



Twenty-five year trends in prevalence of chronic bronchitis and the trends in relation to smoking

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Summary

Introduction: The present study examines how the trends in the prevalence of chronic bronchitis during the last three decades associate with changes in smoking habits during the same period.

Methods: Altogether 47 896 subjects aged 25–74 years were examined in six independent cross-sectional population surveys repeated every five years between 1982 and 2007 in Finland. The presence of chronic bronchitis, smoking habits and other risk factors were measured by standard questionnaires.

Results: During the study, the prevalence of chronic bronchitis was significantly higher in men than in women. In men aged 25–64 years, the prevalence of chronic bronchitis decreased from 19% in 1982 to 13% in 2007 (p for trend <0.001). The corresponding decrease in women aged 25–64 years was from 13% to 11% (p for trend 0.009). In men aged 65–74 years, the prevalence of chronic bronchitis decreased from 24% to 19% (p for trend 0.032). Simultaneously, male smoking decreased and smoking in middle-aged women increased. However, adjusting for the changes in smoking habits did not change the declining trends in the prevalence of chronic bronchitis. The significant declining trend in chronic bronchitis was seen separately in male current smokers and in male and female never smokers aged 45–74 years and the declining trend was the greatest in male current smokers. In general, female smokers with chronic bronchitis had smoked less than their male counterparts.

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Conclusion: There was a declining trend in the prevalence of chronic bronchitis which was probably explained by both a decrease in smoking and by other factors.

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Introduction

Chronic bronchitis is characterized by chronic mucus secretion from airways and smoking plays an important role in its pathogenesis [1]. Exposures to occupational airborne particles as well as ageing may also contribute to chronic bronchitis [2,3]. Chronic bronchitis, in turn, has been associated with an accelerated decline in FEV₁ [4,5], with lower life quality [6], increased medical costs [7] and finally with increased respiratory, cardiovascular and all cause mortality [4,8–11].

According to the earlier studies from the United States (the Tecumseh study) and Scotland (the Renfrew and Paisley survey) the prevalence of *chronic phlegm production (most mornings for 3 months/year)* was in 1960s–1970s about 27–28% in general male population aged 40–64 years [9]. In elderly smoking rural Finnish men and women (with mean age 59 and 56, respectively), the prevalence of chronic phlegm production was 41% and 21%, respectively in 1971 [12]. In 1972–77 the prevalence of chronic bronchitis was 22% and 12%, respectively in general Finnish male and female population aged 30–64 years [13]. In the 1980s in Italy altogether 18% and 5% of men and women aged 20–64 years, respectively, reported to have *chronic phlegm production* and the prevalence increased with age and smoking [3]. In 1995, the prevalence of chronic productive cough in northern Finland was 12% in men (10% in women) aged 20–69 years (and 19% in men aged 60–69 years) [14]. Since the beginning of 1970s many tobacco control initiatives have been carried out in Finland and male smoking has declined remarkably since 1972 [15]. On the other hand, Finnish women, like women in many western countries, increased their smoking in the 1970s [15–17]. The present study examines the trends in the prevalence of chronic bronchitis between 1982 and 2007 and their relation to changes in smoking habits in Finland.

Methods

Subjects

Cross-sectional risk factor surveys were conducted every fifth year in Finland by the National Public Health Institute since 1972 [15,18]. Independent population samples were studied in five areas: in the provinces of North Karelia and Kuopio since 1972, in south-western Finland since 1982, in cities of Helsinki and Vantaa since 1992, in Oulu since 1997 and in Lapland since 2002. The study subjects were drawn from the population register by random sampling and the target population was 25–64 year old subjects. The study samples were stratified according to sex and 10-year age group so that at least 250 people (at least 200 in 2007) were included in each subgroup. The sampling method

was modified to comply with the protocol of the World Health Organisation MONICA (Multinational Monitoring of trends and determinants in Cardiovascular disease) project [19] and since 2002 the later recommendations of the European Health Risk Monitoring project (EHRM) [20]. Actually, the National FINRISK Studies (1982–1992) were part of the WHO MONICA project and since 1982 also part of the WHO CINDI (Countrywide Integration Non-communicable Diseases Intervention) program [15]. There was also a sample of subjects aged 65–74 years in the province of North Karelia and Helsinki since 1997 and in Lapland since 2002.

The present study includes six surveys of these National FINRISK Studies, i.e. surveys carried out between 1982 and 2007 ($n = 47\,896$) (Table 1). In the present study, both those smokers who had no complete data on smoking and those smokers who had quit smoking less than a month ago were excluded from analyses (altogether $n = 903$ between 1982 and 2007). Those subjects who had no data on the symptoms of chronic bronchitis ($n = 1540$) and subjects who reported of having asthma diagnosed by a doctor ($n = 1727$) (Table 1) were also excluded.

Measurement of chronic bronchitis, smoking status and other variables

Chronic bronchitis was defined in subjects without a history of asthma by a positive response to the same standard question 'Do you bring up phlegm on most days or nights for at least as much as three months each year' [4,9,21] in a self administered questionnaire. Smoking, marital status, education and occupation were also asked with standardised questions. Smoking status was classified into the three categories: never-, ex- and current-smokers (Table 1). Smokers had smoked regularly at least one year (cigarettes, cigars or pipe) and had smoked during the preceding month. Ex-smokers had stopped smoking at least one month before the survey. The pack-year was calculated by multiplying the years of smoking by the daily number of smoked cigarettes and then dividing the product by 20.

Occupation was classified into seven categories: agriculture and dairy farming, factory, mine and construction work, the unemployed, students, housewives, pensioners and office work (or suchlike work, e.g. service activity). The level of education was classified into four categories: an elementary school, a vocational school, an upper secondary school/college and an academic degree. Marital status was classified into four categories: married/cohabitation without marriage, unmarried, divorced and widowed. The area of residence was classified into four categories: North Karelia and Kuopio, south-western Finland, Lapland and Oulu, and the capital area (cities of Helsinki and Vantaa).

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