



**Karolinska
Institutet**

Institutionen för kvinnors och barns hälsa

Severe asthma and asthma control in schoolchildren

AKADEMISK AVHANDLING

som för avläggande av medicine doktorexamen vid Karolinska
Institutet offentligen försvaras i Skandiasalen, plan 1, Astrid Lindgrens
barnsjukhus, Solna

Fredagen den 1/3, 2013, kl 13.00

av

Björn Nordlund

Barnsjuksköterska

Huvudhandledare:

Med. dr. Inger Kull
Karolinska Institutet
Klinisk forskning och utbildning,
Södersjukhuset

Bihandledare:

Professor Gunilla Hedlin
Karolinska Institutet
Institutionen för kvinnors och barns hälsa

Med. dr. Christophe Pedroletti
Uppsala Universitet
Kvinnors och barns hälsa

Fakultetsopponent:

Docent Lennart Nilsson
Linköpings Universitet
Allergicentrum

Betygsnämnd:

Professor Eva Rönmark
Umeå Universitet
Folkhälsa och klinisk medicin

Docent Hans Hildebrand
Karolinska Institutet
Institutionen för kvinnors och barns hälsa

Docent Lena Palmberg
Karolinska Institutet
Institutet för miljömedicin, IMM

Stockholm 2013

ABSTRACT

Background: Asthma is a major health problem in children and most troublesome during severe or persistent symptoms. Children with problematic severe asthma have a disproportionate consumption of health care, despite high-dose treatment with inhaled corticosteroids (ICS). Little is known about children with impaired asthma control or problematic severe asthma in regards to prevalence in a normal population, characterisation and classification, and health effects measured as health-related quality of life (HR-QoL).

Aim: The overall aim of this doctoral thesis was to evaluate the burden of symptoms and factors associated with impaired asthma control in schoolchildren.

Materials and Methods: The study population consisted of 3 015 children up to 12 years of age from the prospective birth cohort BAMSE, and children from the Severe asthma study with problematic severe asthma (n = 56) and, for comparison, controlled asthma (n = 39). Parental questionnaires collected data on environmental exposures, asthma symptoms and treatments. In the BAMSE study, asthma control was classified based on parental reports and according to a modified GINA classification. The prevalence of severe asthma with dispensed high-dose ICS was estimated through the Swedish drug register. Evaluations with component-resolved allergy diagnostics, exhaled nitric oxide (FeNO), bronchial hyperresponsiveness to methacholine (BHR), blood count of eosinophils and HR-QoL were applied in the Severe asthma study.

Results: In the BAMSE cohort, a high proportion of children with asthma were classified as impaired in their asthma control (partly or uncontrolled) at 8 years, 84% of 323, and at 12 years, 53% of 329, (p < 0.001). Parental report of symptoms varied in these children, with more activity limitation (66% vs. 48%, p < 0.001) and wheeze \geq 4 times in last year (52% vs. 38%, p = 0.002) at 12 years compared with at 8 years, but fewer with nocturnal symptoms (36% vs. 82%, p < 0.001) and less acute healthcare utilization (15% vs. 34%, p < 0.001) at 12 years. Severe asthma was prevalent in 0.4% of children in a normal urban population at age 12, or 4% among children with asthma.

Children with impaired asthma control at both 8 and 12 years in the BAMSE cohort (n = 91) and children with problematic severe asthma had more often a family history of allergic disease and comorbidity of rhinitis than children with controlled asthma.

Multi-sensitization to animal-derived components was more pronounced in problematic severe asthma than in controlled asthma, 25% vs. 8% (p = 0.03), and was associated with increased eosinophil inflammation as compared with children sensitized to fewer animal-derived components, FeNO 38 ppb vs. 25 ppb (p = 0.002), blood eosinophils 0.65 vs. 0.39 (p = 0.021), and BHR 112 vs. 28 (p = 0.002).

Children with problematic severe asthma were more impaired in HR-QoL than children with controlled asthma 5.4 vs. 6.7 (p < 0.001).

Conclusion: A high proportion of schoolchildren reported impaired asthma control. Children with problematic severe asthma have impaired HR-QoL, with effects of limitations in daily activities and reduced emotional well-being. Common factors associated with children having impaired asthma control at both 8 and 12 years and problematic severe asthma were family history of allergic disease and comorbidity of rhinitis.