Nurses' Knowledge and Management of Children with Bronchial Asthma at Wad Medani Pediatric Teaching Hospital, Gezira State, Sudan, 2013

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B.Sc. in Nursing

University of Khartoum (2006)

A Dissertation

Submitted to University of Gezira in Partial Fulfillment of the Requirements for the Award of Degree of Master of Science in Pediatric Nursing

Department of Nursing

Faculty of Applied Medical Sciences

February, 2014
Nurses' Knowledge and Management of Children with Bronchial Asthma at Wad Medani Pediatric Teaching Hospital, Gezira State, Sudan, 2013

Suad Mohamed Adam Shani

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<td>Dr. Ietimad Ibrahim Abd Elrahman Kambal</td>
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Date: February, 2014
Nurses' Knowledge and Management of Children with Bronchial Asthma at Wad Medani Pediatric Teaching Hospital, Gezira State, Sudan, 2013

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Date of Examination: 4, February, 2014
Dedication

To My Mother
To My Father,
To My Husband
To My Family
Acknowledgment

I am heartedly thankful to my main supervisor Dr. Hanan Mabrouk, Ramadan Mohammed, and co-supervisor Dr. Ietimad Ibrahim Kambal, for their support from the initial to the final level support and limited consultation enabled me to developed an understanding of the subject.

I would like to express my appreciation and sincere gratitude to my mother and my father and husband for their support, not only in this research but for their support and advice in all life.

Thanks for all those who helped me in collection, analysis and typing of this thesis.
Nurses’ Knowledge and Management of Children with Bronchial Asthma at Wad Medani Pediatric Teaching Hospital, Gezira State, Sudan, 2013

Suad Mohamed Adam Shani

Abstract

Asthma is a chronic inflammation of the bronchial trees and narrowing of the air ways. It is the most common respiratory disorder of children. A descriptive hospital based study was conducted at Wad Medani Pediatric Teaching Hospital aimed at assessing nurses’ knowledge and management of children with bronchial asthma during the period of the study from March to April 2013. The sample size consisted of all available nurses (80). The data collected using a questionnaire designed for the purpose of the study. The data analyzed by using statistical package for social sciences (SPSS). The results revealed that 62.5% of study sample hold university degree and (43.8%) of nurses their years of experiences were more than 10 years. Also the results revealed that (45%, 71.2%, 77.5%) of nurses, respectively their knowledge about the definition, signs and symptoms and diagnosis of bronchial asthma were correct complete. 77.5% of nurses their knowledge about diagnostic tests of bronchial asthma were correct complete. 80% of nurses their knowledge about respiratory complications of bronchial asthma were correct complete and 91.2% of nurses their knowledge about medications of bronchial asthma were correct complete. The study concluded that most of the pediatric teaching hospital nurses had awareness regarding management of bronchial asthma in children. The study recommended that learning facilities as library books, and periodical journal and internet regarding bronchial asthma in children should be available for the nurses at hospital as well as periodic training program should be established in this field.
معلومات وممارسات الممرضات تجاه رعاية الأطفال المصابون بالربو الشعبي
بمستشفى الأطفال التعليمي بود مدني، ولاية الجزيرة، السودان. 2013م

سعاد محمد آدم شني

ملخص الدراسة

الربو هو التهاب مزمن في الشعب الهوائية وتورم وضيق في الممرات الهوائية. وهو مرض مزمن أكثر شيوعاً في الأطفال بين الأمراض التنفسية. أجريت هذه الدراسة الوصفية بمستشفى الأطفال التعليمي بود مدني. هدفت الدراسة إلى تقييم معرفة وممارسات الممرضات تجاه رعاية الأطفال المصابون بالربو الشعبي خلال فترة الدراسة من مارس إلى أبريل 2013. كان حجم العينة عبارة عن (80) ممرضة وهي العينة المتاحة أثناء فترة الدراسة. أستخدمت استمارة إستبيان لجمع البيانات صممت من أجل أغراض الدراسة. تم تحليل البيانات بإستخدام الحزمة الإحصائية للعلوم الاجتماعية (SPSS). أظهرت النتائج أن 62.5٪ من عينة الدراسة يحملن درجة جامعية وأن 43.5٪ من عينة الدراسة كانت خبرتهن العملية أكثر من 10 سنوات. كما أظهرت النتائج أن (45٪، 71.2٪، 77.5٪) من الممرضات على التوالي كانت معرفتهن صحية وكاملة عن تعريف الربو الشعبي، أعراض وعلامات وتشخيص الربو الشعبي. كانت معرفتهن عن الاختبارات التشخيصية للربو الشعبي بنسبة 77.5٪ بينما 80٪ من الممرضات إعطاء مضاعفات الجهاز التنفسي من الربو الشعبي كاحتياجات كاملاً وصحية و91.2٪ بالنسبة لمعرفتهن بالأدوية المستخدمة في علاج الربو الشعبي كانت صحية وكاملة. خلصت الدراسة إلى أن أغلبية عينة الدراسة لديهن معلومات ممتازة عن الربو الشعبي. أوصت الدراسة بضرورة استخدام المجلات الدورية والكتب المكتوبة والإنترنت بهذا الشأن وأيضاً التدريب المستمر للممرضات.
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<tr>
<td>UK</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>CDC</td>
<td>Central Diseases Control</td>
</tr>
<tr>
<td>U.S</td>
<td>United States</td>
</tr>
<tr>
<td>COPD</td>
<td>Chronic Obstructive Pulmonary Diseases</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>ISAAC</td>
<td>International Study of Asthma and Allergies in Childhood</td>
</tr>
<tr>
<td>GINA</td>
<td>Global Initiative for Asthma</td>
</tr>
<tr>
<td>ARIA</td>
<td>Allergic Rhinitis and its Impact on Asthma</td>
</tr>
<tr>
<td>SPSS</td>
<td>Statistical Package for Social Sciences</td>
</tr>
<tr>
<td>HDU</td>
<td>High Dependency Unit</td>
</tr>
<tr>
<td>PICU</td>
<td>Pediatric Intensive Care Unit</td>
</tr>
<tr>
<td>PEFR</td>
<td>Peak Expiratory Flow Rate</td>
</tr>
<tr>
<td>CXRs</td>
<td>Chest X-ray</td>
</tr>
<tr>
<td>PMDI</td>
<td>Delivery via Pressurized Metered Dose Inhaler</td>
</tr>
<tr>
<td>IV</td>
<td>Intravenous</td>
</tr>
<tr>
<td>COPD</td>
<td>Chronic Obstructive Pulmonary Diseases</td>
</tr>
<tr>
<td>LABR</td>
<td>Long Acting Inhaler beta&lt;sub&gt;2&lt;/sub&gt; agonist</td>
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1. Introduction

1.1 Background:

Asthma is chronic inflammation of the bronchial tubes swelling and narrowing of the air ways. Asthma is narrowing the most common chronic illness in children. Allergy can be play role in some, but not all asthmatic patients. Many factors can precipitate asthma attach and they are classified as either allergens or irritants, allergens such as pollen smoke, upper respiratory infection exercise can tiger asthma attach, symptoms of asthma include shortness of breath, wheezing and cough, chest tightness (Mannix R, et al, 2007).

Asthma usually diagnosed based on the presence of wheezing and confirm with tests, the management of asthma avoids precipitating factors is important, mediations can used to prevent bronchial aspasm include braonchodiators to open up the airys, steroid to reduce inflammation. The best strategy for dealing with asthma involves education and prevention. This involves avoidance of allergens and daily use of inhaled steroids and other drugs, guideline indication of hospitalization are based on repeat, patients take to hospital and regularly monitoring assessment and care giver about medications for patients with bronchial asthma. The nurses should be aware of bronchial asthma among children and require emergency management intervention (Emmanouil Rovithis et al, 2001).

1.2 Problem statement:

World wide in Australia prevalence of asthma appear to be increase and causes of concern for health authorities and the general population. The number of children with asthma countries to grow one in 12 children (about 25 million or 8% of USA population) (Mannix R, et al, 2007).

In developed countries asthma is not just public health problem in developing countries, the incidence of the disease varies greatly. In India has an estimated 12.20 million asthmatic. Mortality due to asthma is not comparable size to the day to day effects of the disease. Although large available, asthma tends to occur in epidemic and effects young children. The cost of asthma society
could be reduced to a large concerted international and national action. (Mannix R, et al, 2007).

In Sudan the period prevalence rates for asthma and rhinitis were studied in a Sudanese village close to the Nile (Kalakla), where the inhabitants are seasonally exposed to very large numbers of nonbiting midges (the “green nimitt” midge, *Cladotanytarsus lewisi* [Diptera: Chironomidae]). The results were compared with those in a control village some distance from the river, where this midge nuisance does not occur. Of the 5262 persons enumerated in Kalakla, 4.9% suffered from asthma compared with 3.2% of the 2634 in the control area. For allergic rhinitis the rates were 6.7% for Kalakla and 1.5% in the control town. The percentage of patients with the combination of asthma and allergic rhinitis was four times greater in the affected area. (Wilkinson A.H., 2003)

1.3 Justification and rational

Asthma attacks is affecting children during life, and can lead to respiratory failure, if the air way is severely irritants, so there are needs for proper nursing intervention to reduce severity of attack among children. There was previous study in this field before.

1.4 Objectives

1.4.1 General Objective:

- To assess the nurses' knowledge and management of children with bronchial asthma at Wad Medani Pediatric teaching hospital, Gezira State, Sudan during the period of the study.

1.4.2 Specific Objectives:

- To assess the nurses' awareness about knowledge of bronchial asthma.
- To evaluate the nurse's awareness about children during nursing intervention for bronchial asthma.
2. Literature Review

2.1 Definition of bronchial asthma

Asthma is the most common respiratory disorder of children. Chronic inflammation of the bronchial mucosa and hyperreactive airways results in bronchoconstriction and reversible airway narrowing. It typically presents with wheeze, dry cough, difficulty breathing and/or chest tightness. Bronchial asthma is a condition of the lungs which is characterized by periodic, reversible constriction (narrowing) of the bronchi. Why does constriction occur periodically? Constriction occurs because bronchi are hyperreactive to a variety of stimuli to which the patient is exposed intermittently. (Douglas E. et al, 2007)

Asthma attacks all age groups but often starts in childhood. It is a disease characterized by recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from person to person. In an individual, they may occur from hour to hour and day to day. This condition is due to inflammation of the air passages in the lungs and affects the sensitivity of the nerve endings in the airways so they become easily irritated. In an attack, the lining of the passages swell causing the airways to narrow and reducing the flow of air in and out of the lungs. (Emmanouil Rovithis et al, 2001)

2.1.1 Pathology

Why can't the patient breathe?

Bronchi and bronchioles contain thick, tenacious mucous plugs. The mucous contains Curschmann's spirals, eosinophils and Charcot-Leyden crystals. Other characteristic histologic findings which lead to narrowing of the bronchus include: thickening of the basement membrane, submucosal edema, hypertrophy of the submucosal glands and smooth muscle cells. (Douglas E. et al, 2007)
2.1.2 Pathogenesis

Extrinsic or atopic asthma: This group is an example of type I IgE-mediated hypersensitivity reaction to foreign antigens. Begins in childhood. The child (his or her respiratory tract mast cells) is sensitized to a substance which is extrinsic to the body. A series of chemical and structural changes occur in the bronchi with exposure to the foreign substance. Clinical examples: pollen, food, animal dander. Intrinsic or non-atopic: This group is an example of a non-immune reaction causing asthma. Clinical examples: aspirin, virus, stress, exercise. (Ralph Leischner, M.D., 2008)

2.2 Causes

Asthma cannot be cured, but could be controlled. The strongest risk factors for developing asthma are exposure, especially in infancy, to indoor allergens (such as domestic mites in bedding, carpets and stuffed furniture, cats and cockroaches) and a family history of asthma or allergy. A study in the South Atlantic Island of Tristan da Cunha, where one in three of the 300 inhabitants has asthma, found children with asthmatic parents were much more likely to develop the condition. Exposure to tobacco smoke and exposure to chemical irritants in the workplace are additional risk factors. Other risk factors include certain drugs (aspirin and other non-steroid anti-inflammatory drugs), low birth weight and respiratory infection. The weather (cold air), extreme emotional expression and physical exercise can exacerbate asthma. Urbanization appears to be correlated with an increase in asthma. The nature of the risk is unclear because studies have not taken into account indoor allergens although these have been identified as significant risk factors. (Douglas E. et al, 2007)

Experts are struggling to understand why rates world-wide are, on average, rising by 50% every decade. And they are baffled by isolated incidents involving hundreds of people in a city, who suffer from allergies such as hay fever but who had never had asthma, suddenly being struck down by asthma attacks so severe they needed emergency hospital treatment. (Mannix R, et al, 2007)
• One such incident in London, UK, in June 1994 saw 640 people rushed to emergency departments in the throes of full-blown asthma attacks. A similar incident happened in Melbourne, Australia. Many experts have blamed climatic conditions such as thunderstorms, which break up pollen grains, releasing starch granules that trigger attacks. But they do not know why ordinary hay-fever sufferers developed a life-threatening condition without warning.

2.3 Asthma Risk Factors

There are usually reasons or risk factors that predispose you to asthma and respiratory problems. Asthma does not just happen randomly to anyone without asthma risk factors. Let's look at some asthma risk factors and see how they increase the chance that a person will have the asthma symptoms of cough, wheezing, and shortness of breath associated with the disease. After determining your personal risk factors for asthma, decide on the ones you can control and try to make some lifestyle changes. Avoidance of the risk factors you can control is crucial in preventing asthma symptoms. While you cannot change your gender or family history, you can avoid smoking with asthma, breathing polluted air, allergens, and taking care of your general health so you don't become overweight. Take control of your asthma -- by controlling your asthma risk factors. By understanding all the risk factors, you may be able to prevent or control your asthma. (Douglas E. et al, 2007)

2.3.1 Gender and Asthma

Childhood asthma occurs more frequently in boys than in girls. It's unknown why this occurs although some experts find a young male's airway size is smaller when compared to the female's airway, which may contribute to increased risk of wheezing after a cold or other viral infection. Around age 20, the ratio of asthma between men and women is the same. At age 40, more females than males have adult asthma. (Emmanouil Rovithis et al, 2001)
2.3.2 Family History of Asthma

Blame Mom or Dad or both for your asthma. The inherited genetic makeup predisposes you to having asthma. In fact, it's thought that three-fifths of all asthma cases are hereditary. According to a CDC report, if a person has a parent with asthma, he or she is three to six times more likely to develop asthma than someone who does not have a parent with asthma. (Mannix R, *et al*, 2007)

2.3.3 Airway Hyperreactivity and Asthma

It appears that having airway hyperreactivity is another risk factor for asthma, although researchers are not sure why this is true. In asthma, the airways are hyperreactive and become inflamed when they meet such asthma triggers as allergens or cold air. Not all people with airway hyperreactivity develop asthma, but in those who do have it, the airway hyperreactivity appears to increase the risk of asthma. (Currie GP, *et al*, 2005)

2.3.4 Atopy and Asthma

Atopy means allergic hypersensitivity that affects different parts of the body that do not come in contact with allergens, substances that trigger the body's allergic reaction. Atopy can include eczema (atopic dermatitis), allergic rhinitis, allergic conjunctivitis, and asthma. Some children with eczema or atopic dermatitis develop asthma. Some findings indicate that children with atopic dermatitis may have more severe and persistent asthma as adults.

2.3.5 Allergies Linked to Asthma

Allergies and asthma often coexist. Indoor allergies are a predictor of who might be at risk for an asthma diagnosis. One nationwide study showed levels of bacterial toxins called endotoxins in house dust were directly related to asthma symptoms and use of asthma inhalers, bronchodilators, and other asthma drugs. Sources of other indoor allergens include animal proteins (particularly cat and dog allergens), dust mites, cockroaches, fungi, and mold. Changes that have made houses more "energy-efficient" over the years are thought to increase exposure to these causes of asthma. (Currie GP, *et al*, 2005)
2.3.6 Environmental Factors and Asthma

Indoor air pollution such as cigarette smoke, mold, and noxious fumes from household cleaners and paints can cause allergic reactions and asthma. Environmental factors such as pollution, sulfur dioxide, nitrogen oxide, ozone, cold temperatures, and high humidity are all known to trigger asthma in susceptible individuals. In fact, asthma symptoms and hospital admissions are greatly increased during periods of heavy air pollution. Ozone is the major destructive ingredient in smog. It causes coughing, shortness of breath, and even chest pain - and can boost the susceptibility to infection. Sulfur dioxide, another component of smog, also irritates the airways and constricts the air passages, resulting in asthma attacks. (Douglas E. et al, 2007)

Gas stoves are the primary source of indoor nitrogen dioxide. Studies show that people who cook with gas are more likely to have wheezing, breathlessness, asthma attacks, and hay fever than those who cook with other methods. It is estimated that more than half of the households in the U.S. use gas stoves. Weather changes can also result in asthma attacks in some people. For instance, cold air causes airway congestion and an increase in mucus production. Increases in humidity may also cause breathing difficulty in a certain population. Some studies show that asthma is more common in overweight children. Overweight asthmatics seem to have more uncontrolled asthma and more days on medications for asthma. (Douglas E. et al, 2007)

2.4 Sings and symptoms:

- Transient early wheezers where wheezing is commonly associated with viral upper respiratory infections. This is most likely to be grown out of by about 3 years, particularly in those children without a family or personal history of atopy.
- Non-atopic wheezers who again are likely to outgrow symptoms by early school age.
- Children who go on to develop a more persistent, atopic asthma, associated with raised immunoglobulin E (IgE) levels. (Mannix R, et al, 2007)
2.5 Acute asthma

Acute asthma is a relatively common paediatric emergency. Forty UK deaths due to asthma in the 0-14 years’ age range were recorded in 2006, (British Guideline on the Management of Asthma, BGMA, 2011), which underlines the necessity to treat acute asthma as severe until proven otherwise and to refer children who respond inadequately to community treatment urgently to hospital. It is vital to recognise the severity of an acute asthma attack. Clinical signs are a poor indicator of the degree of airways obstruction and some with acute severe asthma may not appear distressed. (British Guideline on the Management of Asthma, BGMA, 2011)

Clinical assessment of the severity of an acute asthma attack in those aged over 2 years BGMA, 2011)

<table>
<thead>
<tr>
<th>Acute severe</th>
<th>Life-threatening</th>
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<tbody>
<tr>
<td>Unable to complete sentences in one breath.</td>
<td>Silent chest.</td>
</tr>
<tr>
<td>Unable to feed or talk.</td>
<td>Cyanosis.</td>
</tr>
<tr>
<td>Pulse &gt;120 in those aged over 5 years or &gt;130 in 2-5 year-olds.</td>
<td>Poor respiratory effort.</td>
</tr>
<tr>
<td>Respiratory rate &gt;30 in those aged over 5 and &gt;50 in 2-5 year-olds.</td>
<td>Hypotension.</td>
</tr>
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<td></td>
<td>Exhaustion.</td>
</tr>
<tr>
<td></td>
<td>Confusion.</td>
</tr>
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<td></td>
<td>Coma. BGMA, 2011).</td>
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Clinical assessment of the severity of an acute asthma attack in those aged under 2 years BGMA, 2011)

<table>
<thead>
<tr>
<th>Acute severe</th>
<th>Life-threatening</th>
</tr>
</thead>
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<tr>
<td>Oxygen saturations &lt;92%.</td>
<td>Apnoea.</td>
</tr>
<tr>
<td>Cyanosed.</td>
<td>Bradycardia.</td>
</tr>
<tr>
<td>Marked respiratory distress.</td>
<td>Poor respiratory effort.</td>
</tr>
<tr>
<td>Too breathless to feed.</td>
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Children should be monitored carefully and assessed repeatedly to determine the need for admission to secondary care or for transfer to a high-dependency unit (HDU) or paediatric intensive care unit (PICU), where there are features of poorly responsive severe asthma or life-threatening asthma. (Currie GP, et al, 2005)
2.6 Investigations

- Peak expiratory flow rate (PEFR) in children aged over 5 years (use best of three readings, expressed as a % of personal best PEFR).
- Oxygen saturation - should be available in primary care, as low oxygen saturations (<92%) after initial bronchodilator therapy indicate a more severe subgroup of patients, in whom inpatient treatment may be required.
- CXRs and arterial blood gases are not routinely indicated as their information yield is rarely high. (BGMA, 2011).

2.7 Management

Managing childhood asthma involves both an appreciation of current treatment practice but also a willingness to educate and support the child and their family in the longer-term. Different phenotypes of childhood asthma are increasingly being recognised: (Russell G; 2008)

2.7.1 With children aged over 2 years:

- Give calm reassurance at all times.
- Children with life-threatening asthma or SpO₂ <92% should receive high flow oxygen via facemask or nasal cannula.
- Inhaled beta₂ agonists are the first-line treatment for acute asthma:
  - Delivery via a pressurised metered dose inhaler (pMDI) and spacer is preferred in mild-to-moderate asthma as there is less tachycardia and hypoxia compared with delivery via a nebuliser. Children aged under 3 years normally require a facemask attached to the spacer.
  - 2-4 puffs of beta₂ agonists repeated every 20-30 minutes according to clinical response may be sufficient for a mild attack but severe attacks may require up to 10 puffs: drug dosing should be individualized according to severity of attack and response.
  - Those children not improving after receiving up to 10 puffs of beta₂ agonists in primary care should be referred to secondary
care. Continue to give further doses of bronchodilator whilst awaiting transfer. (BGMA, 2011)

2.7.2 Always assess and record of the severity of an acute asthma:

- Pulse rate.
- Respiratory rate.
- Degree of breathlessness (e.g. ability to complete sentences, to feed).
- Use of accessory muscles of respiration (feel the neck muscles for involvement in breathing).
- Amount of wheezing (with increasing severity, wheeze may become biphasic or less apparent).
- Degree of agitation and conscious level.

2.7.3 Low threshold for admission when:

- The attack is late in the day or at night time.
- Recent hospital admission or previous severe attack.
- Concerns regarding social circumstance or ability to cope at home.
  - Blue light those with poorly responding severe or life-threatening asthma, who should receive oxygen and nebulised beta₂ agonists (2.5-5 mg salbutamol or 5-10 mg terbutaline) in transit.
  - Nebulised beta₂ agonists should be repeated every 20-30 minutes - frequent intermittent doses are as efficacious as equivalent continuous nebulised doses.
- Steroid therapy - early use reduces hospital admissions and can prevent symptom relapse.
  - Oral steroids are of similar efficacy to intravenous preparations, which should be reserved for the acutely unwell child who cannot swallow. (BGMA, 2011)
2.7.4 Oral prednisolone in an acute asthma attack:

- Start early in the attack.
- Use 20 mg prednisolone for children aged 2-5 years and 30-40 mg for those aged over 5 years.
- For children on maintenance steroid treatment, give 2 mg/kg prednisolone to a maximum of 60 mg.
- Repeat the dose in children who vomit.
- 3 days' treatment is usually sufficient, but tailor according to the length necessary for recovery.
  - There is insufficient evidence that initiating or increasing inhaled steroids is effective in treating acute symptoms. Always give steroid tablets in preference. Children already on inhaled steroids should continue with their maintenance dose through the attack. Children not already on regular preventative treatment may benefit from initiating them as part of their long-term management - but this should not be confused with the management of the acute attack. (BGMA, 2011)

- Additional emergency treatment:
  - Intravenous (IV) salbutamol - early addition of a bolus dose (15 micrograms/kg) can be a useful adjunct to nebulised treatment in some severe cases. Continuous infusion may be required where there is severe refractory asthma or concerns about reliability of inhalation. Doses exceeding 1-2 micrograms/kg/minute require PICU monitoring.
  - Nebulised ipratropium bromide - where symptoms are refractory to initial beta$_2$ agonist treatment, the addition of ipratropium bromide (250 micrograms/dose, mixed with the nebulised beta$_2$ agonist solution) is of benefit in the first 2 hours of a severe asthma attack.
  - IV aminophylline should only be considered in children with severe or life-threatening bronchospasm who have not responded to other treatment, in an HDU or a PICU setting.
o IV magnesium sulphate - inconclusive evidence of benefit in severe asthma.

Intermittent wheezing attacks in children aged under 2 are usually in response to viral infection and management remains controversial:

- Beta2 agonist bronchodilators may offer marginal benefits to those aged under 2 with wheeze and should be considered if the child is symptomatically distressed. If they are not effective, consider the use of other treatment options. For mild-to-moderate attacks, use a pMDI plus spacer and facemask. Do not use oral beta2 agonists, which have little evidence for efficacy in this context.
- Oral steroid treatment - consider 10 mg soluble prednisolone for up to three days in the management of moderate-to-severe asthma in infancy in the hospital setting.
- Ipratropium bromide can be combined with an inhaled beta2 agonist where there are more severe symptoms. (BGMA, 2011)

2.8 Chronic asthma

Much of the management of asthma has been delegated to asthma nurses - either within the practice or the community. Because asthma is a chronic condition, it usually requires continuous medical care. Patients with moderate to severe asthma have to take long-term medication daily (for example, anti-inflammatory drugs) to control the underlying inflammation and prevent symptoms and attacks. If symptoms occur, short-term medications (inhaled short-acting beta2-agonists) are used to relieve them. (Currie GP, et al, 2005)

Medication is not the only way to control asthma. It is also important to avoid asthma triggers -- stimuli that irritate and inflame the airways. Each person must learn what triggers he or she should avoid. Although asthma does not kill on the scale of chronic obstructive pulmonary diseases (COPD), failure to use appropriate drugs or comply with treatment, coupled with an under-recognition of the severity of the problem, can lead to unnecessary deaths, most of which occur outside hospital. (Gotzsche PC, 2008)
2.8.1 Management of chronic asthma in children aged under 5:

**Step 1: mild intermittent asthma** - inhaled short-acting beta$_2$ agonists as needed.

**Step 2: regular preventer therapy** - add inhaled steroid 200-400 micrograms/day (beclometasone dipropionate or equivalent) or leukotriene antagonist if inhaled steroid cannot be used. Start at the dose of inhaled steroid appropriate to the severity of the disease.

**Step 3: add-on therapy** - for children aged over 2, consider the addition of a leukotriene antagonist or inhaled steroid 200-400 micrograms/day (dependent on what drug they received already as Step 2).

**Step 4: persistent poor control** - refer to a respiratory paediatrician.

2.8.2 Management of chronic asthma in children aged 5-12 years:

**Step 1: mild intermittent asthma** - inhaled short-acting beta$_2$ agonists as needed.

**Step 2: regular preventer therapy** - add inhaled steroid 200-400 micrograms/day (beclometasone dipropionate or equivalent). 200 micrograms is an appropriate starting dose for most patients, but judge according to the severity of disease.

**Step 3: add-on therapies** - add in a long-acting inhaled beta$_2$ agonist (LABA) but, if response is poor, stop. If the asthma is still not controlled, increase the dose of inhaled corticosteroid to 400 micrograms/day (beclometasone dipropionate or equivalent) and then add either a leukotriene receptor antagonist or slow release theophylline.

**Step 4: persistent poor control** - increase inhaled steroid to 800 micrograms/day (beclometasone dipropionate or equivalent).

**Step 5: continuous or frequent use of oral steroids** - use in the lowest dose to provide control whilst maintaining high-dose inhaled steroids and refer to respiratory paediatricians. (Gotzsche PC, 2008).
2.8.3 Management of those aged over 12 is as for adults.

2.8.3.1 Beta₂ agonists

- Short-acting beta₂ agonists work quickly and provide symptomatic relief. No benefits have been shown from regular dosing. Good asthma control is associated with little or no need for short-acting beta₂ agonists. Using two or more canisters of beta₂ agonists per month or >10-12 puffs per day, is a marker of poorly controlled asthma that puts individuals at risk of fatal or near-fatal asthma. Thus, patients overusing inhaled short-acting beta₂ agonists should have their asthma management reviewed.

- LABAs are useful in symptomatic control, particularly in the treatment of nocturnal asthma, but should not be used as relief for an acute attack. Any child using a LABA should also be using regular inhaled corticosteroid, as failure to do these increases the risk of life-threatening attacks. LABAs are the first-choice add-on therapy where control on normal-dose inhaled steroids remains suboptimum in children aged over 5.

- Oral preparations of beta₂ agonists have been used extensively in the past with children but are less effective than inhaled preparations and have more side-effects.

- Parents often worry about the side-effects of beta₂ agonists, particularly sleep and behaviour disturbance, but evidence for links to hyperactivity is weak. (Hadjikoumi I, et al, 2002).

2.8.3.2 Inhaled corticosteroids

- Regular inhaled corticosteroids are recommended where:
  - Beta₂ agonists are being used more than 3 times per week.
  - A child is symptomatic more than 3 times per week.
  - Symptoms disturb sleep more than once a week.
  - A child aged over 5 has had an exacerbation in the last 2 years requiring systemic corticosteroids.

- They should be taken regularly and concordance may be an issue. Improvement in symptoms usually takes 3-7 days.
No impact on later development of asthma has been shown by early intervention with regular inhaled steroids in episodically wheezy children aged under 5. (Townshend J, et al, 2007).

Concerns surrounding systemic absorption abound. Systemic side-effects are unlikely at doses lower than 400 micrograms beclometasone dipropionate or equivalent. The dose likely to cause growth failure or adrenal suppression is unknown, although thought to be 800 micrograms or above of beclometasone dipropionate or equivalent daily. Children receiving these higher doses must be under the care of a respiratory paediatrician and receive a 'steroid card'. Similarly, concerns regarding long-term reduction in bone-mineral density suggest that children should receive the minimum dose sufficient to control their asthma. Growth does not appear to be retarded with recommended doses of inhaled steroids - initial growth velocity (in the first year of treatment) may be reduced but there does not appear to be an effect on ultimate adult height. Nonetheless, regularly monitor the height of children on prolonged high-dose inhaled steroid treatment.

Candidiasis of the throat and mouth may occur, particularly with higher doses of inhaled corticosteroids. Strategies to reduce the risk include use of a spacer and rinsing the mouth with water or cleaning the teeth following inhalation. (Agertoft L, 2000).

### 2.8.3.3 Leukotriene receptor antagonists

- These are an option as 'add-on' therapy to poorly controlled asthma. In children aged over 5, a LABA and inhaled corticosteroids to a dose of 400 micrograms beclometasone dipropionate or equivalent should be trialled before their use.
- Leukotriene receptor antagonists improve lung function, decrease exacerbations and improve symptoms in some patients but there appears to be wide individual difference in response.
- They should not be considered 'steroid-sparing'.


2.8.3.4 Theophyllines

- These are another option as 'add-on' therapy for children aged over 5.
- There is little evidence demonstrating the increased benefit of one particular 'add-on' approach (further increase dose of inhaled steroids 800 micrograms beclometasone dipropionate, leukotriene receptor antagonist, oral theophylline or slow-release oral beta2 agonist) to guide choice.
- Theophyllines and oral beta2 agonists are associated with higher risk of side-effects.

- With any add-on therapy, have a trial for a predetermined time period and stop the therapy if, on assessment, it has no benefit. (Hadjikoumi I, et al, 2002).

2.8.3.5 Referral

Consider referral to specialist colleagues (respiratory paediatrician or specialist children's asthma nurse) for:

- Children receiving high-dose inhaled steroids (800 micrograms beclometasone dipropionate or equivalent).
- Poor response to 400 micrograms beclometasone dipropionate or equivalent and GP not confident at managing add-on treatments.
- Children aged under 5 with drug delivery problems.
- Uncertainty about the diagnosis.
- Recurrent hospital admission.

2.8.3.6 Immunization

**Influenza vaccine** - asthmatic children who require continuous or repeated use of inhaled/systemic steroids or with previous exacerbations requiring hospital admission should be immunised. If children receive repeated systemic steroids
sufficient to cause immunosuppression they also require pneumococcal vaccination. (Calam R, et al, 2005).

2.8.3.7 Drug delivery devices

- MDI plus spacer device is the first-line choice for the delivery of inhaled corticosteroid therapy in those aged over 5.
- Where poor compliance with MDI and spacer is likely to jeopardise good asthma control, alternative devices should be considered whilst still looking to minimise systemic absorption.
- For those aged less than 5, corticosteroid and bronchodilator therapy should be delivered via MDI/spacer and facemask combination. Nebulisers may be considered where MDIs and spacers are not effective or if the child's clinical condition is poor.
- Children and their carers need to be trained in the use of their chosen device prior to prescribing and suitability reviewed looking at compliance and technique. (Calam R, et al, 2005).
Table 2.1: Asthma severity classification:

<table>
<thead>
<tr>
<th></th>
<th>Intermittent</th>
<th>Mild persistent</th>
<th>Moderate persistent</th>
<th>Severe persistent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptoms</strong></td>
<td>2 or less day per week</td>
<td>More than 2 days/week</td>
<td>Daily</td>
<td>Throughout the day</td>
</tr>
<tr>
<td><strong>Nighttime awakenings</strong></td>
<td>2's/month or less</td>
<td>3-4's/month</td>
<td>More than once/week but not nightly</td>
<td>Nightly</td>
</tr>
<tr>
<td><strong>Rescue inhaler use</strong></td>
<td>2 or less days/week</td>
<td>More than 2 days/week, but no daily</td>
<td>Daily</td>
<td>Several times/day</td>
</tr>
<tr>
<td><strong>Interference with normal activity</strong></td>
<td>None</td>
<td>Minor limitation</td>
<td>Some limitation</td>
<td>Extremely limited</td>
</tr>
</tbody>
</table>

(Russell G, 2008).

2.9 Complications

- Reduced quality of life.
- Reduced growth, usually as a result of poor control rather than treatment.
- Psychological morbidity - although differences appear to be the result of poor health rather than asthma itself.
- Absence from school and educational disadvantage.

2.10 Nondrug

- Allergen avoidance - commonly recommended in patients with asthma but there is a lack of good evidence showing its efficacy.
  - House dust mite - a Cochrane review concluded that chemical and physical methods of house dust mite avoidance could not
currently be recommended. However, some families are very committed to trigger avoidance and suggestions can include:

- Complete bed-covering barrier systems.
- Removing all carpets.
- Removing soft toys from bed.
- High temperature washing of bedlinen.
- Acaricides to soft furnishings.
- Improving ventilation with or without dehumidification.


- Pet allergy - there are no controlled trials looking at removing domestic pets. There is varied anecdotal evidence with some experiencing no benefit on removing the pet and others, with continuing exposure to the pet, developing some tolerance. However, it seems sensible not to get a cat or dog if someone in the family already has asthma. (Currie GP, et al, 2005)

- Dietary manipulation - studies looking at supplementation with vitamin C, vitamin E, magnesium and fish oil have not shown significantly beneficial effects. (Currie GP, et al, 2005)

- Complementary and alternative therapies:
  - Buteyko technique - encourages patients to control their rate of breathing based on the idea that symptoms are due to hyperventilation and hypocapnia. Studies suggest no improvement in overall lung function when incorporated into the routine care of asthmatic patients. However, the technique may be helpful in providing symptomatic improvement. (Gotzsche PC, 2008).
  - There is insufficient evidence to recommend acupuncture, herbal or Chinese medicines, homeopathy, hypnosis or relaxation therapies.
  - Air ionisers offer no benefit to the treatment of asthma.

- Smoking cessation advice to care givers and teenage asthmatics. Direct or passive smoking reduces lung function and increases the need for rescue medication and long-term 'preventer' treatment.

- Physical exercise therapy - may increase overall fitness but of no specific benefit to asthma.
• Family therapy - where asthma is difficult to control, this may be a useful adjunct.
• Patient/carer education with the aim of creating partnership with family and child and confident self-care. (Holloway E, 2004).
• Written asthma action plans for self-management lead to consistently improved outcomes. (Thoonen BP, et al, 2003).
• Consider care links, eg to school and transition to adult services. (Holloway E, 2004). Schools should have their own asthma policy; staff are not required to administer asthma drugs except in an emergency but most are supportive of children with asthma and receptive to training in managing asthma and the correct way to administer inhaled drugs.
• Links to local and national patient groups for support and information. (Holloway E, 2004).

The way forward and the role of the WHO

WHO recognizes asthma as a disease of major public health importance and plays a unique role in the co-ordination of international efforts against the disease. International action is needed to:

• increase public awareness of the disease to make sure patients and health professionals recognize the disease and are aware of the severity of associated problems;
• organize and co-ordinate global epidemiological surveillance to monitor global and regional trends in asthma;
• develop and implement an optimal strategy for its management and prevention (many studies have shown that this will result in the control of asthma in most patients); and
• stimulate research into the causes of asthma to develop new control strategies and treatment techniques.
WHO activities

**International Study of Asthma and Allergies in Childhood (ISAAC):** WHO collaborates in ISAAC and, more particularly, in the implementation of the study in developing countries with areas of severe air pollution. A preliminary objective is to obtain information on the association between childhood asthma and air pollution. The first results of this study have shown the prevalence of asthma symptoms to vary from 1.6% to 36.8%.

**Global Initiative for Asthma (GINA):** In 1992, WHO and the US-based National Heart, Lung and Blood Institute jointly formed GINA to cut deaths and disability by developing and implementing an optimal strategy for asthma management and prevention. Since its inception GINA has:

- produced a report covering a range of information detailing all the latest knowledge on causes, the mechanism of the disease, risk factors, management, education and socio-economic factors;
- developed guidelines on asthma management for doctors, nurses, public health officials, patients and their families;
- held workshops to introduce the GINA programme to public health officials and medical professionals in more than 80 countries, leading to implementation of the guidelines;
- been active in disseminating information in 20 languages and bringing together organizations devoted to improving asthma care;
- backed research efforts to improve asthma management.

GINA's goal is to build an active network with multiple organizations concerned with asthma to ensure better patient care world-wide.

**WHO Initiative on Allergic Rhinitis and its Impact on Asthma (ARIA):** WHO is developing a strategy for the prevention of bronchial asthma through the management of allergic rhinitis. The strategy was conceived by specialists from all over the world at a December 1999 meeting on ARIA.
Allergic rhinitis is defined as an allergen-induced inflammation of the membranes lining the nose. Based on the time of exposure to the allergen, allergic rhinitis can be subdivided into perennial, seasonal or occupational disease.

Three statements must be taken into account for the successful prevention of bronchial asthma:

- Among the broad spectrum of allergic diseases, bronchial asthma is the most prevalent, dangerous and life-threatening.
- Underestimated up to now, allergic rhinitis is an important risk factor for asthma.
- One efficient way to prevent bronchial asthma is to control and treat allergic rhinitis from the very beginning of its inception.

Generally speaking, ARIA will broaden the perspectives for primary prevention of bronchial asthma and will promote better understanding of bronchial asthma among physicians and patients. (Currie GP, et al, 2005)

The specific goals of ARIA are defined as follows:

- To increase awareness of allergy and allergic diseases as a preventable public health problem among the medical community, public health officials, and the general public;
- To prepare evidence-based guidelines for the prevention and management of allergic rhinitis as a key element of primary prevention of bronchial asthma;
- To educate physicians and other health care professionals about the relevance of allergic rhinitis to bronchial asthma; and
- To educate the public about the potentially fatal risks of allergy (anaphylaxis) and asthma, especially in children, and to encourage greater dialogue with their physicians. Better education and increased dialogue could avoid approximately 25,000 childhood deaths due to asthma each year. (Currie GP, et al, 2005)
2.11 Prognosis in bronchial asthma:

Asthma is usually chronic, although it occasionally goes into long periods of remission. Long-term outlook generally depends on severity:

- In mild-to-moderate cases, asthma can improve over time, and many adults, even become symptoms free.
- Even in some severe cases, adults may experience improvement depending on the degree of obstruction in the lung and the timeliness and effectiveness of treatment.

Death from asthma is relatively uncommon event, and most asthma deaths are preventable. It is very rare for a person who is receiving proper treatment of die. (Russell G, 2008).

2.12.1 Nursing Assessment for Bronchial Asthma

1. Past medical history:
   - Assess personal or family history of previous lung disease.
   - Review the history of allergic reaction or sensitivity to the substances / environmental factors.
   - Assess the patient's employment history.

2. Activity
   - The inability to perform activities because of difficulty breathing.
   - The decline in the ability / improvement needs help doing daily activities.
   - Sleeping in a sitting position higher.

3. Respiratory
   - Dipsnea at rest or in response to activity or exercise.
   - Breath worsened when the patient lay supine in bed.
   - Using the drug ventilator, for example: raising the shoulders, widen the nose.
   - The existence of wheezing breath sounds.
   - The recurrent coughing.

4. Circulation
   - The increasing blood pressure.
   - There is an increasing frequency of heart.
5. Ego integrity
   - Anxiety
   - Fear
   - Be sensitive to stimuli
   - Restlessness

6. Nutrition
   - Inability to eat due to respiratory distress.
   - Weight loss due to anorexia.

2.12.2 Nursing Diagnosis for Bronchial Asthma

1. Ineffective airway clearance related to the accumulation of mucus.
2. Ineffective breathing pattern related to decreased lung expansion.
3. Impaired nutrition less than body requirements related to inadequate intake. (Russell G, 2008).

2.12.3 Nursing Intervention for Bronchial Asthma

1. Ineffective airway clearance related to the accumulation of mucus.
   Goal :
   2. The Way of breath effectively.
      Result Criteria :

      • Shortness reduced
      • Coughing reduced
      • Clients can issue a sputum
      • Wheezing is reduced / lost.
      • Vital signs within normal limits.

2.12.4 Nursing Intervention:

   • Auscultation of breath sounds, record the sound of breath, for example: wheezing, erekeis, ronchi. Rational : Some degree of bronchial spasms
occur with airway obstruction. Faint breath sounds with expiratory wheeze (empysema), no breathing function (severe asthma).

- Review / monitor respiratory frequency, record the ratio of inspiration and expiration. Rational: Tachypnoea usually found in some degree and can be found at the reception during the stress / the process of acute infection. Respiratory frequency can be slowed down and elongated than the expiration of inspiration.

- Assess the patient to a safe position, for example: elevation of the head does not sit on the backrest. Rational: Elevation head is not easier for respiratory function by using gravity.

- Observation of the characteristic cough, persistent, hacking cough, wet. Auxiliary actions to improve effectiveness cough efforts. Rational : The cough can be settled but is not effective, especially on elderly clients, acute pain /weakness.

- Give warm water. Rational : use of warm fluids can decrease bronchial spasms.


2. Ineffective breathing pattern related to decreased lung expansion.

Goal :
The pattern of effective breathing.

Result Criteria :

- effective breathing pattern
- The sound of normal breathing or net
- Vital signs within normal limits
- Coughing reduced.

Nursing Intervention:

- Assess respiratory frequency and depth of chest expansion. Record the respiratory effort including the use of auxiliary respiratory muscles/ nasal
dilation. R/ velocity usually reaches a depth of respiration varies depending on the degree of respiratory failure. Limited chest expansion associated with atelectasis and/or chest pain.

- Auscultation of breath sounds and record sounds like crekels breath, wheezing. R/ rhonchi and wheezing accompanying airway obstruction/ respiratory failure.
- Elevate the head and help change the position. R/ Sitting high enable lung expansion and eases breathing.
- Observation of the pattern of coughing and secretions character. R/ alveolar congestion often result in cough/irritation.
- Encourage/assist the patient in breathing and coughing exercises. R/ Can increase/number of sputum where the interference plus the lack of comfortable ventilation and breathing effort.
- Collaboration
  - Provide supplemental oxygen.
  - Provide additional humidifikasi eg nebulizer.

R/ Maximize breath breathe and reduce labor, provide moisture to the mucous membranes and helps thinning secretions. (Russell G, 2008).

2.13 Previous studies

Airway inflammation is assumed to be an important determinant in increased bronchial responsiveness (BR). We tested the hypothesis that treatment with an inhaled anti-inflammatory drug (i.e., budesonide) but not with an inhaled β-agonist (i.e., terbutaline) would reduce BR in children with asthma and with minimal or no bronchoconstriction. Twelve patients were treated with budesonide and seven with terbutaline for 6 months. BR decreased in 11 patients receiving budesonide and was significant in seven patients. BR decreased in none of the patients receiving terbutaline FEV1 demonstrated a small increase with budesonide but remained unchanged with terbutaline. Except in one patient, who received terbutaline, the clinical effect was good. We conclude that inhaled corticosteroids but not inhaled β-agonists will decrease persistent BR in most children with asthma. (Kerrebijn K. F., et al, 2007).
The clinical course of 210 children with perennial bronchial asthma was followed in a prospective controlled study in which one half of the children received placebo injections while the other half received conventional hyposensitization therapy. Of the 130 children still under observation at the time of their sixteenth birthday, 22% of the placebo-treated children were free of asthma compared to 72% of the treated children. In the treated group the rate of loss of asthma may be related to the dose of antigen received in hyposensitization therapy. Whereas 66% of the "1/5,000" group were free of asthma at the end of the study, 78% of the "highest tolerated dose" group were symptom free in their sixteenth year. The likelihood of a child outgrowing asthma was not significantly influenced by his sex, age of onset, or severity of his symptoms when first seen. A previous history of hay fever increased the likelihood of a child's asthma persisting into adolescence. (Douglas E. et al, 2007).

Another study: In a controlled prospective study we have measured growth and pulmonary function in children with asthma during long-term treatment with inhaled budesonide and compared these findings with those obtained from children not treated with corticosteroids. Two hundred and sixteen children were followed at 6 monthly intervals for 1–2 years without inhaled budesonide and then for 3–6 years on inhaled budesonide. Sixty-two children treated with theophylline, β2-agonists and sodiumcromoglycate but not with inhaled steroids were also followed for 3–7 years (controls). During the period of budesonide therapy the mean daily dose decreased from 710 to 430 μg (P<0·01) and no signs of tachyphylaxis to the treatment were seen. Budesonide treatment was associated with a significant reduction in the number of annual hospital admissions due to acute severe asthma (from 0·03 to 0·004 per child, P<0·001). In patients not treated with budesonide an annual decrease in % predicted FEV1 of 1–3% was seen. In contrast FEV1 improved significantly with time during budesonide treatment, both compared with the run-in period and with the control group (P<0·01). Furthermore, there was a significant (P=0·01) relationship between the duration of asthma at the start of budesonide and the annual increase in FEV1 during budesonide therapy. After 3 years of treatment with budesonide, children who started this therapy later than 5 years after the onset of asthma had significantly lower FEV1 (96%) than the children who received budesonide.
within the first 2 years after the onset of asthma (101%) ($P<0.05$). No statistically significant changes in growth velocity (run-in=5.6 cm year$^{-1}$, controls=5.6 cm year$^{-1}$, budesonide=5.5 cm year$^{-1}$) or weight gain (run-in=3.5 kg year$^{-1}$, controls=3.6 kg year$^{-1}$, budesonide=3.6 kg year$^{-1}$) were seen during budesonide treatment. We conclude that inhaled budesonide in doses up to 400 μg per day does not stunt growth in children with asthma and that early intervention with this treatment may prevent the development of irreversible airway obstruction and reduce the risk of under-treatment. Finally, continuous long-term treatment is not associated with the development of tachyphylaxis. (Agertoft, L., et al 2009).

**Study done in Sudan**

With the increasing morbidity and mortality of asthma worldwide, international guidelines have been developed for proper management of asthma during admission and after discharge from hospital. Adherence to these guidelines should be revised frequently because it affects the outcomes. The purpose of this study is to assess the adequacy of asthma management among asthmatic patients attending referred clinics in Khartoum. A sample of 98 asthmatic patients aged 20 to 70 years old was selected randomly from those attending asthma referred clinics in Al-Shaab and Ibrahim Malik teaching hospitals in Khartoum. The selected patients were adults, known asthmatic for at least one year and not suffering from other medical problems. Each patient filled a questionnaire requiring demographic data and information about his symptoms to assess his current status of asthma and his current medications to investigate whether they are consistent with recommendations of the international guidelines used in asthma management. Results the majority of patients (61.2%) were young adults 20 to 40 years old. Male to female ratio was about 1:2. About (38.8%) of patients had mild intermittent asthma, (37.8%) had mild persistent and (23.4%) had moderate persistent asthma. More than half of the patients (57.1%) were not receiving medications consistent with recommendations of international guidelines for asthma management. All patients did not use peak flow meters at home for follow up. The majority of them (68.4%) are not followed regularly in the referred clinic. Conclusion: The majority of the
asthmatic patients are not receiving treatment consistent with recommendations of the international guidelines for asthma management. (Sara A Elamin, et al 2011).
3. Materials and Methods

3.1 Study Design:

A descriptive hospital based study was conducted at Wad Medani Pediatric Teaching Hospital aimed at assessing nurses' knowledge and management of children with baronial asthma.

3.2 Study area:

The study was conducted in Wad Medani Pediatric Teaching Hospital, the capital of Gezira state which is a large agricultural area, located in the central region of Sudan which was open in 1987. The locality is about 189km south to Khartoum state. Pediatric teaching hospital is a level one district hospital serves about a lot of poor rural people. It receive patients from the whole state and neighboring states (Algadarif and Sinnar). There are 16 wards in this hospital one out of them are for asthmatic. The respiratory department consists of 40 beds, 2 masks, 2 nebulizer, 5 rooms (statistical Department of Pediatric Teaching Hospital 2010).

Also the data was collected for intensive care unit for regarding asthma patient it consist of 8 beds, and 2 rooms
Table (3.1) Distribution of Manpower in Pediatric Teaching Hospital 2013:

<table>
<thead>
<tr>
<th>Position</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultants</td>
<td>15</td>
</tr>
<tr>
<td>Registrars</td>
<td>7</td>
</tr>
<tr>
<td>Medical officers</td>
<td>11</td>
</tr>
<tr>
<td>House officers</td>
<td>42</td>
</tr>
<tr>
<td>Sisters</td>
<td>7</td>
</tr>
<tr>
<td>Nurses</td>
<td>165</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>7</td>
</tr>
<tr>
<td>Assistant pharmacist</td>
<td>5</td>
</tr>
<tr>
<td>Nutritionists</td>
<td>5</td>
</tr>
<tr>
<td>Assistant nutritionists</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>265</td>
</tr>
</tbody>
</table>

Source: Statistical Department of Pediatric Teaching Hospital. 2013
Table 3.2: Cases of bronchial asthma in pediatric teaching hospital for the years from 2010 to 2012:

<table>
<thead>
<tr>
<th>Year</th>
<th>Admission</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>621</td>
<td>0</td>
</tr>
<tr>
<td>2011</td>
<td>2073</td>
<td>3</td>
</tr>
<tr>
<td>2012</td>
<td>2436</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Statistical Department of Pediatric Teaching Hospital. 2013

3.3 Study Population:

Registered staff pediatric nurses working at the hospital respiratory ward and intensive care unit (ICU), during the period of the study were included in the study.

3.3.1 Inclusion criteria:

All available registered trained nurses who work at hospital respiratory ward and ICU were included in the study.

3.3.2 Exclusion criteria:

Under training nurses were not involved in this study.

3.4 Sample Size:

All available nurses (80) who work in the pediatric teaching hospital respiratory and ICU were included in the study during the period from March to April 2013.
3.5 Data Collection tool:

3.5.1 Interview questionnaire:

A structured interview questionnaire was designed by the researcher including data about socio-demographic characteristic, data about the nurses’ awareness about asthma and definition, signs, symptoms, complications and management, etc).

3.6 Sample technique:

- Official letters for the head manager and matron of pediatric teaching hospital at Wad Medani for approval to collect the data.
- Explanation for the pediatric nurses about the study questionnaire.
- Questionnaire was the researcher for each nurse.

3.7 Data analysis:

The data collected was incorporated and entered in the computer, described and analyzed. Unvaried and using statistical package for social sciences (SPSS).
4. Results and Discussion

4.1 Results:

Table (4.1): Distribution of the study samples according -to their age and gender:

<table>
<thead>
<tr>
<th>Age/years</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 – 30</td>
<td>47</td>
<td>58.8</td>
</tr>
<tr>
<td>31 – 40</td>
<td>26</td>
<td>32.5</td>
</tr>
<tr>
<td>41 – 50</td>
<td>7</td>
<td>8.7</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Female</td>
<td>80</td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100%</td>
</tr>
</tbody>
</table>

This table revealed that 58.8% of nurses have aged ranging from (20 – 30 years) while 8.7% of them their age range between 41 – 50 years. 100% of the study sample were female.
Table (4.2): Distribution of the study samples according to their educational level and years of experiences:

<table>
<thead>
<tr>
<th>Educational level</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary</td>
<td>30</td>
<td>37.5</td>
</tr>
<tr>
<td>University</td>
<td>50</td>
<td>62.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years of experiences</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than one year</td>
<td>5</td>
<td>7.4</td>
</tr>
<tr>
<td>1 to 5 years</td>
<td>20</td>
<td>25.0</td>
</tr>
<tr>
<td>5 to 10 years</td>
<td>19</td>
<td>23.8</td>
</tr>
<tr>
<td>More than 10 years</td>
<td>35</td>
<td>43.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 4.2: shows that 62.5% of nurses hold university degree. The majority of nurses for years of experiences concentrated in more than 10 years (43.8%).
Table (4.3): Distribution of the study samples according to their nurses’ knowledge about definition and symptoms of bronchial asthma:

<table>
<thead>
<tr>
<th>Definition of bronchial asthma</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct complete</td>
<td>36</td>
<td>45.0</td>
</tr>
<tr>
<td>Correct incomplete</td>
<td>15</td>
<td>18.8</td>
</tr>
<tr>
<td>Don’t know</td>
<td>32</td>
<td>36.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sings symptoms of bronchial asthma</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct complete</td>
<td>57</td>
<td>71.2</td>
</tr>
<tr>
<td>Correct incomplete</td>
<td>15</td>
<td>18.8</td>
</tr>
<tr>
<td>Don’t know</td>
<td>8</td>
<td>10.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>80</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4.3: Revealed that 45% of nurses their knowledge about the definition of bronchial asthma were correct complete while 36.2% of nurses don’t know the definition of bronchial asthma. Regarding sings and symptoms of bronchial asthma most of nurses (71.2%) their knowledge were correct complete.
Table (4.4): Distribution of the study samples according to their nurses’ knowledge about factors leads to asthma:

<table>
<thead>
<tr>
<th>Factors leads to asthma</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment factors</td>
<td>39</td>
<td>48.8</td>
</tr>
<tr>
<td>Exercise factors</td>
<td>4</td>
<td>5.0</td>
</tr>
<tr>
<td>Hereditary factors</td>
<td>36</td>
<td>45.0</td>
</tr>
<tr>
<td>Don’t know</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

48.8% of nurses answered the factor that causes bronchial asthma was environmental factors while 45% of them answered hereditary factors.
Table (4.5): Distribution of the study samples according to their nurses’ knowledge about diagnostic tests and respiratory complications of severe attack of bronchial asthma:

Table 4.5: Revealed that 77.5% of nurses their knowledge about diagnostic test of bronchial asthma were correct complete. 80% of nurses their about respiratory complication of bronchial asthma were correct complete while 1% of nurses don’t know.

<table>
<thead>
<tr>
<th>Diagnostic test of bronchial asthma</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct complete</td>
<td>62</td>
<td>77.5</td>
</tr>
<tr>
<td>Correct incomplete</td>
<td>14</td>
<td>17.5</td>
</tr>
<tr>
<td>Don’t know</td>
<td>4</td>
<td>5.0</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Respiratory complications of bronchial asthma</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct complete</td>
<td>64</td>
<td>80.0</td>
</tr>
<tr>
<td>Correct incomplete</td>
<td>15</td>
<td>18.8</td>
</tr>
<tr>
<td>Don’t know</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100%</td>
</tr>
</tbody>
</table>

No 80
Table (4.6): Distribution of the study samples according to their nurses’ knowledge about medications and health education of bronchial asthma in children

<table>
<thead>
<tr>
<th>medications of bronchial asthma</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct complete</td>
<td>73</td>
<td>91.2</td>
</tr>
<tr>
<td>Correct incomplete</td>
<td>7</td>
<td>8.8</td>
</tr>
<tr>
<td>Don’t know</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>health education that frequency of attack prevent it</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct complete</td>
<td>52</td>
<td>65.0</td>
</tr>
<tr>
<td>Correct incomplete</td>
<td>25</td>
<td>31.6</td>
</tr>
<tr>
<td>Don’t know</td>
<td>3</td>
<td>3.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

This table shows that 91.2% of nurses their knowledge about medications of bronchial asthma were correct complete while 8.8% their knowledge correct but incomplete. Regarding health that frequency of attack prevent it 65% of nurses their knowledge were correct complete while 3.8% don’t know.
Table (4.7): Distribution of the study samples according to their nurses’ knowledge about nurses’ role when parent have stress for her child received medication by nebulizer and when drugs given by nebulizer observation provide:

<table>
<thead>
<tr>
<th>nurses role when parent have stress for her child received medication by nebulizer</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct complete</td>
<td>68</td>
<td>85.0</td>
</tr>
<tr>
<td>Correct incomplete</td>
<td>10</td>
<td>12.5</td>
</tr>
<tr>
<td>Don’t know</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nurses role during nebulizer</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interrupted family visit</td>
<td>5</td>
<td>6.3</td>
</tr>
<tr>
<td>Observe nebulizer</td>
<td>30</td>
<td>37.5</td>
</tr>
<tr>
<td>Observe patients condition</td>
<td>40</td>
<td>50.0</td>
</tr>
<tr>
<td>Others</td>
<td>5</td>
<td>6.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>80</td>
<td>100%</td>
</tr>
</tbody>
</table>

This table revealed that 85% of nurses their knowledge regarding nurses role when parent have stress for her child received medication by nebulizer were correct complete. Regarding nurses role during nebulizer half of the study sample (50%) their answered observe patients condition and only 6.3% present family visit.
Table (4.8): Distribution of the study samples according to their nurses’ knowledge about:

<table>
<thead>
<tr>
<th>Nurses assessment during child received nebulizer medication you must assess</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any change occur during child used nebulizer</td>
<td>9</td>
<td>11.3</td>
</tr>
<tr>
<td>Assess child response medication</td>
<td>10</td>
<td>12.5</td>
</tr>
<tr>
<td>Observe regular correct placement of mask</td>
<td>58</td>
<td>73.7</td>
</tr>
<tr>
<td>Others</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

This table illustrated that 73.7% of the study sample their answers were correct complete while 2.5% of them don’t know.
4.2 Discussion

Asthma is a chronic inflammation of the bronchial tubes swelling and narrowing of the air ways. Asthma is narrowing the most common chronic illness in children. Allergy can be play role in some, but not all asthmatic patients. Many factors can precipitate asthma attack and they are classified as either allergens or irritants, allergens such as pollen smoke, upper respiratory infection exercise can tiger asthma attack, symptoms of asthma include shortness of breath, wheezing and cough, chest tightness. A descriptive hospital based study was conducted at Wad Medani Pediatric Teaching Hospital aimed at assessing nurses’ knowledge and management of children with bronchial asthma during the period of the study from March to April 2013. One tool of data collection were be used. A structured interview questionnaire was designed by the researcher including data about socio-demographic characteristics of the nurses’ awareness about asthma (definition, signs, symptoms, complication and management…etc). The data collected was incorporated and entered in the computer, described and analyzed. Unvaried and using statistical package for social sciences (SPSS).

The results revealed that 58.8% of nurses have aged ranging from (20 – 30 years) while 8.7% of them their age range between 41 – 50 years. 100% of the study sample were female. 62.5% of nurses hold university degree. The majority of nurses for years of experiences concentrated in more than 10 years (43.8%). Also the results revealed that 45% of nurses their knowledge about the definition of bronchial asthma were correct complete while 36.2% of nurses don’t know the definition of bronchial asthma. Regarding signs and symptoms of bronchial asthma most of nurses (71.2%) their knowledge were correct complete. 48.8% of nurses answered the factor that causes bronchial asthma was environmental factors while 45% of them answered hereditary factors.
77.5% of nurses their knowledge about diagnostic test of bronchial asthma were correct complete. 80% of nurses their knowledge about respiratory complications of bronchial asthma were correct complete while 1% of nurses don’t know and 91.2% of nurses their knowledge about medications of bronchial asthma were correct complete this result is similar to study done by Emmanouil Rovithis et al, (2001) who illustrated that: Both groups increased their level of knowledge (mean total score) between the two occasions (before and after the course) but only for the NSs was the difference found to be statistically significant (t= 3.326, d.f. = 11, p < 0.01). The KSc improved after the course for both groups, but the difference was again, only statistically significant for the NSc (t = 2.628, d.f. = 11, p <0.05). The mean ASc score of the two groups also improved after the course, the difference between the two occasions was found to be significant for both the GPs (t = 3.024, d.f. = 8, p < 0.05), and the NSs (t = 3.362, d.f. = 11, p < 0.01). (Emmanouil Rovithis et al, 2001)

8.8% their knowledge correct but incomplete. Regarding health education that frequency of attack to prevent it 65% of nurses their knowledge were correct complete while 3.8% don’t know

This result revealed that 85% of nurses their knowledge regarding nurses role when parent have stress for her/his child received medication by nebulizer were correct complete. Regarding nurses role during nebulizer half of the study sample (50%) their answered observe patients condition and only 6.3% interrupted family visit. 73.7% of the study sample their answers were correct complete while 2.5% of them don’t know.
5. Conclusion and Recommendations

5-1. Conclusion

Based on the results of this study, the researcher concluded that most of the pediatric teaching hospital nurses had a good knowledge regarding management of bronchial asthma.
5.2 Recommendations:

Based on the result of this study the following recommendations are suggested:

- Learning facilities as library books and, periodical Journals and internet regarding bronchial asthma in children should be available for the nurses at hospital.

- Training program for all nurses working at Wad Medani pediatric teaching hospital on theoretical back ground, reasoning and appreciation for every activity for each step in management of bronchial asthma patients for upgrading their knowledge through more qualified nurses.
References

Agertoft, L., Pedersen S., (2009). Effects of long-term treatment with an inhaled corticosteroid on growth and pulmonary function in asthmatic children. Department of Paediatrics, Kolding Hospital, DK-6000 Kolding, Denmark


Asthma (children under 5) - inhaler devices, NICE (2000)

Asthma (older children) - inhaler devices, NICE (2002)

British Guideline on the Management of Asthma; British Thoracic Society (BTS) and Scottish Intercollegiate Guidelines Network - SIGN, 2008 (latest revision May 2011)


Emmanouil Rovithis Christos Lionis Sofia E Schiza Dimosthenis Bouros. (2001) Assessing the knowledge of bronchial asthma among primary health care physicians in Crete: A pre- and post-test following an educational course. Biostatistics Laboratory, Department of Social Medicine, University of Crete, Greece BMC Medical Education (2001)


National strategy for COPD (including asthma), National service frameworks and strategies, NHS Choices


Russell G; Wheeze in preschool children. BMJ. 2008 Jun 16; Lung and Asthma Information agency; Epidemiological information


Appendix I

معلومات الممرضين والممرضات تجاه رعاية الأطفال المصابون بالربو الشعبي

بمستشفى الأطفال التعليمي بود مدني، ولاية الجزيرة السودان

المعلومات الشخصية:

1. العمر:
   أ) 20 – 30 سنة ( )
   ب) 31 – 40 سنة ( )
   ج) 41 – 50 سنة ( )

2. النوع:
   أ) ذكر ( )
   ب) أنثى ( )

3. المؤهل العلمي:
   أ) أساس ( )
   ب) ثانوي ( )
   ج) جامعي ( )
   د) فوق الجامعي ( )

4. عدد سنوات الخبرة:
   أ) أقل من سنة ( )
   ب) 1 – 5 سنوات ( )
   ج) 5 – 10 سنة ( )
   د) أكثر من 10 سنوات ( )

معلومات الممرضين والممرضات عن الربو الشعبي:

1. الربو الشعبي عند الأطفال هو؟
   أ) التهاب مزمن بالشعب الهوائية ( )
   ب) التهاب جاد بالشعب الهوائية ( )
   ج) التهاب بالشعب الهوائية ( )
2. أعراض الربو الشعبي عند الأطفال هي:
أ) ضيف في التنفس  ( )
ب) صوت في التنفس  ( )
ج) أخرى  ( )

4. تشخيص الربو الشعبي عند الأطفال؟
أ) صورة أشعة للصدر  ( )
ب) اختبار وظائف الرئة  ( )
ج) كرويات الدم البيضاء  ( )
ج) أخرى  ( )

6. الأدوية التي تستخدم في علاج الربو الشعبي عن طريق:
أ) الاستنشاق  ( )
ب) الحقن  ( )
ج) شراب  ( )
ج) أخرى  ( )

7. للوقاية من حدوث الربو الشعبي عند الأطفال:
أ) التهوية الجيدة والبيئة النظيفة  ( )
ب) متابعة الطبيب بصورة منتظمة  ( )
ج) عدم وقف الدواء من قبل المريض  ( )
ج) أخرى  ( )
معلومات الممرضين والممرضات عن جهاز الاستنشاق:

1. دور الممرض تجاه العامل النفسي للأم عند وضع الطفل في جهاز الاستنشاق:
   أ) شرح أعراض المرض ( )
   ب) شرح الهدف من العلاج بجهاز الاستنشاق ( )
   ج) لا يعرف ( )

2. عند إعطاء الطفل الدواء عن طريق جهاز الاستنشاق يجب مراعاة:
   أ) منع الزيارة للمريض ( )
   ب) مراقبة جهاز الاستنشاق ( )
   ج) مراقبة حالة المريض ( )
   د) لا يعرف ( )

3. عند أخذ للعلاج عن طريق جهاز الاستنشاق يجب تقييم:
   أ) التغيرات التي تحدث للطفل عند استخدام جهاز الاستنشاق ( )
   ب) ملاحظة استجابة الطفل للعلاج ( )
   ج) مراقبة وضع الكمامة في وضعها الصحيح ( )
   د) لا يعرف ( )