

Associations between parental reports of doctor-diagnosed asthma and allergy among Danish children and their family habits and dwelling characteristics

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1 Introduction

Risk factors associated with the development of asthma and allergies among pre-school children are numerous and include both food, heredity, and family habits. More recently it has been suggested that the list of risk factors may also include chemical and other environmental exposures in the dwelling and day care centre, where the child spends the majority of its time during the earliest life years. However, findings from epidemiological studies carried out in different geographical regions at different times have indicated some disparity in the importance of dwelling characteristics and other factors that may be associated with children's health symptoms. Thus, potential risk factors and their association with asthma and allergy symptoms seem to be national or even region specific and may also change over time as new exposures occur.

Children's health and indoor environment exposures in dwellings were previously studied in Sweden, Norway and Bulgaria (Bornehag et al. 2005, Øie et al. 1999, Naydenov 2007). The current paper analyses associations between asthma/allergy symptoms among 11082 Danish children and selected dwelling characteristics and other potential risk factors. The study is part of the Danish "Indoor Environment and Children's Health" (IECH) study

2 Materials/Methods

In January 2008 17500 Danish families with children aged 1 to 5 years were invited to

complete a questionnaire containing 116 questions on the health biography of the child with special emphasis on asthma/allergy symptoms, characteristics of the dwelling and the child's bedroom in particular, pet keeping, food habits, and indoor environment factors. The questionnaire was based on the questions related with the child's health in the ISAAC study (Asher et al. 1995). All families were residents of the Danish island Funen and as such, the survey covered only a limited geographical area of Denmark. However, Funen is considered to be representative of the total population in terms of the distribution of most demographic variables. Meaningful data from 11082 families were received corresponding to a response rate of 63%.

Associations between parental reports of doctor-diagnosed health symptoms (asthma, hay fever/rhinitis) and risk factors considered important and of interest for the current analysis were evaluated by multivariate logistic regression.

3 Results

The prevalence of asthma among the study population of 11082 Danish children was considerably higher (9.6% among the girls and 14.3% among the boys) than found in recent related studies among Bulgarian and Swedish children (Naydenov 2007, Bornehag et al. 2005), but in correspondence with findings from a recent Danish study, which observed that 8.6% of the studied girls and 12.4% of the boys

suffered from asthma (Hermann et al. 2006). The prevalence of hayfever/rhinitis was 2.0%, which corresponded well with data obtained among Swedish children, but was considerably lower than in Bulgaria.

Table 1 presents results of the multivariate analyses of associations between the parents' reports of doctor-diagnosed asthma and doctor-diagnosed hayfever/rhinitis and selected dwelling and family habits.

Table 1. Results of multivariate analyses of risk factors for doctor diagnosed asthma and doctor diagnosed hayfever/rhinitis.

	Asthma	Hayfever / rhinitis
Parents smoking first year of life	á á	
Current pets indoors		á
Socio-economic status		
Dwelling size		
Renovation due to moisture damage	á á	
Visible moisture in dwelling		
Visible mould in dwelling		
Condensation on windows (>5 cm)		
Moldy or earth-like odor		
Construction period	-/á/á á	

Logistic regression adjusted for age, sex, breastfeeding, and atopy. á á p < 0.01, OR>1; á p < 0.05, OR>1; á p < 0.05, OR<1; -/á/á á significance level varied between different construction periods.

Although only significant for asthma, Table 1 shows that families in dwellings that had been renovated due to mould or moisture damage consistently reported more asthma symptoms, whereas visible moisture or visible mould *per se* was not associated with symptom prevalence. Renovation due to mould or visible moisture was reported by 9.9% of the families, visible moisture in the dwelling by 24.7% (4.3% in the child's bedroom), and visible mould in the dwelling by 29.1% (9.3% in the child's bedroom). It is possible that families with symptomatic children may act more readily after discovery of moisture or mould problems, which may result in over-reporting of remediation measures among these families if they are aware

of the suspected risks posed by such problems. Only the occupant-related factor "furry pets kept in the dwelling" was related with the prevalence of hayfever/rhinitis. Fewer children with pets indoors suffered from hayfever/rhinitis than those without current pets, probably due to avoidance behaviour among the parents.

4 Conclusions

Children residing in dwellings that had been renovated due to moisture or mould had a significantly increased prevalence of doctor diagnosed asthma. Other non-building related factors associated with asthma and allergy symptoms were increasing age, male sex, short duration of breastfeeding (asthma), atopy, pet keeping (hayfever/rhinitis), and parents' smoking during the child's first year of life (asthma). The protective association between current pet-keeping and allergy corresponds with findings in earlier studies in Sweden, but contrasts findings in the related Bulgarian study.

5 Acknowledgement

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6 References

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