

Research papers

Project for the Evaluation of Asthma in Tipton Schools (PEATS)

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ABSTRACT

Objectives To evaluate an education project on childhood asthma, designed to enable young asthmatic children to better understand their condition and manage it more effectively, and to identify improvement in asthma management.

Design Two-day educational programme, followed by administration of a lifestyle questionnaire.

Participants and setting Children aged 5–10 years, registered with a Tipton Care Organisation GP and identified as asthmatic from school health records.

Main outcome measures Reduction in use of reliever inhalers; increased use of preventative inhalers; qualitative assessment of changes.

Main results One-hundred and ninety-two children were identified as asthmatic. One-third (n = 63) were not taking any medication, and appeared to be either wrongly labelled as asthmatic or recovered; 46% (n = 59) on inhaled medication were prescribed a bronchodilator and steroid inhaler; 19% (n = 24) were only prescribed a steroid, without reliever inhalers; 11% (n = 8) on inhaled medication did not use a steroid inhaler regularly, even if prescribed one; 41% (n = 31) children used two or more puffs of bronchodilator daily; the greatest number regularly used was nine puffs daily; 27% (n = 11) indicated that their asthma was improving.

Conclusions The high proportion of children not taking medication raises concerns about erroneous diagnosis and poor compliance; we recommend that schools take action to improve diagnostic records. Despite limited data, the educational programme appears to have been beneficial in improving appropriate inhaler use. Considerable difficulties were encountered in administering a quality of life questionnaire to children within a full curriculum. We pose the question that these

Introduction

The future of the NHS is expected to involve healthcare trusts networking across healthcare agencies and the community.[1] As a large first-wave personal medical services (PMS) project involving eight general practices and a population of 37 000 in the seventh most deprived borough in the country, the Tipton Care Organisation has run over 21 projects, many running in partnership with other agencies.

During 1999, two of the authors (IW, JH) attended a local meeting looking into joint working across agencies, and heard a head teacher talk positively about one school's experiences of an asthma education project. IW felt that unless the project was

properly evaluated, this and similar projects involving 'joined up working' would never become mainstream due to lack of evidence of success. It was proposed that a project be established to measure changes in the use of reliever and preventative inhalers, enabling the assessment of improvements in participants' quality of life.

Background to the project

Asthma is the leading serious illness among children and the leading cause of school absenteeism attributed to chronic conditions.[2] A definite diagnosis of asthma can be difficult to obtain in young children, and it is often not possible to measure airway function in order to confirm the presence of variable airway obstruction.[3] Nationally, asthma is regarded as a major health problem with increasing prevalence.[2] The National Asthma Campaign estimates that 1.5 million UK children (14% of those aged 2–15 years) have asthma.[4] The prevalence amongst Tipton schoolchildren aged 5–10 years is estimated to be around 12%.[5] Diagnosis is based on the presence of subjective key features, such as wheeze, dry cough, breathlessness and noisy breathing, consideration of alternatives, response to treatment trials and repeated reassessment.[3] Reported wheeze is the cornerstone of asthma diagnosis, yet there is a less than 50% agreement between parents' and clinicians' reports of wheeze and asthma.[6] The British Thoracic Society (BTS) Asthma Guidelines suggest that asthma should be suspected in any child with wheezing, ideally heard on auscultation and distinguished from upper airway noises.[3] Objective tests to help diagnosis include measurement and changes in peak expiratory flow (PEF) and/or forced expiratory volume (FEV_1) over time or in response to therapy. Practice data indicate that many children start inhaler therapy during this diagnostic period, although guidelines suggest that tests should be used to confirm an asthma diagnosis before long-term therapy commences.[5] Respiratory disease in children accounts for a considerable amount of general practitioner (GP) and practice nurse time and children with asthma use significantly more health services than other children.[7]

Method

The project investigated children aged 5–10 years at the time of the educational programme. All of Tipton's 15 primary schools were invited to take part, and eight (53%) agreed. They were randomly divided into 'project' and 'control' schools. Asthmatic children at the eight schools were identified by a description of asthma on the school health record, which has parent-identified details of medical conditions. Diagnosis was confirmed with the child's GP, if that GP was part of the Tipton Care Organisation (TCO). All asthmatic children were invited to participate, and their parents/guardians received an information pack and consent form. Only children with parent/guardian consent took part in the programme and only children registered with a TCO GP were included in the study. This was because the researchers only had access to medical records from the TCO practices.

The education programme was held over two days in four stages during 2000, and is detailed in Box 1.

Box 1 The asthma education programme

Day 1

Session 1
- Introduction to the programme
- Getting to know each other
- Ground rules for working together
- Multiple choice quiz to assess knowledge of asthma
- Brainstorming on personal experience of asthma
- Exhibition of inhalers

Session 2
- Workshop on physical and social aspects of asthma: body parts affected
- Symptoms, triggers, management
- Children choose which topics to develop for teaching

Session 3
- Decide on format for presentation – posters, leaflets, poems, stories
- Work on presentation topics

Day 2

Session 1
- Finish topics
- Show work to others in group and discuss
- Develop outline for presentation

Session 2
- Plan presentation
- Repeat multiple choice quiz to estimate knowledge gains
- Rehearse presentation

Session 3
- Presentation to school assembly
- Awarding of certificates

Inhaler use for all children registered with TCO GPs was checked before the programme and used as a baseline. This was rechecked 12 months after the educational programme, to ascertain if any changes had occurred.

This team included GPs, school health nurses, a project facilitator, research assistant and pharmacist. It benefited from advice from a university department. As children entered the study, the research assistant completed the Childhood Asthma Questionnaires (CAQs).[8] Two questionnaires were used; one for 5–7 year olds, and another for 8–10 year olds.[9] To minimise disruption of the school day, CAQs were administered in groups ranging from three to seven pupils in size. After completion of the CAQs, children were shown reliever and preventer inhalers and the researcher facilitated a discussion about their use.

The consent form enabled parents/guardians to have the opportunity to make both structured comments relating to the usage of their children's inhalers and any general comments.

Twelve months after the educational programme finished, the children's medication records were investigated for the two years prior to June 2001, encompassing one year before and one year after the project.

Results

A total of 192 children were identified as asthmatic from the school health records. Twenty-seven had no recorded asthma medication and 36 had had no inhaler prescriptions issued for at least 12 months prior to the study. This means that 63 (33%) children, recorded as asthmatics in the school, did not appear to be registered as asthmatic at their GP surgery. This is summarised in Box 2.

Box 2 Medication status for children registered with a TCO GP, and listed in their school records as suffering from asthma (n)

Children listed in school records as suffering from asthma	192
Children with no recorded asthma medication	27
Children with no recorded inhaler prescriptions in previous 12 months	36
Total of children who did not have prescribed asthma medication	63
Children 'labelled' as asthmatic with no prescribed medication	33%

In all, 128 children had regular prescriptions for asthma inhalers. Of these, 59 (46%) were prescribed both a short-acting (reliever) bronchodilator and a steroid inhaler, and 24 (19%) were only prescribed a steroid inhaler with no recent prescriptions for reliever inhalers. Forty-five children (35%) had only a bronchodilator inhaler prescribed. This is summarised in Figure 1.

Thirty-one children used two or more doses of bronchodilator daily. The greatest number of doses used was nine daily on a regular basis. Eight children did not use a steroid inhaler regularly, even though they were prescribed one.

Forty-one parents made additional comments relating to their child's asthma; 11 parents felt that their child's asthma was improving; 11 thought that asthma was triggered by a cold, with 10 feeling that the weather may have been a trigger. Nine indicated that asthma was made worse by exercise and three found night cough a problem. Other comments included that one child did not like being seen with an inhaler and that the school did not always allow children to keep their (reliever) inhalers with them.

A total of 134 children were using prescribed medication at the time of the programme in summer 2000. Of these, 116 were control children and 18 had taken part in the educational programme. Thirty children (26%) in the control group and three children (17%) in the programme group stopped using any inhalers in the twelve months after the programme finished. Both the children who had had no asthma treatment prescribed for two years prior to June 2001 and those who stopped using inhalers in the 12 months after the programme were excluded from any further calculations. There was no significant association between the prescribing of inhalers and a known GP clinical interest in asthma ($\chi^2 = 0.57$, $P = 0.452$).

Compliance was estimated as the average use of $\leqslant 1$ dose (in some cases two puffs) a day of bronchodilator, and appropriate use of steroid inhalers according to prescribed doses. Of those with prescribed medication 12 months after the programme took place, ten (67%) of those who took part in the educational programme appeared compliant, and five (33%) were not. Comparative figures from the controls show that only 38 (54%) appeared compliant, with 32 (46%) apparently not compliant. The highest average dose per day of bronchodilator was six to seven doses. Twenty of the non-compliant children used 50% or less of the stated dose of steroid and/or long-acting bronchodilator. One child was prescribed a 'rescue' course of prednisolone. Children prescribed more than one inhaler device were significantly less likely to be compliant than those having only one device ($\chi^2 = 14.53$, $P < 0.001$).

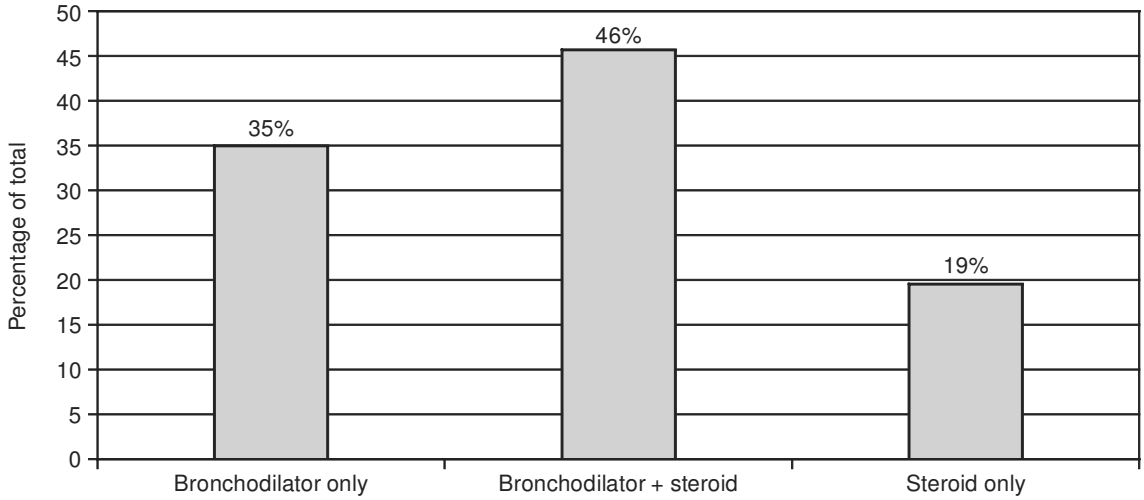

Figure 1 Inhalers used by children registered with a Tipton Care Organisation GP, and listed in their school records as suff ering from asthma

Discussion

A number of potential difficulties were quickly identified:

- subjects were young children who needed to concentrate sufficiently long to be able to fill in a quality of life questionnaire
- co-ordinating consent letters and questionnaires to parents
- fitting in with an increasingly pressured school schedule.

It was therefore evident that considerable resources, time and a multidisciplinary team would be essential for successful co-ordination.

During the facilitated discussions, some of the children claimed to have never seen or used any asthma medication, suggesting that these schools' diagnostic records of asthma are unreliable. School health records were compiled using information given by parents when children joined. The fact that so many children were labelled by the school as asthmatic, and yet had had no prescribed medication for up to two years, may suggest either that children with respiratory infections are being routinely labelled as asthmatic at an early age, or that childhood asthma has the potential to improve or cure itself, or both. Recent guidelines suggest that the natural history of wheeze is dependent upon the age at first presentation, and the earlier the onset the better the prognosis.[3] It suggests that the majority presenting before the age of two years will become asymptomatic by mid-childhood (6–11 years). This agrees with the findings from this study that around 30% of children identified as asthmatic had had no prescribed medication for at least two years, and that a further 49 children stopped using prescribed medication during the twelve months following the programmed part of the study.

Another possibility is that diagnoses of wheezing cough are being interpreted as 'asthma'; a label which unfortunately remains with children throughout their schooldays. Such children may grow up with the misguided perception that their activities are restricted due to asthma. Even with inhalers, a number of asthmatic children still had problems with exercise, which limited their activities. Recent guidelines remind healthcare professionals that people with asthma may suffer from wheeze, shortness of breath, chest tightness and cough, but that none of these is specific for asthma, and that the hallmark of asthma is that these symptoms tend to be variable, intermittent, worse at night and provoked by triggers such as exercise.[3] This is an area for primary care healthcare teams to address, and indicates priority areas for education and training, which could also usefully include communication with parents, and language used to express diagnoses.

Non-pharmacological management of asthma is also considered a priority and maternal smoking is associated with significantly higher prevalence of wheezing illness in early childhood, although there seems no link between parental smoking and symptoms in adult life.[3] Encouraging breast-feeding is also considered important and both these areas are of concern in our primary care trust (PCT).[10]

Although anything more than mild intermittent asthma should be controlled using a regular steroid inhaler, 45 children (35%) were prescribed only a bronchodilator inhaler.[3]

While guidelines recommend that average daily use of bronchodilator should be two doses or less, 31 of these children used two or more doses of bronchodilator daily.[11]

A total of 195 children were investigated for the two-year medication audit of June 2001, and of these, 24 had followed the educational programme and 166 were in the control schools. The audit showed that 56 (30%) of the children had had no asthma medication prescribed for two years. This compares with 33% from the analysis of 12 months previously.

Of the 85 children still using inhalers in June 2001, 37 (44%) appeared to be non-compliant. One possibility is that non-compliance represents an underdiagnosis of the condition's severity. With ineffective prescribed therapy, children might feel that using their inhalers is not worth the effort required and consequently not use them. The fact that children were significantly less likely to be compliant if prescribed more than one inhaler device suggests that GPs might wish to consider prescribing a single appropriate device for children whose asthma is controlled.

From the limited data, our study suggests that the educational programme was beneficial. Only 17% of the children receiving the programme stopped using inhalers in the twelve months after the study, compared with 26% of the control children, and of those using inhalers, 67% of the programme children were compliant in June 2001 compared with 54% of the control children.

Limitations of the study

As the study was limited to schools within TCO, the sample size was small. There were sometimes difficulties in obtaining the necessary parental consent, and only children registered at a TCO GP practice were included in the practice-based audits. Thirty-eight children took part in the active programme, although only 27 were registered at TCO practices. Of these, only 15 had asthma medication prescribed during the twelve months following the course.

The relationship, if any, between age and compliance was not considered. There was also no analysis of the children's sex. It is suggested that differences exist between male and female children with regard to age of onset and persistence of the condition.[3]

Any relationship between the school location, GP practice and compliance was not considered, and parental support given to the children was not quantified.

Despite claims that the CAQ could be administered in small groups, our experience suggests that it should only be undertaken by people who are already very skilled in use of the tool and that more than one individual needs to be present in the room to keep the children attentive and to answer queries.[8]

Conclusions

An early diagnosis of asthma seems to remain with children throughout their primary school life as shown by the high rate of around 30% identified as asthmatic, but with no prescribed inhalers. Possible reasons for this have already been discussed, but healthcare professionals have a responsibility to ensure that a diagnosis of asthma before the age of two years is not allowed to become something that 'labels' a child for their entire schooldays. This should be a priority in any asthma training programme.

From the limited data, it would seem that the educational programme in Tipton schools did lead to improved management of the disease, which was sustained 12 months after the project. The programme cost about £40 a child to deliver, but increased frequency and severity of wheezing episodes is associated with recurrent wheeze into adulthood.[3] If the disease is not controlled in childhood, lifetime medical and social costs would far exceed the cost of the educational programme. Future paediatric asthma studies might help define diagnostic criteria to improve early management of the condition, which, combined with a specific educational programme for children, could greatly improve their prognosis. Many more schools in a larger area would be required to recruit sufficient numbers to make this possible, however.

Compliance rates seem to vary according to circumstances, and suggest a need for focused training for healthcare professionals, and rational prescribing of inhaler devices.

Tipton is an area of considerable socioeconomic deprivation, and this would be expected to impact on a number of areas, including poor housing, health and low educational achievement. The resulting damp housing conditions and high smoking prevalence contribute substantially to the prevalence and severity of asthma.[12] There is evidence that patients with severe asthma and adverse psychosocial factors (including financial or employment problems, obesity, drug or alcohol abuse, etc) are at risk of death.[3] It is assumed that compliance in treatment would lead to better lifestyle control. Further studies using lifestyle questionnaires would be needed to confirm this.

We look forward to the National Service Framework for asthma, as it will hopefully offer a definition of paediatric asthma and better guidelines for its management, turning asthma management into a more defined science. We would like to reach a stage where all parents can be as positive as one in our study who said 'I do not let these problems interfere in her life; with the help of inhalers she is able to lead a very active and full life'. This should be the goal for all patients, children and adults alike.

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CONFLICTS OF INTEREST

None.

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