Allergol Immunopathol (Madr). 2017;xxx(xx):xxx-xxx

Allergologia et immunopathologia

Sociedad Española de Inmunología Clínica, Alergología y Asma Pediátrica

www.elsevier.es/ai

ORIGINAL ARTICLE

Incidence of asthma in young adults from Castellon, Spain: A prospective cohort study

L. Segura-Navas[a], A. Arnedo-Pena[b,c,*], R. Tosca-Segura[d], M.A. Romeu-García[e], N. Meseguer-Ferrer[e], E. Silvestre-Silvestre[f], F. Conde[f], S. Fernández-González[g], M. Dubon[f], M. Ortuño-Forcada[f], J. Fabregat-Puerto[h], C. Fenollosa-Amposta[f], M.R. Pac-Sa[i], L. Museros-Recatala[j], A. Vizcaino-Batllés[e], J.B. Bellido-Blasco[e,c]

[a] *Health Centre, Burriana, Castellon, Spain*
[b] *Department of Health Sciences, Public University of Navarra, Pamplona, Spain*
[c] *CIBER: Epidemiology and Public Health (CIBERESP), Barcelona, Spain*
[d] *Service of Pediatrics, Hospital General, Castellon, Spain*
[e] *Epidemiologic Division, Public Health Centre, Castellon, Spain*
[f] *Public Health Centre, Castellon, Spain*
[g] *Hospital 12 de October, Madrid, Spain*
[h] *Health Care Documentation, Hospital General, Castellon, Spain*
[i] *International Health, Sanidad Exterior, Castellon, Spain*
[j] *Health Inspection, Hospital General, Castellon, Spain*

Received 17 February 2017; accepted 30 March 2017

KEYWORDS
Asthma;
Incidence;
Cohort;
Young adults;
Risk factors

Abstract
Background: The objective was to estimate the incidence of asthma in young adults from 13–15 years old to 23–25 years old, and associated factors.
Methods: In 2012, a population-based prospective cohort study was carried out in Castellon from the cohort who had participated in the International Study of Asthma and Allergy in Childhood in 1994 and 2002. A telephone survey was undertaken using the same questionnaires. A new case of asthma was defined as a participant free of the disease in 2002 who suffered asthma, was diagnosed with asthma, or took medications against asthma based on self-report from 2002 to 2012.
Results: The mean age of participants was 24.9 ± 0.6 with a follow-up of 79.1%. Asthma cumulative incidence was 3.4%: 44 new cases occurred among 1280 participants. The incidence was higher in females than males with relative risk (RR) = 2.02 (95% confidence interval [CI] 1.1–3.8). A significant decrease of asthma incidence density was observed (8.2 cases to 3.5 cases per 1000 person/year). Factors associated with the incidence of asthma were allergic rhinitis (RR = 4.05; 95% CI 1.7–9.6), bronchitis (RR = 2.13; 95% CI 1.0–4.5), mother's age at time

* Corresponding author.
E-mail address: albertoarnedopena@gmail.com (A. Arnedo-Pena).

http://dx.doi.org/10.1016/j.aller.2017.03.003

Please cite this article in press as: Segura-Navas L, et al. Incidence of asthma in young adults from Castellon, Spain: A prospective cohort study. Allergol Immunopathol (Madr). 2017. http://dx.doi.org/10.1016/j.aller.2017.03.003

of birth (RR = 0.87; 95% CI 0.8–0.9) and a pet other than a dog or cat (RR = 0.42; 95% CI 0.2–0.9). For gender, some variations in the risk factors were observed.
Conclusions: A significant decrease in the incidence of asthma was observed. Several risk and protective factors were found.

Introduction

Asthma is the most common respiratory disease of the lower respiratory tract in children worldwide, and is becoming one of the most prevalent chronic diseases and causes of morbidity today. According to data obtained in the International Study of Asthma and Allergy in Childhood (ISAAC) phase III worldwide,[1] in schoolchildren the asthma prevalence stands at 11.7%, increasing to 14.1% in the case of teenagers. In Castellon, the latest data on prevalence stands at 9% for adolescents.[2]

Few published studies have evaluated the trend in asthma incidence among the same population from school age to adulthood. A study based on the European Community Respiratory Health Study (ECRHS) estimated a cumulative incidence of 3.9% among adults aged 20–44 years.[3] In Castellon, the incidence among adolescents (13–15 years old) was 6.4% (108 new cases) between 1994 and 2002.[4]

In this context, the objective of the present study was to follow up the cohort of schoolchildren in Castellon from 2002 (13–15 years old) to 2012 (23–25 years old) in order to estimate the incidence of asthma and its risk factors, and to compare it with the period 1994–2002.

Patients and methods

A population-based prospective cohort study was carried out on the cohort of schoolchildren who had participated in the ISAAC phases I (6–7 years old) and III (13–15 years old) in 1994 and 2002, respectively. During January–June 2012, the same period and the same questionnaires from the previous studies were used with some additional questions. The information was obtained by telephone interviews with participants conducted by staff at the Public Health Centre of Castellon and other health institutions. The questionnaire included items on asthma, eczema and allergic rhinitis following the ISAAC methodology. In addition, information about risk factors for asthma was based on specific questionnaires completed by the parents of participants in the ISAAC phases I and III in 1994 and 2002, respectively.

Definition of asthma was based on a positive response to at least one of the following questions.

Have you ever had asthma?
Do you take any medication for asthma?
Has the doctor diagnosed asthma?

From 3607 schoolchildren who participated in the ISAAC phase I in 1994, 1805 schoolchildren took part in 2002 in the ISAAC phase III,[4] and 1435 (79.5%) adolescents were follow-up to 2012; 370 (20.5%) adolescents were lost to follow-up. Of the 1435 follow-up participants, 1280 were free of asthma in 2002.

Statistical analysis

The cumulative incidence of asthma was estimated considering the new cases divided by the follow-up participants with a 95% confidence interval (CI), considering a binomial distribution. Asthma incidence density (AID) was estimated from the person – years of follow-up. Chi2 and Fisher tests were used to compare qualitative variables, and Kruskal–Wallis test was used for quantitative variables. Poisson regression models were used in the bivariate and multivariate analysis to study the relationship between asthma and risk or protective factors by the relative risk (RR) with 95% CI. For the multivariate analyses, independent covariates associated with asthma and an alpha value less than $p < 0.20$ were included in the model to arrive at a model with all the covariates with a significant association. No interactions were observed among significant variables and all models had an adequate goodness-of-fit. Population attributable risk (PAR), the percentage of cases reduced by removal of a risk, and population prevented fraction (PPF), the percentage of cases prevented with an intervention, were calculated following the formulas proposed by Kleinbaum et al.[5] The Stata® programme (version 12) was used in the statistical analysis.

The study was approved by the Ethics Committee of the General Hospital of Castellon and informed consent was obtained from each participant.

Results

The follow-up rate from 2002 to 2012 was 79.5% (1435/1805); 743 were female and 692 male; the mean age was 24.9 ± 0.6 years. Some significant differences between the follow-up group and non-follow-up group are shown in Table 1. Participation was higher among females than males, in younger than older participants, and in small-town residents than city residents. Variables such as mother's age at time of birth, smoking mother, and cat at home were associated with lower participation. On the other hand, exclusive breastfeeding was associated with higher participation.

Please cite this article in press as: Segura-Navas L, et al. Incidence of asthma in young adults from Castellon, Spain: A prospective cohort study. Allergol Immunopathol (Madr). 2017. http://dx.doi.org/10.1016/j.aller.2017.03.003