



ORIGINAL ARTICLE

Prevalence of secondhand smoke exposure in asthmatic children at home and in the car: A cross-sectional study



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KEYWORDS

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Abstract

Objective: To compare secondhand smoke exposure (SHSe) prevalence at home and inside the car between asthmatic and non-asthmatic Portuguese children.

Materials and methods: This is a cross-sectional study that assessed children's SHSe in a representative sample of nine Portuguese cities. A validated self-reported questionnaire was administered to a random sample of 4th grade students during the school year of 2010/2011. The asthma prevalence was defined by the answers to three questions regarding asthma symptoms, medication and inhaler use. We performed chi-square tests and analysed frequencies, contingency tables, confidence intervals, and odd-ratios.

Results: The self-reported questionnaire was administered to 3187 students. Asthma prevalence was 14.8% (472 students). Results showed that 32.3% of non-asthmatic children and 32.4% of asthmatic children were exposed to secondhand smoke as at least one of their household members smoked at home. The prevalence of parental smoking, smoking among fathers and smoking among mothers at home was also similar in both groups (asthmatic and non-asthmatic children). SHSe inside the car was 18.6% among non-asthmatic children and 17.9% among asthmatic children.

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Conclusions: Asthmatic and non-asthmatic children were equally exposed to secondhand smoke, because no significant differences were found between the two groups concerning the prevalence of SHSe at home and inside the car. These findings highlight the need to include SHSe brief advice in paediatric asthma management.

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Introduction

Worldwide, children's SHSe is a serious public health problem.¹ Children living with smokers are more likely to become smokers themselves. Thus, reducing children exposure to secondhand smoke (SHS) must become a public health priority.¹⁻³ Asthma is the most frequent chronic disease in childhood and its prevalence and morbidity has been increasing in most countries.^{4,5} Asthma diagnosis in younger children may be difficult, but at school age a more stable phenotype of asthma has already been developed.⁶ Since suggestive asthma symptoms in children are not asthma-specific, the use of anti-asthmatic therapy can be a complementary diagnostic criteria.⁷ SHSe is a common and avoidable risk factor for wheezing and asthma in children, increasing the incidence of these problems by at least 20%.⁸ SHSe is associated with asthma exacerbations and poor asthma control in children.^{7,9,10} Many children often do not have the personal power to complain or to protect themselves.¹¹ Children are more frequently exposed at home and in the car, as a result of parents' smoking behaviour or other household smoker.⁸ Parental smoking, and particularly maternal smoking, significantly increases the risk of asthma, especially in school-aged children. These behaviours worsen the severity of asthma symptoms and may impair lung growth and lung function.⁸⁻¹⁰ Preventing parental smoking and promoting smoke-free homes is crucial for asthma prevention and control.^{8,9} In the United States of America (USA), 39% of families reported at least one smoker at home.¹² Prior studies have shown that the prevalence of smoking bans among asthmatic children living with a smoker was less than 50%.¹³ SHSe inside vehicles is relatively common, and particularly harmful due to its higher concentrations of smoke when compared to SHSe at home.¹³ Until now few studies have addressed asthmatic-children SHSe at home or inside the car.

The aim of this study was to estimate and compare SHSe prevalence at home and in the car among asthmatic and non-asthmatic Portuguese children.

Materials and methods

Study design

A cross-sectional study, based on a self-reported questionnaire, was administered to 4th grade students during the school year of 2010/2011. The schools included in this study were randomly selected from a list provided by the Office of Statistics and the Planning Department of the Portuguese Ministry of Education.

The study was approved by the Directorate of Innovation and Curriculum of the Ministry of Education and by the directors of the selected schools.

The questionnaire had been previously administered to a small pilot group of 4th grade students. We taught the teachers how to administer the questionnaire in the classroom. Nevertheless, most of the questionnaires were administered by our full-time researchers. Before the administration of the questionnaire, every participant was asked to deliver an informed consent form signed by their parents.

Population and sample

The population consisted of 11,659 students from the 4th grade in the school year of 2010/2011. The theoretical sample size consisted of 4112 students assuming an expected SHSe prevalence of 35% with a 95% confidence interval (CI) and a precision of 1.5%. Before the implementation of smoking bans in Portuguese public places, a previous study in the Portuguese population (Braga) showed SHSe prevalence rates of 38%.¹⁴

We included randomly-selected 4th grade students from schools in Braga, Oporto and Viana do Castelo (North littoral of Portugal); Covilhã (Centre inland), Évora (South inland), Faro and Lisbon (South littoral), and the islands of Madeira (Funchal) and Azores (Angra do Heroísmo). We achieved a response rate of 77.5% (70↔90%) with a drop-out of 925 students. The reasons for the drop-out were: (1) parents did not sign the consent form; (2) students forgot to bring the signed consent form to school; (3) students missed school when the questionnaire was administered. Thus, the sample was representative of school-aged children from the 4th grade of nine Portuguese counties during the school year of 2010/2011 and included 3187 students.

Instrument

We administered a self-report anonymous questionnaire, which has been developed and validated for this study. It was based on survey tools used in previous studies to evaluate second-hand smoke exposure (e.g. Precioso et al., 2010. *Rev Port Pneumol.* 2010;16:57-72)¹⁵ and a questionnaire developed for the "Child Exposure to Environmental Tobacco Smoke (CHETS) Scottish study".¹⁶ Content validity was assessed through specialist revision and a pilot administration among a group of 4th grade children. The questionnaire was reviewed according to their feedback, and changes in the number and in the structure of questions were made. The final version of the questionnaire consists of 34 multiple choice questions and four open-ended

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