An evaluation of parental knowledge of childhood asthma in a family practice setting

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Study objective. To measure and evaluate parental knowledge of and misconceptions with regard to childhood asthma and its treatment.

Design. A cross-sectional, descriptive survey.

Setting. A family practice in Mandalay, Mitchell's Plain, on the Cape Flats.

Participants. The sample comprised all parents (N = 105) with an asthmatic child aged between 2 and 18 years attending the practice. The response rate was 95.2%.

Outcome measures. A semi-structured questionnaire which included a 55-item psychometrically validated asthma knowledge test.

Results. An average score of 72% was achieved. Parents were most knowledgeable about aetiology, symptomatology, pathophysiology, precipitants and environmental control. They were less informed about asthma therapy, asthma prognosis and general medical knowledge. In addition, numerous misconceptions were identified, which together with the knowledge deficiencies, could lead to inadvertent non-compliance. Parental concerns centred predominantly on their lack of confidence to manage acute asthma attacks, and fears about asthma prognosis.

Conclusion. The study underscores the need for systematic asthma education, especially with regard to acute attack management and preventive medications. In addition, parents must acquire confidence and practical skills to cope with acute attacks.

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Childhood asthma is a common chronic condition in both developed[1] and developing communities.[2] In South Africa the estimated prevalence of childhood asthma is 3 - 6%.[1,2] In the past two decades medical treatment has improved significantly with the widespread use of new and specific medications. Nonetheless, there has been an increase in asthma mortality[3] and morbidity.[4,5] In addition, asthma consumes an increasing share of the health care budget, estimated at 1 - 2% for industrialised countries.[5] Possible reasons for the high morbidity and mortality include underdiagnosis and undertreatment by doctors and poor self-management by many patients. Inadequate knowledge, skills and confidence to manage the disease result in inappropriate management decisions and delayed care.[4]

Clinical experience in family practice has indicated that many misconceptions about asthma are prevalent among parents with an asthmatic child; these may negatively influence compliance and attitudes towards the disease.[6,7] To date, however, there has been a dearth of local research on the disease-related knowledge of families of asthmatic children who are managed in family practice settings.

This study aimed to assess parental knowledge, misconceptions and concerns about childhood asthma.

Subjects and methods

The study design consisted of a cross-sectional survey of a complete consecutive series of parents of children aged 2 - 18 years with the diagnosis of asthma and who had attended the practice between January 1989 and February 1993. The diagnosis of asthma was made whenever patients responded to bronchodilator therapy for recurrent episodes of coughing and wheezing for a minimum of two illness episodes. Of the 75 patients who met these criteria, 16 had relocated and were not contacted while the parents of 5 patients declined to participate. Structured questionnaires were delivered to the remaining 54 families for completion in their homes. Permission for this study was granted by the Ethics and Research Committee of the University of Cape Town.

Asthma knowledge test

Following a search of the literature, an initial pool of 110 questions was collected, from which 55 were selected for the final questionnaire. The following eight content areas were covered by the 55 multiple-choice questions: general medical knowledge, aetiology, asthma symptomatology, pathophysiology, prognosis, precipitants, environmental control and asthma therapy. Sample items are listed in Table I.

Table I. Examples of items in the asthma knowledge test

1. In the older child, the severity of an asthmatic attack is best determined by
   a. Asking the child how tight his chest is feeling
   b. Performing a blowing test using a peak flow meter
   c. I don't know
2. The 'preventers', e.g. Becotide, Lomudal, Zaditen:
   a. Should be taken regularly for a long time
   b. Can be stopped as soon as the child feels better
   c. I don't know
3. When your child has a sudden attack of asthma, you should:
   a. Take him to the doctor or hospital if his usual medicine does not help within a half or 1 hour
   b. Continue giving more medicines at home
   c. I don't know
4. Inhaler pumps taken for asthma as the doctor has prescribed:
   a. May weaken the heart
   b. Do not weaken the heart
   c. I don't know

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Psychometric properties

Content validity refers to the representativeness of the questions included in the measuring instrument.[8] This was established by the process of test construction during which items were sampled from the professional and lay literature and the questions evaluated by experts at the allergy clinic of Red Cross War Memorial Children's Hospital. This led to the removal of faulty and difficult items.

Construct validity refers to the ability of the measuring instrument to measure the specific construct it was designed to measure.[8] This was assessed by administration of the test to the following groups who were thought to possess varying levels of knowledge about asthma: 16 fifth-year medical students, 9 medical doctors, 13 parents attending the asthma clinic at Red Cross Hospital and 12 parents without asthma or asthmatic children. Respective scores of 95.3%, 90.1%, 78.5% and 49.4% indicated that the test successfully discriminated levels of asthma knowledge among the different groups. As expected, parents with no experience of asthma achieved the lowest score.

Acceptable reading levels were calculated using the Flesch formula.[9] To overcome threats to validity such as 'cheating' and guessing, parents were requested to respond spontaneously, to use the 'I don't know' option, and not to exchange answers with each other or consult books.

Knowledge scores were obtained by adding the number of correct responses to each item. Total knowledge scores, reflecting overall test performance, and eight subsection scores, reflecting the dimensions of knowledge about asthma, were calculated for each parent. To identify specific asthma knowledge deficiencies and misconceptions among parents, a comprehensive analysis of each subsection was undertaken.

Items on the sociodemographic and medical characteristics of the patients and parental concerns about childhood asthma were included in the questionnaire.

Statistical analysis

Statistical analysis of the data was undertaken with the assistance of a statistician in the Department of Community Health, University of Cape Town, using EPI Info 5 statistical software. The Wilcoxon-2 sample test and chi-square analysis were used to examine associations between knowledge about asthma and sociodemographic and medical variables. Responses to open-ended questions were analysed using qualitative methodology.[10]

Results

Completed questionnaires were received from 52 mothers and 48 fathers. The overall response rate was 95.2%. The mean age of respondents was 34.8 years (range 21 - 52 years). Two per cent of parents had primary school education only, 56% had been to high school, and 42% had a tertiary education. Forty-seven per cent of parents smoked and 29 families had pets such as dogs, cats and birds. Forty-three per cent of parents had had a child admitted to hospital for asthma, 12% of parents were asthma sufferers and 15% of respondents had lost a family member to asthma. Sixty-one per cent of parents reported that their child used no preventive medication while 79% of children took one or more relieving medications.

With the exception of a statistically significant difference between the knowledge score of parents with a high school education and those with a tertiary education (71.8% and 80% respectively, $P = 0.0368$), no other significant associations were found.

Results of the asthma knowledge test

Average total scores of 71.3% and 72.9% were obtained by fathers and mothers respectively (Table II). Mean subsection scores indicate that parents were more knowledgeable about asthma aetiology, symptomatology, precipitants and environmental control (Table III).

Table II. Means, SDs and ranges (%) on the asthma knowledge test

Asthma knowledge	No.	Mean	SD	Range
Fathers	48	71.3	14.6	36.4 - 92.7
Mothers	52	72.9	14.4	34.5 - 92.7

Table III. Mean subsection scores (% correct responses) on the asthma knowledge test

Category	No. of items	Fathers	Mothers
1. General medical	4	57.3	52.4
2. Aetiology	4	87.0	92.3
3. Symptomatology	7	80.6	82.4
4. Pathophysiology	5	73.4	73.8
5. Prognosis	2	61.5	65.3
6. Precipitants	10	74.8	80.8
7. Environmental control	4	88.0	91.3
8. Therapy	19	66.2	64.4

General medical knowledge

About 95% of parents knew that asthma is a disease of the lungs. Over 80% were aware that the common cold had a viral aetiology but approximately two-thirds incorrectly believed that antibiotics were effective against viral infections.

Aetiology

Knowledge was high, with an approximate score of 90% on each item. Parents knew that asthma causes airway sensitivity, that exposure to cigarette smoke can bring on asthma, that asthma runs in families, and that asthma is more likely to occur in children who are allergic to pollen and house-dust mite.

Symptomatology

Asthma symptoms were well known among parents, with an average score of about 80%. The common symptoms of night-time coughing, wheezing and shortness of breath on effort were well known. Alarmingly, only slightly more than half of the parents knew that the severity of an attack is best determined by the patient's blowing into a peak-flow meter. About 20% of parents incorrectly believed that asking a child how tight his chest felt was an adequate assessment of severity; a further 20% did not know.

Pathophysiology

Most parents (approximately 80%) knew that an acute attack of asthma was due to mucosal inflammation, smooth-muscle contraction and mucous secretions. However, 80% of parents incorrectly identified asthma as an inspiratory difficulty.

Prognosis

While half of the parents knew that breast-feeding delayed the onset of asthma, about two-thirds knew that the prognosis of asthma was unpredictable.

Precipitants

Feathers, colds and influenza, worry, and being unhappy or upset were correctly identified by over 80% of parents. With regard to asthma and exercise, approximately 80% of parents knew that asthmatics can play sport, that swimming was better for asthmatics than running, that taking a puff from an inhaler pump before exercise may prevent asthmatic symptoms and that a physically fit child will have fewer attacks. Only 60% were aware that cold air can precipitate an attack and fewer than 50% failed to recognise excessive laughter as a precipitant.

Environmental control

Over 90% of parents were aware of the beneficial effects to asthmatic children of a dust-free bedroom, frequent vacuuming of carpets and mattresses and exposing them to the sun. Only approximately 10% of parents incorrectly identified cats and dogs as suitable pets for asthmatics. Moreover, 75% regarded a move to a hot, dry climate as beneficial to asthmatics.

Asthma therapy

This subsection included interventions for acute attacks and routine ambulatory care. Both fathers and mothers achieved low scores of 66.2% and 64.4% respectively. More than 90% of parents knew that medications only allow for control of asthma, not cure, but more than 50% did not know that inhalers provide a lower dose and fewer side-effects than tablets and syrups. With regard to preventive medications, about 50% did not know that they reduce airway swelling and inflammation and require a few weeks to take effect. Surprisingly, 80% knew that the frequency of acute attacks is reduced with daily use of preventives. Parents fared better with regard to reliever medications, with more than 80% being aware that they should be used when a child starts to cough and wheeze, given that this could herald an acute attack. Most parents correctly responded that night-time coughing and a sudden attack require relieving medications. More than 90% knew that during an acute attack both parent(s) and child should remain calm, the child should breathe slowly and regularly and medical assistance should be sought if the regular medications do not bring relief within 1 hour.

Parents held many misconceptions. About 60% felt that inhalers weaken the heart while 75% believed the regular administration of medications would lead to addiction and render the medicines ineffective. Two-thirds of parents believed that folk remedies were effective in treating asthma.

Parental concerns

In response to the open-ended question'What worries you most about your child's illness?', parents were most concerned about acute attacks and their child's future health.

Discussion

Parents obtained an average score of 72% on the asthma knowledge test, which compares favourably with parental performances in other studies.[11-13] Although this may be interpreted as indicative of satisfactory levels of knowledge, the presence of errors and misconceptions is a cause of concern, given their potential for causing inadvertent non-compliance.[14] Parents were least successful in answering items on asthma therapy, prognosis and general medical knowledge.

A number of specific gaps exist in parental disease-related knowledge. They were unable to distinguish between viral and bacterial infections and expected antibiotic treatment for both. This is particularly noteworthy given the recent consensus statement that specifically states that antibiotics have no benefit in the treatment of childhood asthma.[15] About 60% were either unaware of the value of the peak flow meter as a measure of the severity of an attack or considered the child's subjective assessment to be adequate. Although the majority of patients were mild asthmatics and would probably not be using peak flow meters regularly, it is important for parents to know that the subjective assessment of acute attacks at home is inadequate. With regard to the common precipitants of asthma, about 40% were unaware that cold air or excessive laughter can precipitate acute attacks. More than 50% of parents did not know the benefits of inhaler therapy relative to drug dosage and side-effects. Parental understanding of preventive drugs is especially lacking, with the majority being unaware of how they work. About 40% said they give immediate relief of symptoms and one-quarter said that they can be stopped as soon as the child feels better. In view of the recent understanding of asthma as an inflammatory illness and the economic benefits of preventing hospital admissions,[5] such deficiencies in understanding are very important. Although mild asthmatics do not need preventive therapy,[15] it is important for parents to be aware that anti-inflammatory drugs could be administered if the severity increases. The presence of these deficiencies demonstrates a lack of essential knowledge, i.e. knowledge required for optimal compliance, and reaffirms the need for asthma self-management programmes and education.[16]

About 50% of parents smoked cigarettes even though 80% knew the deleterious effect of smoking on asthma. Clearly, knowledge of the harmful effects of smoking does not necessarily translate into behavioural change. Given that smoking is harmful to asthmatic children,[15] it may be necessary for doctors to acquire specialised counselling skills in the area of smoking prevention and cessation.[17]

A significant number of parental misconceptions about asthma therapy were detected in the asthma knowledge test and the open-ended question. These include beliefs that inhaler therapy weakens the heart, and that regular therapy leads to addiction and eventual drug ineffectiveness. It is