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Institutet**

**Institutet för miljömedicin  
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# Prevalence and determinants of asthma, COPD and allergy to common airborne allergens in northern Vietnam

AKADEMISK AVHANDLING

som för avläggande av medicine doktorsexamen vid Karolinska  
Institutet offentligen försvaras i Lennart Nilsson salen, Nobels v. 15A

**Fredagen den 16 december, 2011, kl 13.00**

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## ABSTRACT

**Introduction:** While a large amount of data about the epidemiology of asthma, allergy, COPD, chronic bronchitis and respiratory symptoms are available from developed countries, the information about these diseases and conditions in developing countries in south-east Asia are scarce. There are, however, several reports indicating an increase in asthma and allergy parallel to urbanization in developing countries. The proportion of smoking men in south-east Asia including Vietnam is large.

**Aim:** The aim of this thesis was to assess the prevalence of obstructive airway diseases and symptoms and their relation with demographic data including smoking habits among adults in rural and urban Vietnam. Special interest was paid to asthma, rhinitis, allergic sensitization and COPD.

**Methods:** The study was conducted in two parts. A random sample of subjects aged 21 -70 years were invited; 3008 subjects living in an inner city area of Hanoi, Hoankiem, and 4000 in a rural area of Bavi in northern Vietnam. An internationally used questionnaire was delivered by field workers to the study subjects. From the questionnaire responders, a randomly selected sample of 750 subjects from each of the two areas was invited to the second part of the study. The second part consisted of clinical examinations including structured interview, dynamic spirometry, skin prick testing (SPT) and bronchial provocation testing with methacholine. The SPT panel included ten common indoor and outdoor allergens. For the structured interview a modified GA<sup>2</sup>LEN study questionnaire was used. The spirometry followed the American Thoracic Society guidelines and East Asian reference values were used. COPD was defined by using the fixed ratio of FEV<sub>1</sub>/FVC < 0.7.

**Results:** The response rate to the questionnaire was 92% in Bavi and 70% in Hoankiem. Of men in Bavi 67.8% (Hoankiem 49.7%;  $p < 0.001$ ) were smokers, while of women 4.2% were smokers in Hoankiem (Bavi 1.2%;  $p < 0.001$ ). The prevalence of ever having had asthma was in Hoankiem 5.6% (Bavi 3.9%;  $p = 0.003$ ) with no major gender difference. The most common symptom was longstanding cough (Hoankiem 18.1%, Bavi 12.0%;  $p < 0.001$ ) followed by sputum production, while the prevalence of symptoms common in asthma was considerably lower. Respiratory symptoms were slightly more common in men than women. Allergic rhinitis ever or chronic nasal symptoms were reported by 50.2%. The prevalence of allergic rhinitis was considerably higher in the urban area compared to the rural, 29.6% vs 10.0% ( $p < 0.001$ ). Allergic rhinitis ever and chronic nasal symptoms were both significantly associated with asthma and respiratory symptoms ( $p < 0.001$ ). Exposure to gas, dust or fumes at work was significantly associated with all rhinitis conditions. No major gender differences were found, and smoking was not significantly associated with the nasal conditions.

The participation rate in the clinical part was 46%. The representativeness of the participants was good as no statistical difference in prevalence of symptoms was found between the participants and all responders in the questionnaire survey. Of men 36.9% and of women 31.0% (n.s.) had positive SPT to at least one allergen. The most common sensitizer was the storage mite, *Blomia tropicalis* (men 27.7%; women 18.7%,  $p = 0.013$ ). Sensitization to mites and cockroach were common (26.1%; 13.2%), and was strongly associated with allergic rhinitis. Young age, male sex and occupational exposure to gas, dust and fumes were risk factors for allergic sensitization to mites or cockroach. A significant positive association between the number of positive SPT reactions and airway hyper-reactivity was found.

The overall prevalence of COPD was 7.1% (men 10.9%; women 3.9%), and the prevalence increased considerably by age. The distribution of COPD by disease severity was 12.5% severe or very severe COPD (FEV<sub>1</sub> < 50% of predicted), 40% moderate COPD (FEV<sub>1</sub>  $\geq$  50 < 80% of pred.) and 47.5% mild COPD (FEV<sub>1</sub>  $\geq$  80% of pred.). Among men with COPD all but one was current or ex-smokers, while the women with COPD were all never smokers. Among men, COPD was strongly related to the number of pack-years of tobacco consumption and a half of smokers aged  $\geq$  60 years had developed COPD.

**Conclusions:** The prevalence of asthma in adults may have increased in both urban and rural Vietnam, as the few previous estimates have found 2% of adults having asthma. The majority of men were smokers versus a few percent of women. A half of the studied population had rhinitis conditions with allergic rhinitis being more common in the urban area, however, a difference in the knowledge about what allergy is may have contributed to this urban-rural difference. The pattern and prevalence of allergic sensitizers conforms to results from other areas with a similar climate. Taking into account the young population of Vietnam, the prevalence of COPD must be considered as high particularly among smoking men. Except increasing age and a previous history of asthma, no other risk factors for COPD among women could be demonstrated.

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ISBN: 978-91-7457-578-1