ORIGINAL ARTICLE

REDUCTION OF ASTHMA SYMPTOMS IN CHILDREN BY LIFESTYLE MODIFICATION

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Abstract

Aim: To determine whether adopting lifestyle modifications of healthy food and feeding habits could reduce the asthma symptoms and wheezing in children.

Design: This prospective study of 12 weeks duration included 106 chronic wheezers and 50 controls from 6 months to 14 years of age. The study group was subjected to lifestyle modifications (proper feeding practices, correct posture and healthy food habits) whereas, the control group received treatment with inhaled corticosteroid and leukotriene inhibitors.

Results: The demographics and initial clinical presentations were comparable in both groups with no statistical significance. In the study group all clinical parameters (cough, breathlessness and rhonchi) showed significant improvement as early as 2 weeks. By 12 weeks, more than 80% were symptom-free in the study group (cough 19% v/s 36 %; p=0.01, breathlessness 3% v/s 18%, p=0.0009 and rhonchi 17% v/s 34%, p=0.01 in the cases and controls respectively).

Conclusions: Asthma symptoms and wheezing in children could be reduced by lifestyle modifications of healthy food and feeding practises. Use of inhalers and leukotriene inhibitors could be avoided in more than 80% of the subjects

Keywords: Asthma and wheezing in children, Lifestyle modification, Micro and macro aspirations, GERD.

Introduction

Wheezing including asthma is a common cause of morbidity in children. Recurrent asthma occurs in 35% of pre-school children. Of these, one third continue to have persistent asthma into later childhood. (1) An Indian study has documented asthma prevalence of 16.6% and 5.7% in urban and rural children respectively. (2) The cause of childhood asthma has not been determined, although contemporary research implicates a combination of environmental exposures and inherent biological and genetic vulnerability. (3) A study in rabbits has shown that repeated small volume milk aspirations cause persistent airway inflammation and is associated with greater airway reactivity compared to controls. (4) There are several studies supporting the fact that pulmonary aspirations [direct aspiration as well as aspiration due to gastroesophageal reflux disease (GERD)] is very common in children giving rise to recurrent respiratory manifestations like cough, wheezing and asthma. (5-8) It is also known that aspiration from gastroesophageal reflux or direct aspiration from oral liquids can cause wheezing. (9)

Lifestyle modifications adopted in the present study were evolved over the last 10 to 12 years from clinical observation based on patient feedback. For example, when a hungry baby is put to breast, it will suck rapidly and hurriedly; this coupled with the ejection reflex of the mother, the oral cavity of the baby will be flooded with milk and there will be a tendency to choke and aspirate the feed. Once these aspirations were prevented by innovative lifestyle modifications, it was observed that there was considerable reduction in the recurrence of wheezing in small infants. The primary objective of this study was to determine whether adopting lifestyle modifications of healthy food and feeding habits could reduce asthma symptoms and wheezing in children.

Methods & Materials

This prospective study was conducted between October 2009 and June 2010. Approval was obtained from the Institutional Ethics Committee. Informed consent was taken from the parents of the patients. One hundred and six consecutive patients in the age group 6 months to 14 years attending the asthma clinic of the PVS hospital, Kozhikode (India) were enrolled in the study group. Only those who were symptomatic during the last 3 months with at least one episode of wheezing per month and who were symptomatic at enrolment were included in the study. Children with congenital heart disease (CHD), those receiving anti tuberculosis treatment (ATT) and those critically ill, were excluded. Fifty patients attending the asthma clinic of the pediatrics department of the Kozhikode medical college formed the control group. Patients of both groups were clinically evaluated. The following innovative lifestyle modifications were advised to the patients of the study group.

Lifestyle modifications:

We looked at the common feeding practices that caused direct aspirations and applied measures to rectify them. Also, we identified the posture and food habits that caused aspiration and applied remedial measures.

A) To prevent choking and aspirations: While breast-feeding the baby, mothers were advised to give small frequent feeds, initially expressed breast milk followed by direct feeding and not to feed lying down. Other liquid feeds were to be given as small sips and the patients were advised to avoid fast drinking.

B) Correct posture: Mothers were advised to keep the head end of the baby elevated when put to sleep. Also, they were advised to avoid using the homemade cloth cradle.

C) Healthy food: All homemade food items are allowed except "kadalakkari" (a south Indian delicacy made of Bengal gram), potato dry fry, and deep fried items. Of the food items bought from shops, only biscuits, Rusk (a type of dried bread) and bread were allowed. They were advised to avoid all other fried food, confectionaries and food items containing artificial taste makers, colouring and sweetening agents and also to avoid eating health drink powders.

The advice regarding these lifestyle modifications were

given to the patient's care-takers (and to the patients too, if they were educable) in one to one sessions. Educational pamphlets on healthy food habits were also given to the care-takers. On subsequent visits, the compliance was verified and confirmed in one to one sessions.

The control group was prescribed inhaled corticosteroids and or leukotriene receptor antagonist as per the guidelines. (10) Both the groups were followed up at 2 weeks, 4 weeks, 8 weeks and 12 weeks and the clinical parameters of cough, breathlessness and rhonchi were recorded at each visits.

Statstical Methods

Data of demographic and clinical features of both cases and controls were compared using t test and chi square test. All tests were two tailed, and $p < 0.05$ was considered significant. These statistical analyses were carried out using Graph Pad Prism 4 version 4.03 statistical software (Graph Pad Software, USA).

Results

Baseline demographic parameters in both groups are depicted in Table 1. History of allergy and family history of asthma with inhaler usage was more in the cases as compared to the controls.

Table 1: Demographics and clinical features at enrolment

Characteristics	Study group (n-106)	Controls (n- 50)	P value
Age (years ± SD)	5.5±3.6	5.2±3.1	0.55
Gender (male: female)	69:37	33:17	0.91
Weight (kg ± SD)	17.5±9	17.9±7.5	0.81
History of allergy, n (%)	27 (25)	5(10)	0.02
Passive smoking, n (%)	16 (15)	11 (22)	0.28
Past history of tuberculosis treatment, n (%)	32 (30)	15 (30)	0.98
Asthma in family, n (%)	50 (47)	33 (66)	0.02
Inhaler use, n (%)	43 (41)	5 (10)	0.0001
Symptom duration, (years ± SD)	2.8±2.4	2.9±2.3	0.79
Cough, n (%)	106 (100)	49 (98)	0.14
Breathlessness, n (%)	82 (77)	40 (80)	0.17
Rhonchi, n (%)	106 (100)	48 (96)	0.03

After intervention, by 2 weeks, breathlessness, cough and rhonchi were present in less than 40% of patients in the cases group and by 12 weeks less than 20% remained symptomatic. (Table 2)

Table 2: Comparison of persistent clinical features at 2, 4, 8 and 12 weeks

Clinical features	2 weeks		4 weeks		8 weeks		12 weeks		
	Study n (%)	Control n (%)	Study n (%)	Control n (%)	Study n (%)	Control n (%)	Study n (%)	Control n (%)	p value
Cough	40 (39)	49 (98)	37 (36)	38 (76)	18 (18)	18 (36)	20 (19)	18 (36)	0.019
Breathlessness	3 (3)	17 (34)	3 (3)	10 (20)	2 (2)	5 (10)	3 (3)	9 (18)	0.0009
Rhonchi	39 (38)	45 (90)	37 (36)	32 (64)	16 (16)	16 (32)	18 (17)	17 (34)	0.01

Discussion

In our study, we found that by lifestyle modifications aimed at avoiding unhealthy food and changing feeding habits, asthma symptoms and wheezing could be improved. As there is no gold standard for the diagnosis of asthma, clinical parameters were taken as the yard stick in this study. All the patients enrolled were getting recurrent wheezing for nearly 3 months before enrolment and were experiencing transient symptomatic relief with bronchodilators. Also at the time of initial enrolment, all patients were symptomatic and experiencing symptomatic relief with bronchodilators (salbutamol). Therefore all subjects fulfilled the criteria for diagnosis of asthma.

The demographics and clinical presentation at first contact were comparable in both groups. Inhaler users were more in the study group (41%) compared to control (10%).This may be due to inadequate response, poor acceptability and stigma attached to the inhaler use. No PEF (Peak Expiratory Flow) monitoring or

spirometry was done because patients from the age of 6 months onwards were studied. Moreover, this study was an attempt to address recurrent wheezing (including asthma) in a broader perspective and its relation with micro and macro aspirations rather than childhood asthma alone.

One of the important features we identified in our clinical practice was the use of home-made cloth cradle in which the babies were put to sleep. Babies lying supine in these cradles will have an anteriorly curved position which produces abdominal compression leading to reflux. Thus avoiding the use of cradle and by keeping the babies with head end raised, the incidence of aspiration due to reflux was reduced in the cases group.

There are some studies to support the effect of diet in childhood asthma. A study in Mexican children has shown that Mediterranean diet has some protective role in asthma and allergic rhinitis. (11) The diet's main nutritional components include antioxidants and polyphenols that appear to offer protection. A Cochrane meta-analysis has revealed that adherence to 'Mediterranean diet' may provide some protection against wheeze and asthma in childhood. (12) But a recent study done in Spanish school children did not support the protective effect of 'Mediterranean diet' on the prevalence or severity of asthma. (13) A study on relationship of infant feeding to recurrent wheezing at 6 years has shown that recurrent wheeze at 6 years is less common among non atopic children who were breastfed as infants. (14) This study only addressed the temporal relationship of breast feeding and wheezing at 6 years whereas the present study looked at the feeding habits and methods for avoidance of choking and aspiration while feeding. In the present study, the list of food items advised to avoid were long, especially those bought from shops and avoiding those did lead to reduction in symptoms. A study by Wickens et al on frequent consumption of hamburgers showed a dose dependant association with asthma symptoms, and frequent takeaway food consumption also showed a similar association with bronchial hyper responsiveness. (15)

The present study was a pilot study and further large, multi-centric and preferably randomised control trials are required in this area. The follow up period (12 weeks) was short, but a reasonable inference could be drawn because all these patients were experiencing symptoms every 2 - 4weeks and were symptomatic in the previous 12 weeks before the intervention with lifestyle modifications. The statistically significant positive outcome in the study group showed that the said lifestyle modifications were effective in reducing asthma symptoms and wheezing in children and that too without the use of any medications.

Conclusion

Asthma symptoms and wheezing in children could be reduced by adopting lifestyle modifications of healthy food and feeding practises; and use of inhalers and leukotriene inhibitors could be avoided in majority.

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