Gender and educational differences in smoking initiation rates in Spain from 1948 to 1992

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Background: The pattern of smoking initiation is of importance in understanding the prevalence of smoking and future trends in tobacco-related diseases. Objective: To analyse trends of cigarette smoking initiation rates by sex and educational level in Spain. Methods: Pooled data from the 1993, 1995 and 1997 Spanish National Health Interview Surveys were used (16,365 males and 17,478 females aged >15 years). The age and smoking status of each subject were reconstructed for five calendar periods (1948–1952, 1958–1962, 1968–1972, 1978–1982, 1988–1992). Age-specific (10 to 24 years old) smoking initiation rates were calculated for males and females, and according to level of education (high education: university and secondary school; low education: primary and less than primary). Results: Among males, there was a trend towards earlier age at start of smoking and higher initiation rates between 1958 and 1982, and a subsequent decline in initiation rates, more apparent in males with a higher level of education. Smoking initiation among females was rare until the 1960s, and from the period 1968–1972 onwards a converging pattern with that of males was observed. Women with a higher level of education started smoking before women with low education, but this pattern changed over the period 1978–1982, with higher initiation rates among less educated women during the last period studied. Conclusions: These results help to characterize the tobacco epidemic in Spain, now at the end of stage 3. The observations are in agreement with diffusion-of-innovations theory and the social and economic changes from the 1960s onwards in Spain.

Keywords: educational level, Health Survey, initiation, pattern, smoking, socioeconomic status, Spain

Previous studies have shown that there are gender and socioeconomic heterogeneity effects in cigarette smoking across Europe.1–3 Tobacco smoking spread quickly before the 1950s in northern European countries among males and afterwards the prevalence of cigarette smoking among females began to rise as well.4 In the mid-1970s, smoking prevalence among males and females began to decrease in northern European countries. In southern European countries, the decline was manifest in males but not in females.1,3,4 In addition to gender, one of the most important determinants of smoking behaviour is socioeconomic position: the habit starts among subjects in upper social classes or with higher educational level and later extends to lower socioeconomic groups.1,2,5

In Spain, a decline in the prevalence of smoking in males has been observed during the last 10 years, while in females, smoking prevalence has increased in the middle-aged (16–44 years old) and in higher socioeconomic levels. In men, the prevalence of smoking decreased from 55.1% in 1987 to 44.9% in 1997, while smoking prevalence in women increased from 22.9% to 27.2%.6 Smoking cessation has increased only in men (quit ratio of 26.5% in 1987 and 34.1% in 1997) but not in women (quit ratio of 31.3% in 1987 and 28.4% in 1997), and educational differences are also apparent.7

Early initiation of smoking is associated with heavy smoking in adult life,8,9 and is strongly associated to the occurrence of smoking-related diseases such as cancer, cardiovascular and respiratory diseases.10 Moreover, early age at starting smoking is associated with lower cessation rates, longer duration of smoking, and higher nicotine dependence in adulthood.11–14

The analysis of the pattern of smoking initiation in the USA up to the 1980s showed that the increase of smoking initiation among females began in the 1950s and was similar to males in the 1980s. In southern Europe, smoking initiation among females was rare until the 1960s but from the mid-1970s onwards a converging pattern between genders has been described.15,16

The rates of smoking initiation by gender and by educational level may be of importance in understanding the prevalence of smoking and the trends of tobacco-related diseases. Thus, to examine the dynamics of smoking initiation in Spain, the rates of smoking initiation between the ages of 10 and 24 were systematically
analysed by gender and educational level in five calendar periods between 1948 and 1992.

SUBJECTS AND METHODS
Data were drawn from three Spanish National Health Interview Surveys which were conducted in 1993, 1995 and 1997 by the Ministry of Health. Independent population samples of 26 400 in 1993 and 8300 in 1995 and 1997 were randomly selected within strata of geographical area and municipality size in order to be representative of the non-institutionalized population of Spain. Personal home-based interviews were conducted by trained interviewers. For subjects less than 16 years old, proxy interviewers answered the questions. The initial response rate was 90% for 1993 and about 85% for 1995 and 1997, but substitutions were permitted. The same methodology and questionnaire was used in the three surveys. The surveys included sociodemographic data and information on self-perceived health morbidity, life-style habits (including current and past smoking), and health service utilization, preventive activity practices and prevalence of disabilities. Copies of the original computer files were obtained from the Ministry of Health and the three surveys were pooled to obtain a sample of 33,875 subjects, including for each subject, sociodemographic data and smoking-related variables: smoking status at interview, type of tobacco smoked (cigarettes, cigars or pipe) and age at starting smoking for ever smoker and, in addition for former smokers, age at stopping smoking. Smoking habit was classified as current smokers (smoking daily), ex-smokers (subjects who have smoked but currently do not smoke at all), and never smokers. Occasional smokers were considered to be non-smokers. Cigar and pipe smokers (0.7% of the sample) were excluded. From the initial sample, only subjects directly interviewed and 25 years old or older and with complete information on smoking during the calendar periods studied were considered: 12,914 males (3,782 never smokers and 9,132 ever smokers) and 14,163 females (10,414 never smokers and 3,749 ever smokers). Subjects aged 25 and over were selected because younger subjects would not have completed the maximum level of studies at the time of interview.

The five calendar periods of interest were 1948–1952, 1958–1962, 1968–1972, 1978–1982 and 1988–1992. The age and the year of initiation of each subject were reconstructed for each calendar period of interest together with his or her smoking status at that time (non-smoker or smoker). For each calendar period and year of age (10 to 24 years old), the numerator of the smoking initiation rate was the number of subjects starting smoking and the denominator was the number of subjects at risk (non-smokers at that moment, including former smokers) at that same age. Smoking initiation rates were computed by gender and by educational level, considered as the highest educational level attained (high education: university and high school; low education: primary and less than primary school). Sampling weights derived from the sample design were included in the analysis.

RESULTS
Smoking initiation rates at ages 10 to 24 by gender and educational level for the individuals who began to smoke in the calendar periods 1948–1952, 1958–1962, 1968–1972, 1978–1982 and 1988–1992 are presented in figure 1. Among males, there was a trend towards earlier age at smoking initiation and higher initiation rates between 1958 and 1982 (initiation rate of 10% at 18–20 years old in the calendar period 1948–1952, and about 15% in period 1968–1972), and a subsequent decline in initiation rates (about 10%) at ages 16 to 18 during the last calendar period considered, as well as at age 18 or over (about 5%) during the last calendar period studied. The pattern of smoking initiation in males presents some variation according to education. In males, in the 1948–1952 calendar period, the initiation rates were higher among more educated males but from the 1968–1972 calendar period onwards the initiation rates became higher for males with low education, with a maximum peak (about 20% at ages 16–18) in the 1978–1982 calendar period.

Smoking was rare among females before the 1958–1962 calendar period, though from period 1968–1972 onwards a converging pattern with that of males was observed (initiation rates of 15% in males and 4% in females aged 16–18), with quite similar rates of smoking initiation in the last calendar period considered (initiation rate of 10% in males and females aged 16–18). Women with a higher level of education, however, started smoking before (1958–1962 calendar period) women with a low level of education. This pattern is apparent in the 1968–1972 period and reversed in the 1978–1982 calendar period, with higher initiation rates among less educated women (initiation rate of 16% and 10% in low and high educated women, respectively) (figure 1).

DISCUSSION
This study shows how the patterns of smoking initiation in Spain have varied according to gender and educational level. The pattern is consistent with data showing some progress in the reduction of smoking initiation for adolescent males in recent years but an increase for females. A shift towards early age at starting in both sexes is however present. These results differ from previous observations in the USA and Finland, where the increase of smoking initiation among females began in the 1950s and was similar to males in the 1980. Our results confirm the delay in the spread of the tobacco epidemic in southern European countries in comparison with other western countries. Previous observations from Italy and Catalonia using a similar methodology showed an increase of smoking initiation among females early in the year 1955 that was confirmed in 1965. It is known that smoking in southern Europe is more frequent among women in higher educational categories. Results indicate a dynamic process of change in the gradient of educational level in the initiation of smoking depending on the cohort and, consequently, on the observed prevalence according to...
education. This finding is also consistent with diffusion of innovations theory, because early adopters of an innovation, which smoking among men in the late 1940s and in women in the 1960s in Spain could be considered to be, have a higher educational level than later adopters.2,21 This pattern also indicates that Spain is moving to the end of stage 3 of the smoking epidemic, according to the description by Lopez et al.22 which is characterized by the beginning of a decrease of smoking prevalence among males, particularly in the higher educational levels, and females reaching their peak rate in this stage, which could be around 35–45%. As the smoking epidemic proceeds, smoking becomes concentrated in lower socioeconomic groups.

The social changes which have occurred in Spain in the last five decades could contribute to explaining why the onset of this epidemic began later in Spain than in other European countries. The period of time when smoking initiation among women took place was defined in Spain not only by political democratization but also by the corresponding social and economic changes. The change in access by women to high and university education during the last three decades is remarkable: whereas only 9% of women aged 55 to 59 in 1996 had completed secondary school, 60% aged 25 to 29 in 1996 had attained the same educational level.23 The other social change was related to the increased participation in the workforce by women. The male workforce was fully employed in the second half of the 1960s: from 3 million women (32% of all women of working age) to 4.1 million women (39%) in 6 years (1968–1974), while the total number of men did not change.23 A different pattern of participation has been described for the two periods. In the first period (1968–1974), women increased their participation in the active working population after having children, i.e. in the age-group 30 to 50; whereas in the second period (1985–1990) women first went into the labour market and delayed childbearing until they had a stable job.23 So the rate of increased participation was concentrated between the ages of 15 and 40. These factors are consistent with explanations in other countries where the increase of smoking is associated with a change in sex role norms and behaviour, including social acceptance of smoking among women in parallel with these changing roles.24,25 Women had a lack of power that was translated into control of their behaviour. Social disapproval of women’s smoking existed until the 1960s, enforced with rules of decorum and gender-appropriate behaviour, as present in pre-democratic Spain. Thereafter, with smoothing of rules in the 1970s, the tobacco industry promoted the changing gender distribution of smoking (by sponsorship of activities that link cigarettes to young, healthy, vital, and self-determined women).24,26,27 Potential limitations of this study include the fact that smoking habits were assessed retrospectively during the interview, and this might have introduced some recall bias.28 We examined the distribution of the ages reported by the same age cohorts of ever smokers in the three surveys before pooling the surveys. Although there is a preference for reporting ages 16, 18 and 20 as opposed to age 17 and 19, this tendency is present for the three periods, as also noted by other authors.15,29 No systematic trend to report younger or older ages of initiation according to the respondent’s age at interview was present.

The sample in each survey was large and representative of the general population, and substitutions due to refusal were below 15% in the three surveys. We did not include for analysis subjects who did not provide information on age or age at starting smoking or educational level. Some selection bias related to the highest mortality of smokers, which is inversely related to age at starting smoking, is possible. For this reason, the analysis was restricted to the year 1948 or later; i.e. to subjects born around 1934 and aged 63 or younger in 1997.

Recent data indicate an inversion of the prevalence of smoking according to educational level among women following the evolution initiated by men.30 This data suggests that we are only beginning to observe the health consequences of the diffusion of the smoking epidemic among women in Spain as well as in other southern European countries. In Spain, lung cancer mortality rates among women were among the lowest in Europe,31 but this situation is currently changing with a recent increase in the incidence and mortality rates12 from this tumour.32–34 All these findings, together with the experience of other developed countries with an earlier the spread of the tobacco epidemic, indicate that strong actions directed to women, and especially at young ages, are required in order to prevent smoking initiation in Spain and in countries at similar stages of the tobacco epidemic. Last but not least, special anti-smoking activities addressed to disadvantaged socioeconomic groups should also be a priority.

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