** suspecting a diagnosis of OA is relatively easy; confirming and dealing with the long-term effects and possible changing of jobs is much more complex and should be referred to a specialist.

Certain drugs may make asthma worse. These include beta-blockers, non-steroidal anti-inflammatory drugs (e.g. voltaren, aspirin), anxiety medications and anti-epileptic drugs.

**GENERAL EDUCATION**

Having seen the doctor, the patients’ medication will be decided upon, based on a number of important factors.
Sustainable financial status, lifestyle, age, and assessment of asthma severity and frequency of symptoms, day and night time. The GINA (Global Initiatives for Asthma guidelines) goals are universally accepted and include the achievement and maintenance of control, while engaging in normal activity, including exercise. Lung functions should be as close to normal as possible with few or no exacerbations. Avoid adverse side-effects from medication and prevent asthma mortality.

**Action of drugs**

**Explain the actions of relievers to the patient**

Identify the specific one that has been decided upon. SAB2 (salbutamol or fenoterol) are used for immediate relief with effects

<table>
<thead>
<tr>
<th>Spacer</th>
<th>Colour/compatibility</th>
<th>&lt;4 years</th>
<th>&gt;4 years</th>
<th>Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glaxohaler (GSK) (10)</td>
<td>Mostly purple, sometimes orange. Used with most MDIs. Difficult to put back together, if separated</td>
<td>With mask</td>
<td>Without mask</td>
<td>Remove valve near mouthpiece. Place mask over mouth and nose, with mouth open and allow 5 breaths per dose actuation. Shake in-between doses. Wash face after controllers</td>
</tr>
<tr>
<td>Zerostat (Cipla) and mask (11)</td>
<td>White, available with and without valves. Used with most MDIs. Separates into 2 halves, easy to transport</td>
<td>With face mask – same ordered separately</td>
<td>No face mask, used directly in mouth</td>
<td>Discourage hyperventilation, particularly in older child. Shake in-between doses. Wash face after using mask/spacer for controllers.</td>
</tr>
<tr>
<td>Neonate Aerolioner (Boehringer Ingelheim) (12)</td>
<td>Orange. Used with most MDIs. Spacer cannot be used if mask removed for the older child</td>
<td>&lt;6 months</td>
<td>No</td>
<td>Place mask over mouth and nose, while mouth open and allow 5 breaths per dose actuation. Shake in-between doses. Wash face after controllers</td>
</tr>
<tr>
<td>Baby Aerolioner (Boehringer Ingelheim) (13)</td>
<td>Yellow. Used with most MDIs. Spacer cannot be used if mask removed for the older child</td>
<td>Yes</td>
<td>No</td>
<td>As above</td>
</tr>
<tr>
<td>Aerolioner (Boehringer Ingelheim) (14)</td>
<td>Blue. Used with most MDIs</td>
<td>No</td>
<td>Yes</td>
<td>Whistles loudly when breathing is incorrect. Allow 2 to 5 good long slow sucks after each actuation. Shake in-between doses.</td>
</tr>
<tr>
<td>Cooldrink-bottle spacer (17)</td>
<td>Clear plastic cooldrink bottle with a compatible-sized hole burned into the bottom using wand (18). Used with most MDIs</td>
<td>Yes, if used with separately ordered Cipla baby mask</td>
<td>Yes, but used without mask</td>
<td>Encourage patient to maintain a good lip seal around the opening, so that no medication escapes. Allow 2-5 good long slow sucks after each actuation. Shake in-between doses.</td>
</tr>
</tbody>
</table>

**Table II. Spacers (Fig. 1)**

Spacers improve and enhance deposition in the airways. They overcome co-ordination and decrease local side-effects: thrush, hoarseness and cough. Spacers should not be shared among patients, and patients should be encouraged to bring them to each follow-up visit. All spacers should be primed when new and after washing; before using: wash in a mild detergent, air dry and actuate 4 or 5 doses of the most cost-effective asthma medication into the device. Optimal delivery is assured, when 20 minutes later, it is used for administration of medication.

**Fig. 1. MDI and spacers.**
lasting up to 4 hours. If these are required frequently, the patient should seek medical help. During an acute attack, in lieu of a nebuliser, an SAB2, via MDI plus spacer may be used (20 puffs for adults and 10 puffs for children – one puff at a time). If there is no improvement refer to doctor for possible oral steroids. Long-acting β₂-agonists (salmeterol or formoterol), should only be used in conjunction with inhaled corticosteroids (ICS), and never administered to preschoolers. Side-effects include tremor, palpitations, headaches and facial flushing. In the case of under-2-year-olds and the elderly, ipratropium bromide (e.g. Ivent) may be prescribed. Beneficial effects are noted 30-40 minutes after administration and side-effects include dry mouth and constipation.

**Explain the actions of controllers**

Identify specific device to be used and the dose required (budesonide, fluticasone propionate or beclomethasone). Explain that if taken regularly, every morning and every evening, the inflammation in the airways which causes asthma symptoms will be reduced and this in turn should reduce the severity and frequency of acute attacks. Patients should not stop until they next see their doctor, even though symptoms are not present. Side-effects are rare but may include hoarseness or oral thrush. This may be overcome by using a spacer or regular rinsing of the mouth, after each ICS administration. Reassure patients that corticosteroids used for asthma are different from anabolic steroids used by athletes.

The appropriate device should be demonstrated and checked. Always have a placebo available and demonstrate the device yourself, then ask patient to do so. Watch closely and discuss any concerns. Correct technique with inhaler is essential and adherence vital. Tables I and II and Figure 1 illustrate and outline device techniques and care.

An emergency action plan should be written down, taking into account the patient’s lifestyle. Printed action plans are available at www.asthma.co.za

Discuss a self-management plan. This should include the nature of asthma and how the patient can recognise signs and symptoms of worsening asthma. These include deterioration in peak flow (if meter is used), increase in diurnal variations, an increase in symptoms with more frequent use of bronchodilators, yet declining efficacy of same. Sleep disturbance and a decrease in exercise tolerance should also be recognised as signs of impending asthma deterioration. In addition, the patient should be told (and the plan written down) what action to take and where to go – even in the middle of the night, when to start prednisolone, how much, and how to avoid triggers (including smoking). Asthma symptom and adherence diary available at www.asthma.co.za

Finally, and most importantly, make a **follow-up appointment**. On all subsequent follow-up visits adherence (how many times did you forget your medication?), inhaler technique evaluation, and an exploration of possible different health beliefs and/or psychological issues should be addressed in order to achieve optimal control.

**CONCLUSION**

A trained enthusiastic allergy and asthma nurse can work together with the health team and patients in order to strive for improved control and quality of life for all patients.

**THE FUTURE**

It would be a great advantage to have an allergy course where nurses can be trained as allergy nurse practitioners, who will work in conjunction with allergists and also function at primary health clinics where specialists are not always available. They could work in pathology services where they can conduct basic allergy tests, e.g. skin-prick tests. These allergy nurse practitioners would also provide patient education in areas beyond specialist clinics and assist doctors to refer patients to the specialised centres when necessary.

**Acknowledgement**

We thank the authors of the National Asthma Education Programme Version 2011 which has been used for this article.

We thank Prof Paul Potter for his invaluable assistance in the preparation of this article.

**Declaration of conflict of interest**

The authors declare no conflict of interest.

**REFERENCES**


