

UMEÅ UNIVERSITY MEDICAL DISSERTATIONS
New series No 927 ISSN 0346-6612 ISBN 91-7305-756-8

From
The OLIN Studies and Division of Respiratory Medicine and Allergy, Department
of Medicine, Sunderby Central Hospital of Norrbotten, Luleå
Department of Respiratory Medicine and Allergy, University of Umeå, and
Unit for Lung and Allergy Research, National Institute of Environmental Medicine,
Karolinska Institutet, Stockholm, Sweden

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD):

Prevalence, Incidence, Decline in Lung Function and Risk Factors

**The Obstructive Lung Disease in Northern Sweden Studies
Thesis VI**

AKADEMISK AVHANDLING

Som med vederbörligt tillstånd av Rektorsämbetet vid Umeå Universitet för
avläggande av doktorexamen i medicinsk vetenskap kommer att
offentligen försvaras
klockan 09.00 fredagen den 19 november 2004
i Aulan, Sunderby Sjukhus, Luleå

Av

Anne Lindberg

Fakultetsopponent: Professor Sven Larsson
Institutionen för Invärtesmedicin, Avdelningen för Lungmedicin och
Allergologi, Sahlgrenska Universitetssjukhuset, Göteborg

ABSTRACT

Chronic Obstructive Pulmonary Disease (COPD); prevalence, incidence, decline in lung function, and risk factors. - The Obstructive Lung Disease in Northern Sweden Studies, Thesis VI - Anne Lindberg

The Obstructive Lung Disease in Northern Sweden (OLIN) Studies started in 1985 as an epidemiological project with the aim to detect preventable risk factors for obstructive lung diseases and allergy. In recent years there has been a focus also on obstructive sleep apnoea syndrome (OSAS) and chronic obstructive pulmonary disease (COPD) besides asthma and allergy. The aim of this thesis was to estimate the prevalence and incidence of COPD, risk factors for COPD, and decline in lung function in relation to COPD.

The OLIN cohort I (cI) was recruited in 1985/86 and consisted of all 6610 subjects born 1919-20, 1934-35 and 1949-50 in eight geographical areas of Norrbotten. A postal questionnaire survey was performed in 1985/86, 1992 and in 1996. All subjects reporting respiratory symptoms at the questionnaire in 1985/86 were invited to examination in 1986, 1996 and 2002-03. A random sample of 1500 subjects from the participants at the 1996 postal questionnaire survey was invited to examination in 1996 and 2003. The participation rate has been high, $\geq 85\%$. The OLIN cohort III (cIII) was recruited in 1992, a postal questionnaire was sent to a random sample of 5681 subjects aged 20-69 years. In 1994/95 a random sample of 970 subjects were invited to examination of whom 666 participated.

The prevalence of COPD in the general population sample (cIII) in ages <45 was 4.1%, 11.6%, 9.1%, and 5.1% according to the criteria of BTS¹, ERS², GOLD³, and ATS⁴ respectively. The corresponding figures in ages ≥ 45 were 9.7%, 15.4%, 17.1%, and 16.5%, respectively. In the age-stratified general population sample (>45 y, cI), the prevalence was 8.1% and 14.3% according to the BTS and GOLD criteria. The prevalence was strongly associated with higher age and smoking but not gender. The prevalence among smokers 76-77 years old was 45% and 50% (BTS and GOLD criteria). A majority of subjects with COPD had respiratory symptoms (in prevalent BTS 94%), most commonly cough and sputum production. Nearly a half of the subjects with COPD had contacted health care due to respiratory complaints other than common colds, but only a minority reported a physician diagnosis relevant for COPD (16% of prevalent COPD according to BTS in cIII, 31% in cI). The 10-year cumulative incidence of COPD (1986-1996) was estimated at 8.2% (BTS) and 13.5% (GOLD) in the symptomatics of cI, associated with higher age and smoking but not gender. Persistent smoking, male gender and reported chronic productive cough were associated with a faster decline in FEV₁. Among incident cases of COPD a large proportion (23% of incident BTS) had a rapid decline in FEV₁, >90 ml/year, corresponding to a decrease of 28 percent-units of normal value during ten years. The 7-year cumulative incidence of COPD in the random sample of cI (1996-2003) was estimated at 4.9% and 11.0% (NICE guidelines⁵ and GOLD) and associated with smoking but not gender. The incidence according to GOLD, but not NICE, was associated with increasing age. In multi-variate analyses most respiratory symptoms were markers of increased risk for developing COPD.

In conclusion, the prevalence and the incidence of COPD were associated with age and smoking and affected by the use of different spirometric criteria. Respiratory symptoms marked an increased risk for developing COPD. A high proportion of subjects developing COPD had a rapid decline in lung function. Further, there was a substantial underdiagnosis of COPD.

¹British Thoracic Society: FEV₁/VC <0.70 & FEV₁ $<80\%$ predicted (pred), ²European Respiratory Society: FEV₁/VC $<88\%$ pred in men, $<89\%$ pred in women, ³Global initiative for Chronic Obstructive Lung Disease: FEV₁/FVC <0.70 , ⁴American Thoracic Society: FEV₁/FVC <0.75 + symptoms or physician diagnosis, ⁵The British National Institute for Clinical Excellence: FEV₁/FVC <0.70 & FEV₁ $<80\%$ pred.