Treatment of asthma in pre-school children: are girls disadvantaged? A population-based study in Leicestershire UK

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BACKGROUND

• Community-based data on treatment of wheezing illness in pre-school children are scarce. This is unfortunate, as prevalence and severity of wheezing disorders are particularly high in this age-group.

• In school-age children, there is strong evidence for undertreatment, especially in children of low social class, ethnic minorities and female sex.

• Preventive treatment with inhaled steroids is effective in children with persistent wheeze with increasing efficacy in more severe asthma, but not in the management of purely episodic viral wheeze, the most common phenotype in toddlers.

QUESTIONS

1. How many children are treated with:
- Inhaled bronchodilators (BD) ?
- Inhaled corticosteroids (ICS) ?

2. Is treatment appropriate? (evidence for under- or overtreatment)

3. What predicts treatment with ICS?

METHODS

Study design: Questionnaire survey (1998) of a population-based sample of 4277 children aged 1 to 5 years. **Questionnaire* :** Included questions on asthma symptoms and treatment within the past 12 months, family history, social class and environmental exposures. **Statistical analysis:** Unconditional multivariable logistic regression was used to evaluate independent predictors of treatment with BD and ICS, including the following potential predictors: symptoms representing severity of wheeze, triggers of wheeze, chronic cough and upper respiratory symptoms, history of eczema, family history of asthma, parental smoking and socioeconomic factors.

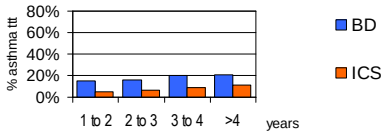
• ERJ 1995;10:1736-41. Lancet 2001; 357:1821-5.

RESULTS

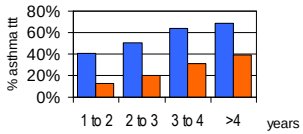
• Response rate: 80% (3410/4277, 2127 White, 1283 South Asian)
• Prevalence of current wheeze (=wheeze in the last 12 months) : 24.6%

1. PREVALENCE OF TREATMENT

Treatment in whole sample (N=3410)



Treatment in current wheezers (N=827)

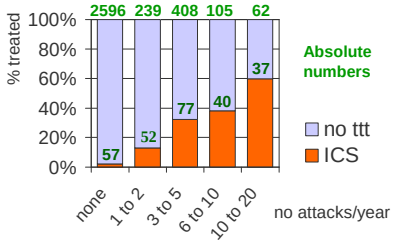


Whole sample population: In total, 18.2% reported BD therapy, 7.7% ICS therapy, 18.7% had at least one of these two drugs

2. TREATMENT BY SEVERITY

As treatment with ICS is recommended in severe wheezers, but not in very mild cases, we analysed treatment in relation to number of attacks of wheeze as a proxy measure for severity.

Treatment with ICS in relation to number of attacks of wheeze in the past 12 months



• Treatment increased steeply with increasing severity, but even in the most severe group, only 60% reported ICS.
• Among children who did not report wheeze or a maximum of 2 attacks/year, 109 children reported treatment with ICS. This represents 41% of all children with reported ICS (n=263) and thus a high number of potentially overtreated children.

3a. PREDICTORS OF ICS THERAPY IN CHILDREN WITH CURRENT WHEEZE (N=827)

	OR	(95% CI)
short of breath (occas. vs never)	3.1	(1.8 - 5.3)
short of breath (always vs never)	6.6	(3.5 - 12.8)
no of attacks (3-10 vs 0-2)	2.5	(1.6 – 3.7)
no of attacks (10-20 vs 0-2)	4.4	(2.1 – 8.8)
pollen as trigger	3.0	(1.6 – 5.6)
exercise as trigger	1.8	(1.2 – 2.7)
history of pneumonia	3.4	(1.4 – 7.9)
age (>3 years vs <3 years)	2.6	(1.7 – 3.7)
boys	1.5	(1.0 – 2.2)

Multivariable logistic regression adjusted for all listed factors and ethnicity.

3b.PREDICTORS OF ICS THERAPY IN CHILDREN WITH SEVERE WHEEZE (N=141)

• In a second step, we repeated the analysis in the subgroup of severe wheezers who had at least 6 attacks of wheeze/year and shortness of breath at least occasionally.
• This subgroup of severe wheezers, the most likely to benefit from treatment comprised 141 of the 827 children with current wheeze (17%); 33% were girls and 67% boys.

	OR	(95% CI)
short of breath (always vs occas.)	3.5	(1.4 – 8.7)
no of attacks (10-20 vs 6-10)	2.8	(1.1 – 6.7)
pollen as trigger	8.3	(1.7 – 24.1)
history of eczema	4.9	(1.7 – 9.3)
boys	4.5	(1.8 – 11.5)

Multivariable logistic regression adjusted for all listed factors, age and ethnicity.
No association with ethnicity, social class,parental education, parental asthma!

CONCLUSIONS

- **A high proportion (19%) of unselected pre-school children in the community used asthma inhalers**.
- Treatment with ICS was not sufficiently adjusted to severity:
  → There is evidence for **undertreatment** in children with severe symptoms, especially girls..
  → On the other hand children with very mild episodic symptoms received treatment with ICS thus showing probable **overtreatment.**
- Treatment with **inhaled corticosteroids** increased with increasing **severity of wheeze,** symptoms suggestive of **atopy** and **male sex**, but was not associated with ethnicity or social class.
- **Phenotype-specific treatment matched to severity of wheeze** could improve quality of life and reduce health costs by reducing hospitalisation rates in severe wheezers and avoiding unnecessary treatment in mild cases.
- **Possible undertreatment in girls** needs further investigation.