Full Length Research Paper

Risk factors for asthmatic children attending the paediatric clinic at Al-Amal National hospital, Sudan

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Asthma is the most common respiratory disorder in children. It could be precipitated by several triggering factors including respiratory tract infection, smoke, weather changes and many other factors. To determine the risk factors for bronchial asthma in children attending the paediatric department at Al-Amal National Hospital. A hospital based prospective study carried out between 19/11/2012 to 20/2/2013 at Al-Amal National Hospital, Khartoum North, Sudan. 120 patients (1-18 years) were questioned about their medical history through a questionnaire form and examined clinically. Data was analyzed using the Statistical Package for Social Sciences (SPSS). 120 patients were included in the study. Male to female ratio was 1:55 to 1. Most of them (81.66%) have family history of bronchial asthma. Weather change (91.66%), respiratory tract infections (80%), smokes and fumes (77.5%), house dust (75%) and strong perfumes (69%) were found to be the major triggering factors. Asthma could be triggered by more than one factor in the same child. Only 39 patients were on regular follow up. All of them were on inhaled steroids. Only 4 were using long acting inhaled B₂ agonists and steroids. Asthma could be triggered by more than one factor in same child. Weather change is the most common triggering factor followed by respiratory tract infections, smokes and fumes, house dust and strong perfumes. Protocols for management of asthma modulated for local use will be of great help.

Keywords: Bronchial asthma, Children, Risk factors, Sudan.

INTRODUCTION

The Global Strategy for Asthma Management and Prevention Guidelines define Asthma as a chronic inflammatory disorder of the airways associated with increased airway hyper-responsiveness, recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night/early morning (Agrawal). It implies reversible airways obstruction. More than 20% of children wheeze at sometime (Collier et al., 2000).

Asthma is the most common chronic respiratory disorder in childhood, affecting 15 – 20 % of children worldwide. It affects 12.2% of children in Khartoum state- Sudan and remains the 3rd common cause of hospital admission for children following pneumonia and malaria (Haj-Sharif, 2012). Worldwide there appears to have been a significant increase in the incidence and severity of asthma over the past decades (Agrawal; Liessauer and Clayden, 2007; Mustafa et al., 2008; Aligne et al., 2000). Studies conducted in different countries have reported an increase in asthma prevalence of about 50% per decade (Agrawal; Andrew et al., 2004). The highest rates are in the developed world (Agrawal; Andrew et al., 2004). In contrast, children living in rural areas of
developing countries and farming communities (Germany, Austria) are less likely to have asthma and allergy (Andrew et al., 2004; Hendryx et al., 2012). The causes of this increase are not well known but may be related to factors such as increased impact of environmental allergens, indoor and outdoor air pollutants, increased obesity rates and inadequate early immune system exposures. Other researchers suggest that urban exposures are the key and that lower asthma rates in rural areas reflect lower urban-related risks rather than a rural protective effect (Hendryx et al., 2012). In general, asthma is under-diagnosed and under-treated (Agrawal et al., 2004; Khalil, 2011; Ostergaard et al., 2012).

In most children the symptoms of asthma are readily controlled, but it is an important cause of school absenteeism, restricted activity and anxiety for the child and family (Liessauer and Clayden, 2007). It is one of the most common causes for presentation, hospital admission and childhood disability (Hendryx et al., 2012; Kumar et al., 2012). Each year 70% of asthmatic children will be admitted to hospital (Bedwani et al., 2008). It is responsible for 160 and 50 deaths per year in USA and UK respectively (Andrew et al., 2004; Bedwani et al., 2008). Fortunately, overall mortality rates have fallen since the 1980s in the developed world due to changes in asthma management, specifically in the increased use of management guidelines and inhaled corticosteroids (Agrawal; Andrew et al., 2004).

In general, most children with asthma improve as they grow older. The more severe the asthma, the older the age at which it is likely to improve, yet asthma may recur in adult life (Hull and Jonson, 1995).

Early childhood risk factors for persistent asthma include: parental asthma, allergy, severe lower respiratory tract infection, wheezing apart from colds, male gender, low birth weight and environmental tobacco smoke exposure (Andrew et al., 2004).

Results

The study included 120 asthmatic children. The majority were boys (73 = 60.8%). The girls were 47 (39.16%). M: F ratio was 1.55: 1. Most of them, 92 (76.66%) were more than five years old and those aged 1-5 years were 28 (23.33%). Only nineteen patients (16%) had history of allergic diseases, where 6 of these (30%) with eczema, 5 (26%) with allergic rhinitis and 4 (21%) with food allergy. Ninety eight patients (81.66%) had family history of bronchial asthma, where forty three of them (43.87%) in siblings, twenty eight (28.57%) in the father and twenty eight (28.57%) in the mother. Forty one (41.83%) also had other relatives with bronchial asthma. More than one family member may be affected (Table 1).

The risk factors that precipitate the asthmatic attack recorded in our children were the change in weather in (91.66%), infections in (80%), smokes and fumes in (77.5%), house dust in (75%), strong perfumes in (69.1%), animals and pets in (20.83%) and others in (13.33%) (Table 2).

All our patients (100%) had cough as a main complaint. Shortness of breath reported in 88.33%, wheeze in 73.33%, fever in 41.66%, running nose in 40% and vomiting in 3.33% of our cases. Tachypnea was reported in 80% of cases, rhonchi in 65.83%, fever in 39.16%, crepitations in 32.5%, recession in 19.16%, cyanosis in 0.83% and others in 1.66% of our patients. (Figure 1 and 2)

Almost one third (39 children) had regular follow up with prophylactic inhaled steroids. From these only four patients (10%) on long acting B₂ agonist and one patient (2.6%) on Leukotriene receptor agonist. Eighty five patients (70.8%) had at least one hospital visit during the last 12 months and forty seven patients (39.1%) had at least one hospital admission during the same period. The mean for hospital visits and admission during the same period is 3.26 and 3.13 respectively. Eighty two patients (Two thirds) were not on regular treatment or follow up, where fifty six of these (two thirds) had one hospital visit during the last 12 months and twenty eight patients (one third) had at least one hospital admission during the same period.

Subjects and Methods

It is a hospital based prospective study. Asthmatic children (1 year – 18 years) attending referred clinic, ER and admitted patients in the paediatric department at Al-Amal National Hospital in Khartoum North-Sudan, from 19/11/2012 to 20/2/2013 were included in the study. The total number seen was 120 patients. A questionnaire containing personal data, disease history and clinical examination was used after obtaining verbal consent.
Figure 1. Symptoms of bronchial asthma in studied children.

Figure 2. Signs of bronchial asthma in studied children.

Table 1. The Distribution of Family history in children with asthma.

<table>
<thead>
<tr>
<th>No.</th>
<th>Family member</th>
<th>No.</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sibling</td>
<td>43</td>
<td>43.87%</td>
</tr>
<tr>
<td>2</td>
<td>Others</td>
<td>41</td>
<td>41.83%</td>
</tr>
<tr>
<td>3</td>
<td>Father</td>
<td>28</td>
<td>28.57%</td>
</tr>
<tr>
<td>4</td>
<td>Mother</td>
<td>28</td>
<td>28.57%</td>
</tr>
</tbody>
</table>

42% had only one family member affected and the rest had multiple members
Table 2. Risk factors for development of asthmatic attacks.

<table>
<thead>
<tr>
<th>NO.</th>
<th>PRECIPITATING FACTORS</th>
<th>NO. OF PATIENTS</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Change in weather</td>
<td>110</td>
<td>91.66%</td>
</tr>
<tr>
<td>2</td>
<td>Infections</td>
<td>96</td>
<td>80%</td>
</tr>
<tr>
<td>3</td>
<td>Smoke and fumes</td>
<td>93</td>
<td>77.5%</td>
</tr>
<tr>
<td>4</td>
<td>House dust</td>
<td>90</td>
<td>75%</td>
</tr>
<tr>
<td>5</td>
<td>Strong perfumes</td>
<td>83</td>
<td>69.1%</td>
</tr>
<tr>
<td>6</td>
<td>Animals and pets</td>
<td>25</td>
<td>20.83%</td>
</tr>
<tr>
<td>7</td>
<td>Others</td>
<td>16</td>
<td>13.33%</td>
</tr>
</tbody>
</table>

**DISCUSSION**

From this study it is clear that the majority of patients were boys (60.8%) and girls were (39.1%). The M: F ratio was 1.55: 1. This is similar to our national figures where in a previous two studies done by Dr. Hana Khalil in June 2011, the M: F ratio was 1.46: 1, and Dr. El-Naji Ahmed Al-Bashir in 1981 where M: F ratio was 1.4: 1. It was similar to international figures as demonstrated by studies by Al Mgvist C in Sweden and in Santiago by Valdivia CG, where they found that M: F was 1.2: 1 (Mustafa et al., 2008; Khalil, 2011; Kumar et al., 2012).

Interestingly most of the studied group was school age children 5-18 years old (74.16%) which is different from general concept that asthma is commoner in preschool children. Difficulty of diagnosis in preschool children may be the explanation (Andrew et al., 2004; Khalil, 2011; Hull and Jonson, 1995) and, to some extent, due to denial of diagnosis by our families that we face in our country.

Only 19 (16%) of studied children had history of allergic diseases, out of these 5 patients (4.16%) having allergic rhinitis, 6 patients having eczema (5%). This may be similar to the study done in India by Sundee and his colleagues where they found that patient with allergic rhinitis and eczema were 9.5% and 4.3% respectively. In contrast, the studies done by Dr. Hana Khalil in Sudan and Kuroiwa C and his colleagues in Japan they found that 28.5% and 24.5% having allergic rhinitis and 15.5% having eczema in both studies (Khalil, 2011). A study done in USA showed that 60-78% of asthmatic patients have co-existing allergic rhinitis (Khalil, 2011). Four patients (3.33%) have history of food allergy, different from the 16.5% found by Dr. Hana Khalil (Sudan) and 29% in a study done in Saudi Arabia by Aba Al-Khalil in 2000 (Khalil, 2011). Only two patients (1.66%) have drug allergy compared to 13.5% in Dr. Hana Khalil study and 8.8% in a study done in Mexico 2006 by Padilla Serrato MT and his colleagues (Khalil, 2011). A statistically significant association of bronchial asthma with family history of asthma was observed (Kumar et al., 2012).

Asthma can be triggered by more than one factor in the same child (Khalil, 2011) and this what happened in almost all the studied group (97.5%). The commonest triggering factor in our study was weather changes (Dust, cold or hotness) (91.66%). This is followed by infections, mainly of the upper respiratory tract (80%). Then smoke and fumes and house dust as (77.5%) and (75%) respectively.

A study done in Sudan by Dr. Maha Mubarek Haj Sharif on 2011 showed that dust was the major triggering factor affecting 49.7% followed by respiratory tract infection 47.2%. This is consistent with the study done in Oman by Omar Al-Rawas and his colleagues where they found that dust is the most common triggering factor for asthma in 49.2% followed by respiratory tract infection in 24.2% (Haj-Sharif, 2012). On the other hand, the study by Dr. Hana Khalil (Sudan) stated that common cold is the most common triggering factor where it affected 30% followed by house dust in 10% and Talih smoke in 9%. Common cold is the major triggering factor in 80-85% of asthmatic patients in the USA, 80% in Netherlands and 78% in Australia (Kumar et al., 2012).

Cockroach sensitization, which often occurs at a very early age in exposed children, has been associated with increased risk of incident asthma (Salam et al., 2004). Interestingly, a study in Costa Rica found that very high prevalence of mite and cockroach allergens, may explain the high prevalence of asthma and asthma-related symptoms. A very high prevalence of a history of wheezing was found in the three studies in Costa Rica with 46.8%, 42.9%, and 45.1% in different age groups among school children. Haryana in India found that factors associated with presence of symptoms of asthma were passive smoking, pets at home, and absence of windows in living rooms (Kumar et al., 2012).
CONCLUSION

Asthma is a common health problem in children and could be triggered by more than one factor in the same child. Change in weather is the most common triggering factor followed by respiratory tract infections, smokes and fumes and house dust. Regular follow up is essential as well as prophylactic treatment to decrease the morbidity and mortality of the disease. Health education is advised for the patient and the family specially the use of inhaled medications with spacer and the none-addictive nature of these medications. Education may include the determination of the triggering factor and the need to avoid it, if possible. Protocols for management of asthma modulated for local use will be of great help.

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REFERENCES