Study of the impact of laws regulating tobacco consumption on the prevalence of passive smoking in Spain

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Background: In 2005, the Spanish parliament passed the Spanish anti-smoking law. This legislation restricted tobacco smoking in public places, including recreation venues (bars and restaurants), but smoking was not completely prohibited in bars and restaurants. The law was enforced in January 2006. With the objective of analysing the impact that this law has had on the general Spanish population, the Spanish Society of Pulmonology and Thoracic Surgery (SEPAR) designed and implemented a survey of a representative sample of the general Spanish population on two separate occasions: in 2005 and in 2007 (12 months after the ban came into effect). Methods: Two epidemiological, observational and cross-sectional surveys were performed among a random and representative sample of the general Spanish population, using the Computer-Assisted Telephone Interview system. Results: In the first survey, a total of 6533 subjects were interviewed, of whom 3907 (59.8%) were non-smokers and in the second, a total of 3289 subjects were interviewed, of whom 2174 (65.9%) were non-smokers. The overall prevalence of exposure to environmental tobacco smoke (ETS) decreased from 49.5% in 2005 to 37.9% in 2007 (22% reduction). The greatest reduction in prevalence of ETS exposure was in workplaces (from 25.8% to 11%, a decrease of 58.8%). Smaller reductions occurred in the home (from 29.5% to 21.4%, a decrease of 27%) and in recreation venues (from 37.4% to 31.8%, a decrease of 8%). Conclusions: Implementation of the smoking ban resulted in a significant decrease in exposure to ETS.

Keywords: anti-smoking regulations, evaluation

Introduction

Passive smoking has been identified as the third leading cause of preventable death in Spain. Although specific data are not available, it is estimated that passive smoking may be responsible for around 3000–3500 deaths per year in Spain.1 Passive smoking causes fatal diseases, including lung cancer, ischaemic heart disease and sudden infant death syndrome.2–4 Different health-related and non-health-related measures have demonstrated efficacy in protecting the health of non-smokers from environmental tobacco smoke (ETS).5 The methods shown to be most effective are banning smoking in public places and restricting tobacco use in the workplace and recreational venues, such as bars and restaurants.6

The Spanish government has ratified the World Health Organization Framework Convention on Tobacco Control (FCTC). This treaty stipulates that countries must take legal action to address tobacco consumption in public places and to protect non-smokers from ETS.

In December 2005, the Spanish parliament passed legislation supporting the establishment of health measures to control consumption of tobacco (law 28/2005). The principal component of this new legislation was a total ban on tobacco consumption in health centres, educational institutions and workplaces. It also restricted tobacco smoking in recreation venues (bars and restaurants), but smoking was not completely banned in these places. The law stipulated that bars and restaurants with a surface area of 100 m² or less could choose either to become smoke-free or to allow smoking. Larger bars and restaurants (>100 m²) were required to provide separate, designated smoking and non-smoking sections. The legislation did not consider changes in the pricing of tobacco products. The law came into effect in January 2006.

To analyse the impact that the new law has had on the general Spanish population, the Spanish Society of Pulmonology and Thoracic Surgery (SEPAR) designed and implemented a survey in a representative sample of the general Spanish population. The survey was carried out on two separate occasions: in 2005, before the passing and implementation of the law, and in 2007, 12 months after the ban came into effect. This paper presents data demonstrating the impact the law has had on changes in the prevalence of passive smoking in Spain.

Methods

Two epidemiological, observational and cross-sectional surveys were conducted among a random and representative sample of the general Spanish population using the Computer-Assisted Telephone Interview (CATI) system. The validity of this method of study has been documented in various Spanish epidemiological studies.6 The field work for the first survey was undertaken in February of 2005, before the announcement of the forthcoming law regulating smoking. The second survey was conducted in January 2007, 12 months after implementation of the smoking ban.

Participants

Through a procedure of random, stratified sampling [using quotas for gender groups (male/female), age (<13; 13–40;
41–65 and >65 years), habitat (rural <5000; urban >5000), based on data provided by the National Institute of Statistics in 2001 regarding the composition of the Spanish population, 6800 questionnaires were completed during February 2005. Following the same procedure, 3298 questionnaires were completed during January 2007. With this sample size, the accuracy of the estimation of the percentage of people who know about the impact of passive smoking (assuming maximum variability of 50%) at a national level is 1.2%.

Data collection

Data were collected by surveyors who specialize in the application of the CATI system and were trained in conducting surveys in an electronic format. The incorporation of responses into the database was performed using automated filters and logic-based sorting routines in order to eliminate inconsistent responses. Of the 6800 surveys performed in February 2005, 6533 were valid after being filtered through the database. Of the 3298 surveys performed in January 2007, 3298 were valid after being filtered through the database.

Descriptive analysis of the information was completed by skilled personnel, using the SAS version 9.1.3 Service Pack 4 (site 0085630001) statistical programme.

Results

Results are presented from the group of non-smokers in both surveys. In the first survey, a total of 6533 subjects were interviewed, of whom 3907 (59.8%) were non-smokers and in the second, a total of 3289 subjects were interviewed, of whom 2174 (65.9%) were non-smokers.

Socio-demographic characteristics of non-smokers

The socio-demographic characteristics of non-smokers in the 2005 survey revealed that more females were non-smokers than males, 57 vs. 43% (P<0.0001). Also, there were fewer non-smokers in the middle age range, between 13 and 65 years (62.2%), than in the groups aged below 13 years (99%) and above 65 years (77%) (P<0.0001). The percentage of non-smokers among the urban population (84%) was higher than that among the rural population (16%) (P=0.0049). These characteristics did not change in the 2007 survey.

Exposure of non-smokers to ETS at home

Of the 3907 non-smoking subjects who completed the survey in 2005, 1153 (29.5%) lived in homes where at least one smoker resided. Of the 2174 non-smoking subjects who completed the survey in 2007, 466 (21.4%) were exposed to ETS at home (table 1). Given the timing of the surveys, it may be concluded that this reduction of 27% is due in part to the impact of the law. However, the rate of exposure to ETS was higher among non-smokers younger than 13 years, but did not appear to change after the law came into effect (40.9% in 2005 vs. 39.2% in 2007).

Exposure of non-smokers to ETS in schools

In 2005, 337 (25.8%) of the 1308 non-smoking, employed survey subjects were exposed to ETS in school. However, in 2007, only 73 (11%) of the 727 non-smoking, employed survey subjects were exposed to ETS (table 1). According to these findings, the prevalence of passive smoking in the workplace decreased by 58% between 2005 and 2007. This reduction may also, in part, be due to the impact of the smoking ban.

Exposure of non-smokers to ETS in recreation venues

In 2005, 1461 (37.4%) of the 3907 non-smoking survey subjects confirmed that they were exposed to tobacco smoke in bars and restaurants (table 1). Exposure to ETS in these locations was higher in males than females (40.4 vs. 35.1%; P<0.0001) and in those younger than 13 years compared with those older than 13 years (42.8 vs. 18.8%; P<0.0001), but there was no significant difference as a function of habitat. In 2007, 692 (31.8%) of the 2174 non-smoking survey subjects responded that they were exposed to ETS in bars and restaurants (table 1). No significant differences were found with respect to gender or habitat. Passive smoking was more prevalent among subjects in the middle age group (79.2%) than among the elderly (8.8%) or children (12%) (P<0.0000).

According to these findings, the prevalence of passive smoking in bars and restaurants decreased from 37.4% in 2005 to 31.9% in 2007. This reduction of 14.7% was probably, in part, due to the impact of the smoking ban.

Overall exposure of non-smokers to ETS

In the 2005 survey, 49.5% of non-smokers were exposed to ETS, whereas in 2007, this figure was reduced to 37.9% (table 1). If the various environments in which one can be subjected to ETS (at home, in school, in the workplace and in recreation venues) are taken into account, 72.3% of those exposed to ETS in 2005 were exposed in one single environment, compared with 66.5% in 2007. In 2005, 24.9% of subjects were exposed to ETS in two different environments vs. 30.4% in 2007 and 2.8% were exposed to ETS in three different environments in 2005 vs. 2.7% in 2007. In 2005 the overall rate of exposure to ETS was greater among subjects older than 13 years than among subjects younger than 13 years (32.6 vs. 12.9%; P<0.0001). In 2007 there was no significant difference between sexes (males 48.9 vs. females 51%) but the differences among age groups remained the same. In neither year were there any differences with regard to habitat.

These data show that the overall prevalence of exposure of non-smokers to ETS decreased from 49.5% in 2005 to 37.9%...
in 2007, a reduction of 22%. This reduction may be considered, in part, due to the impact of the law.

Discussion

The principal finding of this study showed, for the first time in Spain, that the overall prevalence of exposure to ETS decreased from 49.5% in 2005 to 37.9% in 2007. Given the introduction of the smoking ban in 2006, it may be considered that the 22% reduction in ETS exposure was a result of implementation of the law. As expected, because the law prohibits smoking in schools, one of the greatest reductions in prevalence of ETS exposure due to the law was found in schools (down from 29.7% in 2005 to 8.8% in 2007, a decrease of 49.8%). This is important because it is known that one of the results of eliminating smoking in workplaces is a reduction in smoking initiation among young people. There is no better workplace to start than in schools, where children spend much of their formative years.

Given the laxity of the law, a surprisingly large reduction in ETS exposure was noted in workplaces (down from 25.8% in 2005 to 11% in 2007, a decrease of 58.8% because of the law). Smaller reductions in ETS exposure occurred in the home (down from 29.5% in 2005 to 21.4% in 2007, a decrease of 27%) and in bars and restaurants (down from 37.4% in 2005 to 31.8% in 2007, a decrease of 8%) as a result of the law.

Putting legislative measures to control smoking into action in workplaces, schools, health centres and recreation venues and on public transport has been shown to be an effective mechanism for reducing the prevalence of passive smoking in various communities. The Spanish law aspires eventually to achieve a total ban on smoking in many of these public spaces: schools, health centres, public transport and workplaces. However, the law only established a partial ban in recreation venues (restaurants, bars and discos). The marked decrease in prevalence of exposure to ETS in Spanish educational institutions and workplaces between 2005 and 2007 is, without a doubt, due to the impact of the law. In contrast, the decline in exposure to ETS detected in recreation venues was not significant, due to the permissiveness of the law towards tobacco use in these spaces.

Presumably, if the law had been more comprehensive, the results would have been even better. Nevertheless, we believe that a decrease in the overall prevalence of exposure to ETS from 49.5% before the law to 37.9% one year after implementation is positive and a reason for optimism. In Italy, legislation prohibiting tobacco consumption in any public place was implemented in 2005. A recent study performed in Italy 1 year after implementation of the ban found that mean concentrations of nicotine in samples of environmental air in the middle of work places or recreation venues and restaurants had decreased by 95% compared with samples obtained before the smoking ban was introduced.

The decrease in the prevalence of exposure to ETS in the home from 29.5% to 21.4% in our study appears slight and probably reflects low awareness among the Spanish population regarding the health hazards associated with ETS. In addition, another figure that should be noted is the prevalence of exposure to ETS in the home among children younger than 13 years, which was 40.9% in the 2005 survey and was almost unchanged (39.2%) in 2007.

The marked reduction in exposure to ETS in workplaces that we observed may have important implications for Spanish public health. In a recent study, Bartecchi et al.14 found that a public decree that reduced exposure to ETS was associated with a decrease in hospitalisations due to acute myocardial infarction in an isolated community 18 months after implementation of the decree (relative risk = 0.73, 95% confidence interval 0.63–0.85). Another study found an important reduction in admission rate for coronary heart disease after the implementation of legislation banning smoking in workplaces and public places.13 Following the implementation of the smoking ban, the hospitalisation rate decreased by 39% after 1 year and by 47% after 3 years.12 Other studies have also drawn similar conclusions.13,14 Governments and healthcare providers should therefore take note that one fairly simple and inexpensive way of reducing myocardial infarction and other hospital admissions for coronary heart disease is to implement comprehensive smoking bans in workplaces and other public places.

Fong et al.15 recently analysed the impact of the law regulating tobacco consumption in Ireland by performing two surveys, one before and one after implementation of the smoking ban, in a group of smokers. The number of those reported smoking in the workplace decreased from 62% before the ban to 14% after the ban. Corresponding figures for pre- ban vs. post-ban were 85 vs. 3% in restaurants and 98 vs. 5% in bars and pubs. In addition, up to 83% of the smokers questioned considered the law to be either ‘good’ or ‘very good’.

Our figures are not as impressive as those in Ireland, but the Irish ban was much more comprehensive than the Spanish restrictions on smoking. In addition, the study designs were different; our study interviewed non-smokers who explained their perception of compliance with the law in different settings, whereas Fong’s analysis focused on smokers who explained their own behaviours in each of the settings studied. Another important aspect of the study by Fong et al. is that they found a decrease in the prevalence of tobacco consumption in the home. In other words, although the Irish law did not regulate tobacco consumption in the home, banning smoking in public places led to a similar decrease in smoking in the home. This did not occur in Spain and is probably a result of the more comprehensive law in Ireland. Smokers tend to rationalize their continued smoking just as alcoholics rationalize their continued drinking, so it is easy to imagine how smokers could misinterpret partial bans to mean: ‘If the authorities really believed that second-hand smoke is unhealthy they would implement a total ban’. A recent study by Borland et al.16 conducted in four countries (Australia, Canada, United States and United Kingdom) found that once a comprehensive smoking ban had been implemented in restaurants and bars, support for and compliance with the ban were high in all four countries. Another study compared levels of indoor air pollution at different workplaces in 24 geographically diverse countries between November 2005 and August 2006.17 The study analysed PM2.5, which is the concentration of particulate matter in the air smaller than 2.5 μm in diameter. Particles of this size are released from burning cigarettes and are associated with smoking-related disorders. The study found that in Spain the mean concentration of PM2.5 was 215 μg m^{-3}, whereas in other countries with more comprehensive anti-smoking regulations the concentrations were lower: 29 μg m^{-3} in Ireland, 14 μg m^{-3} in New Zealand and 66 μg m^{-3} in Canada.17

The two main weaknesses of our study are the lack of a control group and that the data are based on non-smokers’ perceptions of tobacco smoking in the settings studied. Without a control group we cannot be certain that the observed changes in tobacco consumption were directly attributable to the law. On the other hand, this was a large survey. However, we do not provide objective data to evaluate exposure to air contaminated with tobacco smoke. Another limitation of our study is that it did not distinguish between smoking in restaurants, bars or discos; our results presented ‘recreational venues’ as a single group. The cross-sectional
design of the study should also be considered as another limitation.

In summary, we found reductions in exposure to ETS in public places due to the impact of the law in Spain. The greatest impact of the smoking ban was in workplaces and schools, with a less notable impact in the home and recreation venues.

Conflicts of interest: None declared.

Key points

- Anti-smoking laws are effective in reducing exposure to ETS.
- It is essential to have a total ban on smoking in all public places, otherwise anti-smoking laws lose impact.
- Spanish anti-smoking laws did not help to diminish exposure to ETS in recreational venues (bars and restaurants).

References


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