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Original article

Influence of environmental risk factors on bronchial asthma

Influencia de los factores de riesgo ambientales sobre el asma bronquial

Mariliam Martínez-Igarza [1], Danilo Taño-Tamayo [1], Dianet Saray Peña Ramírez [1], Felix Mario Pérez-Batista [1], Dario López-Méndez [1]

[1]Universidad de Ciencias Médicas de Holguín. Facultad de Ciencias Médicas "Mariana Grajales Coello". Holguín, Cuba.

ABSTRACT

Introduction: bronchial asthma is a chronic airway disease that can be severe and, in some cases, lead to fatal consequences for sufferers. There are a finite number of factors that influence the development and expression of bronchial asthma. Objective: to characterize the environmental risk factors associated with bronchial asthma in patients of the Family Medical Clinic No. 26 of the Pedro del Toro Saad Polyclinic from July to August 2021. Method: an observational and descriptive cross-sectional study was carried out in patients with asthma, dispensed for this condition in the health area of the mentioned polyclinic and family medical clinic. Results: female patients predominated (n = 20; 57,14 %) and in the 35-39 years and 40 years age groups (each with n = 9; 25,71 %). Obesity constituted the main comorbidity (n = 5; 14,28 %), followed by allergy (n = 4; 11,42 %). About half of the patients (n = 18; 51,42 %) were exposed to unfavorable atmospheric conditions, followed by those affected by cigarette smoke (n = 11; 31,42 %). Overcrowding constituted the main unfavorable characteristic of patients' homes (n = 8; 22,85 %). Conclusions: The prevalence of risk factors of environmental origin and those related to housing have an impact on bronchial asthma.

Keywords: Asthma; Air Pollution; Risk Factors.

RESUMEN

Introducción: el asma bronquial es una enfermedad crónica de las vías aéreas que puede ser severa y, en algunos casos, traer consecuencias fatales para quienes la padecen. Existen un número finito de factores que influyen en el desarrollo y expresión del asma bronquial. Objetivo: caracterizar los factores de riesgo ambientales asociados al asma bronquial en pacientes del Consultorio Médico de la Familia No. 26 del Policlínico "Pedro del Toro Saad" en el periodo de julio a agosto de 2021. Método: se realizó un estudio observacional y descriptivo de corte transversal en pacientes con asma, dispensarizados por dicha afección en el área de salud del policlínico y consultorio mencionados. Resultados: predominaron los pacientes del sexo femenino (n = 20; 57,14 %) y en el grupo de edades de 35-39 años y de 40 (cada uno con n = 9; 25,71 %). La obesidad constituyó la principal comorbilidad (n = 5; 14,28 %), seguida de la alergia (n = 4; 11,42 %). Alrededor de la mitad de los pacientes (n = 18; 51,42 %) estaban expuestos a condiciones atmosféricas desfavorables, seguidos aquellos afectados por el humo de cigarro (n = 11; 31,42 %). El hacinamiento constituyó la principal característica desfavorable de los hogares (n = 8; 22,85 %) de los pacientes. Conclusiones: La prevalencia de los factores de riesgo de origen ambiental y los relacionados con la vivienda inciden sobre el asma bronquial.

Palabras clave: Asma; Contaminación del Aire; Factores de Riesgo.

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INTRODUCTION

Bronchial asthma (BA) is a chronic disease of the airways that can be severe and, in some cases, bring fatal consequences for those who suffer from it[1]. It represents a significant social impact on the health of children, adolescents and adults[2] . It is a chronic inflammatory disease of the respiratory system, in whose mechanism various cells and inflammation mediators and bronchial hyperreactivity participate[3]. There is a finite number of factors that influence the development and expression of BA, such as genetic makeup, sex, obesity, allergens, viral infections, and smoking[4].

There is evidence to suggest that indoor exposures and unfavorable weather conditions are important factors in the development and exacerbation of asthma. Some environmental factors that trigger this are the precariousness of the homes, humidity, poor ventilation, and overcrowding, conditions that are common in homes in low-income areas and in vulnerable conditions[5].

Respiratory diseases, asthma and allergies are associated with outdoor and indoor air pollution. The relationship between air pollution and health is becoming more well-known every day. Asthma and allergies have increased over the past decades across Europe; Approximately 10% of the child population suffers from one of these diseases. In indoor environments, environmental tobacco smoke (ETS) is the most frequent. It is clear that passive smoking is a serious health problem and an ignored risk[6].

Intra- and extra-domiciliary allergens are well known as causes of asthma exacerbations; however, its role in the development of this disease is not well known. Mite sensitization and Aspergillus are independent factors for asthma symptoms in children up to 3 years of age[7]. The parallel increase in the prevalence of asthma and obesity in various regions has given rise to the postulation that both entities have a causal relationship. Although this relationship is not completely clear, probably due to the complexity of this epidemic, both conditions share the chronic inflammatory process[8].

Asthma reaches a prevalence of 6.1% to 24%, depending on the population studied and the methodology used. While in New Zealand the prevalence is above 30%, in Latin America the average is estimated at 17%, but with fluctuations between countries ranging from 5% in some cities of Mexico to 30% in Costa Rica [9] . In the year 2020, Cuba showed a prevalence rate of 90.9 per 1,000 inhabitants. The rates with the highest incidence were in the provinces of Havana, the special municipality of Isla de la Juventud and Las Tunas. Holguín province had a figure of 78.8 per 1,000 inhabitants[10] .

BA is a disease that primary, secondary or tertiary prevention can be achieved through health promotion actions. Regardless of the high coverage and quality of medical care, inadequate follow-up of the disease is perceived in relation to medical care, insufficient education of patients and relatives regarding the disease, as well as ignorance of triggering environmental factors and the medical-pharmacological treatment, which negatively affects the quality of life of patients and their families[11,12].

The objective of this study was to characterize the environmental risk factors associated with BA in patients of the Doctor´s Office (DO) No. 26 of the „Pedro del Toro Saad" Polyclinic in the period from July to August 2021.

METHOD

Type of study: An observational and descriptive cross-sectional study was carried out in patients with BA, dispensed for this condition in the health area of the „Pedro del Toro Saad" Teaching Polyclinic in the Holguín municipality, CMF No 26, during the period from July to August 2021.

Universe and sample: The study universe consisted of 53 patients. All patients with BA who remained in the area during the study period and who presented a complete medical history for data collection were included. Patients with no follow-up were excluded. A simple random probabilistic sampling was carried out, through which a sample of 35 patients was formed.

Variables and data collection: the variables were analyzed: age group, sex, comorbidities [obesity, allergy, rhinitis, gastroesophageal reflux, atopic dermatitis, hyperthyroidism, bronchiectasis, chronic obstructive pulmonary disease (COPD)] /, BA triggers (unfavorable weather conditions, presence of animals, humidity, inhaled allergens, cigarette smoke), unfavorable characteristics in the home [location of the home, poor ventilation, kitchen in the bedroom, use of fuel for cooking (eg kerosene, oil), overcrowding].

The sources for obtaining the information were: Analysis of the Health Situation (AOTHS) and individual medical records.

Statistical processing: The data collected was recorded in a database in Microsoft Excel 2016. Analysis of the results was performed using descriptive statistics with absolute and relative frequencies.

Ethical standards: during the work, no therapeutic intervention was carried out and the confidentiality of the data obtained was respected. It was maintained as a premise to respect the bioethical principles of studies with human beings, established in the II Declaration of Helsinki and in the Cuban ethical norms. Approval was obtained from the Ethics Committee and Scientific Council of the „Pedro del Toro Saad" Polyclinic.

RESULTS

There was a predominance of female patients (n = 20; 57.14%) and in the age group of 35-39 years and 40 (each with n = 9; 25.71%), as shown in Table 1.

Table 1. Patients according to age groups and sex

Age group (years)	Male sex		Female sex		Total	
	No.	%	No.	%	No.	%
0 – 4	2	11,11	0	0	2	5,71
5 – 9	2	11,11	3	15	5	14,28
10 – 14	1	5,56	1	5	2	5,71
15 – 19	3	16,66	2	10	5	14,28
20 – 24	0	0	1	5	1	2,85
25 – 29	0	0	2	10	2	5,71
30 – 34	3	5,56	1	5	4	11,42
35 – 39	4	22,22	5	25	9	25,71
40 and over	3	5,56	6	30	9	25,71
Total	18	51,42	20	57,14	35	100

It is observed in fig. 1 that obesity was the main comorbidity (n = 5; 14.28%), followed by allergy (n = 4; 11.42%).

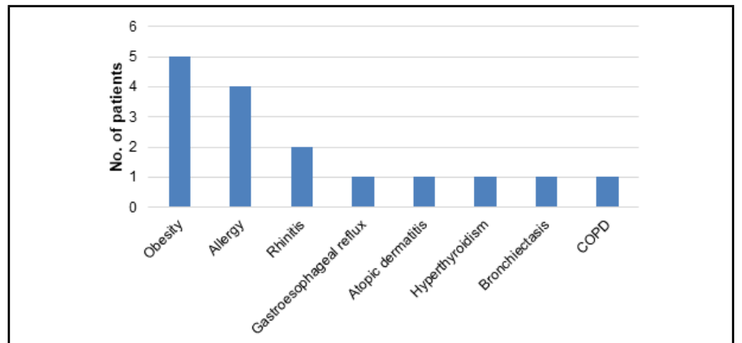

Fig. 1. Patients according to comorbidities.

Around half of the patients (n = 18; 51.42%) were exposed to unfavorable atmospheric conditions, followed by those affected by cigarette smoke (n = 11; 31.42%), as observed in Fig. 2.

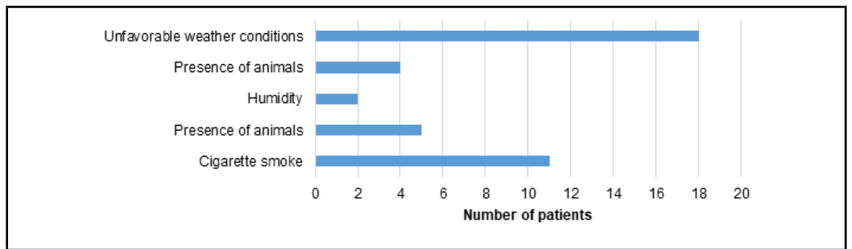

Fig. 2. Patients according to the presence of BA trigger factors.

The fig. 3 evidence that overcrowding was the main unfavorable characteristic of the homes (n = 8; 22.85%) of the patients .

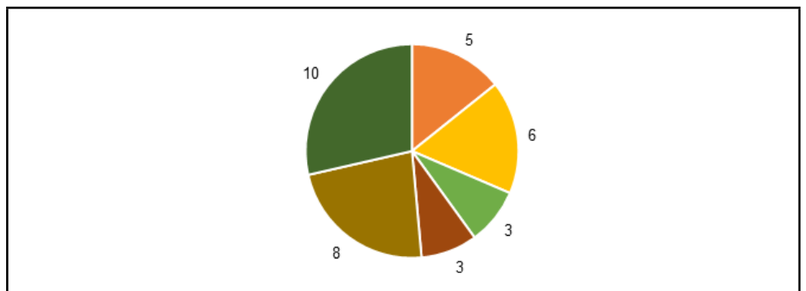

Fig. 3. Patients according to unfavorable characteristics of their homes

DISCUSSION

The incidence of BA has increased significantly in recent years. This is due to the existing air pollution and the lack of knowledge of hygienic-sanitary measures that lead to bad behaviors and unfavorable conditions at home.

The behavior in terms of age groups and sexes observed in this study differs from that reported by López Sánchez et al. [4], who point out that BA is more frequent in males up to the age of 13-14 years, at which age it levels off and, later, it becomes more prevalent in females.

Álvarez Carmenate et al. [11] in their study state that in adulthood the prevalence of BA is higher in women than in men, which coincides with what was found in the present study.

Obesity in postpubertal women precedes asthma, and the relationship between obesity and asthma has been shown to be significant; however, in some studies it has been found that this relationship is similar for both sexes and in others, on the contrary, that this situation only occurs in males. In a cohort, Abreu-Suárez et al. [8] found that the prevalence of asthma symptoms was higher in obese girls who had early menarche (before 11 years of age) than among those who presented it at later ages.

Navarrete-Rodriguez et al. [13] reports that multiple allergens both outside the home and indoors have been implicated; Sensitization depends on the type of allergen, dose, exposure time, age, and probably genetic predisposition.

In the present study it is identified that allergy is one of the diseases that exacerbate asthma, but this can be generated from several triggering factors. It should be noted that environmental contamination constitutes the fundamental pillar of the development of this disease.

According to the results of the investigation, approximately half of the patients were exposed to unfavorable atmospheric conditions. This can include the smoke from vehicles, the combustion or burning of garbage and, in addition, toxic products that remain suspended as small particles in the air.

Romero-Placeres et al. [14] state that, in the city of Havana, the biggest air pollution problem is due to particulate matter, especially smoke. The most used fuel for public transport in the city is diesel, which promotes greater smoke exhaust in vehicles, which are mostly old.

Although there are low levels of air pollution in cities, these are harmful to the respiratory tract of minors and this is related to the increased risk of suffering from acute respiratory diseases [15] . Tobacco consumption in the child population represents a significant public health problem in various parts of the world. In an epidemiological study involving 14,578 adolescents in France, Estruch-Fajardo et al. [16] also found increases in the prevalence of asthma and allergic conditions associated with active tobacco use, after controlling for passive smoking and other variables.

Conflicting results have been found for the association between exposure to pets (cat or dog) and asthma. Previous scientific evidence has not been clear in defining whether avoiding or allowing exposure can prevent, ameliorate, or worsen the development of asthma or its symptoms [17].

Pollution in the home can play an important role in the development and exacerbation of asthma. Another factor related to the presence of symptoms indicative of asthma is the presence of mites. House dust mites have been shown to be strongly associated with the development, severity, and morbidity of asthma [17,18]. The presence of fungi inside the home has a significant influence.

Personal and family respiratory history, and biological contaminants (fungi and dust mites) in the home are risk factors that increase the probability of having symptoms indicative of asthma [18] .

Poor ventilation, followed by problems of overcrowding, can lead to the appearance of mites, fungi and dust particles that exacerbate the disease, in addition to the use of fuels and the use of wood stoves, since inhaling certain amounts of these can cause, over time, inflammation and obstruction of the airways and eventually generate BA.

CONCLUSIONS

Unfavorable weather conditions and overcrowding were the main environmental risk factors influencing BA patients.

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AUTHORSHIP

Mariliam Martínez - Igarza: conceptualization, research, project administration, supervision, validation, writing, data curation, software.
Danilo Taño Tamayo: conceptualization, research, methodology, visualization, writing, formal analysis, supervision, project administration.
Dianet Saray Peña Ramírez: methodology, visualization, writing, data curation, software, validation.
Félix Mario Pérez-Batista: writing, formal analysis, supervision, data curation, writing.
Dario López - Méndez: methodology, visualization, writing, formal analysis, writing, data curation.

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CONFLICT OF INTERESTS

The autors declare that does not exist an interest conflict.