UNIVERSIDADE DA BEIRA INTERIOR

Faculdade de Ciências da Saúde

Comparative study of the prevalence, clinical features, sensitisation profiles and risk factors for Bronchial Asthma between elderly and young adults in Cova da Beira

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Dissertação para obtenção do grau de Mestre em Medicina

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Título: Comparative study of the prevalence, clinical features, sensitisation profiles and risk factors for Bronchial Asthma between elderly and young adults in Cova da Beira

Orientador: Professor Doutor Luís Taborda Barata, M.D., Ph.D.

Co-orientador: Professora Doutora Ana Mafalda Fonseca, Ph.D.

À minha avó

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ABSTRACT

Background: Bronchial asthma is one of the most common allergic diseases worldwide. Very few studies have analysed whether the prevalence of asthma decreases with age. Therefore, the aim of the present study was to compare the prevalence, pattern of aeroallergen sensitization and clinical features of bronchial asthma between elderly and young adults. In addition, we also wanted to analyse possible risk factors for the development of asthma.

Methods: This study followed a cross-sectional design. A standardised allergy and asthma questionnaire and skin prick tests (SPT) were carried out in all volunteers. The study population included two groups of individuals: elderly (aged 65 years and older) and young adults (aged between 18-35 years) from Beira Interior. The sample was selected by simple randomization, after calculating a confidence interval of 95% and an estimated error below 5%. Statistical analysis was carried out using Chi-square tests, Mann-Whitney U test, univariate regression analysis, binary logistic regression analysis and Odds Ratio. A *p* value less than 0.05 was considered statistically significant. All patients signed a written informed consent and the study was approved by the Regional Health Authority Ethics Committee.

Results: A total sample of 1460 volunteers was included. Thus far, we have analyzed a total of 27.6% of elderly volunteers in the Health Care Centre (median age = 73 years; 41.5% males) and 14.1% of the young group (median age = 28 years; 44.2% males). A short questionnaire was applied by telephone to 11% of the total sample. We found significant differences in the prevalence of bronchial asthma between elderly and young adults (19.7% vs 29.4%, respectively; p=0.02; Chi-square test). In addition, the prevalence of atopic bronchial asthma was also significantly lower in elderly than in

young adult patients (32.1% vs 57.1%, respectively; p=0.02, Chi-square test). Both groups were mostly sensitised to *Dermatophagoides pteronyssinus* and *Dermatophagoides farinae*. Significant differences were found in terms of sensitisation to grass pollens amongst elderly and young patients (11.8% vs 70.8%, respectively; p=0.0006, Chi-square test). The majority of the asthmatic patients were sensitised to more than one allergen. Finally, differences were observed in terms of risk factors for bronchial asthma between both groups, with gender as a significant risk factor in elderly patients and concomitant rhinitis in young patients. The presence of rhinitis augmented the risk of having asthma 3.2 times, in the group of young adults.

Conclusions Our preliminary results suggest that the prevalence of asthma is lower in elderly people, the sensitisation profile and the risk factors for this disease are different between elderly and young adult patients.

KEYWORDS

Bronchial asthma

Atopy

Elderly patients

Young adult patients

Skin-prick tests

Epidemiology

RESUMO

Introdução: A asma brônquica é uma das doenças mais comuns a nível mundial. Poucos estudos analisaram se a sua prevalência diminui com a idade. Assim sendo, o principal objectivo deste estudo foi comparar a prevalência, perfil de sensibilização, características clínicas e possíveis factores de risco para o desenvolvimento da asma em idosos e adultos jovens.

Métodos: Estudo transversal que implicou a realização de questionário padrão sobre alergia e asma, bem como realização de testes cutâneos de alergia (TCA) a todos os voluntários. A população do estudo abrangeu dois grupos de indivíduos: idosos (com idade igual ou superior a 65 anos de idade) e adultos jovens (com idades compreendidas entre 18 e 35 anos) da Beira Interior. A amostra foi calculada através de randomização simples. A análise estatística consistiu na aplicação dos testes de Qui-quadrado, Mann-Whitney U, análise de regressão univariável, análise de regressão logística binária e Odds Ratio. Um valor de *p* abaixo de 0,05 foi considerado estatisticamente significativo. Todos os voluntários que participaram nesta investigação assinaram consentimento informado e o estudo foi aprovado pelo Comité de Ética da Autoridade Regional de Saúde.

Resultados: A população do estudo consistiu em 1460 voluntários. Contudo, até ao momento, apenas analisámos um total de 27,6% de idosos no centro de saúde (idade média = 73 anos; 41,5% sexo masculino) e 14,1% do grupo de jovens (idade média 28; 44,2% sexo masculino). Foi aplicado um questionário simples por telefone a 11% do total da amostra. Encontrámos diferenças significativas relativas à prevalência da asma entre idosos e adultos jovens (19,7% vs 29,4%, respectivamente; p = 0,02; teste do Qui-quadrado). Para além disto, a prevalência de asma brônquica atópica foi

significativamente menor em idosos que em adultos jovens (32,1% vs 57,1%, respectivamente p=0,02). Ambos os grupos de doentes asmáticos demonstraram elevada sensibilização para *Dermatophagoides pteronyssinus* e *Dermatophagoides farinae*. Encontrámos diferenças significativas na sensibilização dos idosos e jovens para pólenes de ervas (11,8% vs 70,8%, respectivamente; p=0,0006, teste do Qui-quadrado). A maioria dos doentes asmáticos estava sensibilizada a mais de um alergéneo. Finalmente, foram constatadas diferenças relativamente aos factores de risco para desenvolvimento de asma nos diferentes grupos, sendo o sexo significativo no caso dos idosos e a concomitância de rinite nos jovens. A presença de rinite aumentou em 3,2 vezes a probabilidade de desenvolver asma nos adultos jovens.

Conclusões: Os resultados preliminares sugerem que a prevalência de asma é menor nos idosos, os perfis de sensibilização aos alergéneos, bem como factores de risco para o seu desenvolvimento são diferentes em idosos e adultos jovens.

PALAVRAS-CHAVE

Asma brônquica

Atopia

Idosos

Adultos jovens

Testes cutâneos de alergia

INTRODUCTION

Asthma is a chronic inflammatory disorder of the airways in which many cells play an important role, including mast cells, eosinophils and T lymphocytes. This inflammation is associated with hyperresponsiveness of the tracheobronchial tree to a variety of stimuli, such as exposure to allergens, occupational irritants, tobacco smoke, viral respiratory infections, exercise, strong emotions, irritating chemicals and drugs. Clinically, it is characterized by recurrent episodes of wheezing, dyspnoea, chest tightness, and cough, particularly with worsening at night and/or in the early morning. These symptoms are usually associated with widespread but variable airflow limitation that is, at least, partly reversible either spontaneously or with treatment (1,2). Asthma can be classified in terms of severity (3) and, more recently, in terms of control (4), with treatment being adapted to such features.

In the majority of cases there is a clear association between asthma and atopy (5-7), which is a personal and/or familial tendency, usually manifested in childhood or adolescence, to become sensitized and produce IgE antibodies in response to exposure to ordinary environmental substances (aeroallergens) (8). Atopy can be detected by documentation of specific IgE antibodies in serum or by a positive skin prick test to one or more of those aeroallergens (1,2). (acho que este parágrafo deveria passar para o outro parágrafo de cima)

In the most recent GINA report (“Global INitiative for Asthma”) asthma is considered one of the most common chronic diseases in the world and it is estimated that around 300 million people are affected, which results in a high economic and

clinical impact (2). The prevalence of asthma is increasing in many parts of the world, although it may have stabilized in other parts, at least in children (9).

In Western Europe, there is an estimated high prevalence of asthma of 5.9% (2). In the European Community Respiratory Health Survey (ECRHS), in 1996, the prevalence of asthma documented in Portugal, in adults aged between 20-44 years old, was around 6.0% in Coimbra and 4.3% in Oporto (10). However, in Portugal, the majority of the studies about the prevalence of asthma are related to children and there is a lack of information about other age groups.

In spite of asthma having been regarded for many years as a childhood or youth disease, in fact, elderly patients may also be affected (11), as shown by an Australian study from 1979, in which 65% of elderly patients had asthma (12). More recently, another study involving patients older than 65 years estimated an incidence rate for each year of around 0.1% (13). In an American study ("The Cardiovascular Health Study"), the prevalence of asthma in the age group above 65 years was 4% (14). In a French study, the prevalence of self-reported asthma symptoms in this age group was much higher, about 61% (15). However, an American analysis of all published literature about this topic since 1988 to 2008, showed an overall prevalence of asthma of 5.3% in elderly patients (16).

In fact, asthma in the elderly is a much more complex phenomenon than one might expect. The aging process is characterized by immunological and inflammatory changes that will determine the individual ability to face external challenges throughout life. There is an established impact of oxidative stress on respiratory and allergic pathology, particularly in elderly patients (17). Furthermore, in this age group, characterized by a high incidence of other co-morbilities, asthma is often confused with

chronic obstructive pulmonary disease (COPD), or can occur in the form of atypical symptoms leading to its under-diagnosis and under-treatment (14, 16, 18-20). It can be also due to the false perceptions of symptoms by both patient and physician (21) as explained by its long standing asthma adaptation process and the possibility of its impaired awareness of bronchial constriction. In other cases, there is a situation of concurrent "chronic bronchitis and/or emphysema" (22). In effect, an estimated prevalence of untreated asthma in UK amongst older adults was about 1.7% to 2.2%, which emphasizes even further the dimension of this problem (23,24) The scenario is even worse if one takes into account the impact of asthma on mortality (25). Asthma in the elderly may include individuals who acquired the disease in childhood or adolescence, with disease progression over time or with remissions and relapses (long-term elderly asthmatics) but it may also include patients whose disease began in late adulthood or after 65 years of age (late-onset asthma). These patients who are older than 65 years of age tend to have more frequent irreversible obstruction of the airways, when compared with younger asthmatic patients (26, 27). Nevertheless, although very few studies have addressed this issue, atopy seems to be less common among those with late onset asthma (11). According to all available data in Europe and Portugal there is a need for better characterization of asthma, both in epidemiological and in clinical terms in elderly patients, who constitute an increasing proportion of asthmatic patients. In Portugal, there is a recognized lack of information about the features of asthma in the older population. In order to fill this gap, the aim of the current study was to analyze and compare the prevalence, clinical features, allergen sensitization pattern and risk factors for allergic asthma between young and elderly adult patients.

MATERIALS & METHODS

1. Study Design and Sample Selection

This was a cross-sectional study with a target population composed of two groups of patients: elderly (aged 65 years or older) and young adults (aged between 18-35 years) living in the Covilhã area. The sample was random simple, obtained by randomization of 3 General Practitioners' patient lists at Covilhã Health Care Centre. In order to obtain a 95% confidence interval and an acceptable margin of error of 5%, around a prevalence estimate of 15% and 10%, respectively, 490 young adults and 750 elderly volunteers would have to be recruited. To allow for an expected 60% response rate in young adults and an 80% response rate in the elderly, a total of 1755 volunteers (938 young adults and 817 elderly volunteers would have to be recruited). From these we have, thus far, been able to randomise a 735 young adult and 725 elderly individuals from each group, for a total number of 1460 volunteers. This study was approved by the Ethics Committee of Castelo Branco Sub-Regional Administration.

2. Patient recruitment

Volunteers were invited to participate in the study by phone and by letter. If volunteers refused to participate, no longer lived in Covilhã area, if it was impossible to contact them using all available means or if they had died, a sequential methodology of selection was followed. Based upon the list of the original randomization, we contacted the volunteer placed immediately after on the original recruitment list. All volunteers were studied at Covilhã Health Care Centre, after having signed a written informed consent based on Helsinki Declaration (Appendix 1).

3. Questionnaire

All volunteers filled in a standardised questionnaire (Appendix 2) about signs and symptoms of atopic allergic diseases, particularly bronchial asthma, and which also included some demographic information, concurrent illnesses and treatments, as well as exposure to various triggers, residential and occupational history, so that risk factors for asthma and atopy could be studied. Volunteers who could not fill in or read the questionnaire by themselves, were helped by one of the investigators. The questionnaire included several questions regarding the possible presence of asthma. A brief personal history of atopy was also included in the questionnaire, with special emphasis on information about the most important potential risk factors for the development of asthma, such as occupational history, hobbies, the characteristics of the residence (rural or urban or city, existence of fitted carpets, animal pets inside or outside home), smoking habits and family history of allergy/atopy. All clinical symptoms and risk factors taken into consideration are in agreement with the list of risk factors for asthma as accepted by the American Thoracic Society (ATS) and Global Initiative for Asthma (GINA).

Some of the volunteers could not come to the Health Care Centre and were contacted by telephone in order to answer a brief questionnaire of whether they had any atopy-related symptom, including asthma symptoms.

4. Definition of bronchial asthma and allergic bronchial asthma

For our study, a diagnosis of bronchial asthma was accepted when volunteers self-reported in the questionnaire the repetitive occurrence of the following symptoms: wheezing, shortness of breath, coughing bouts or dyspnoea (after exercise or not),

within the previous 12 months. Cold and flu as a source of such symptoms had been excluded in each case. A diagnosis of asthma was also accepted in the case of volunteers who had a previous physician-based diagnosis of asthma or who were on medication for asthma.

Allergic bronchial asthma was accepted when patients had criteria for self-reported asthma, in association with positive skin tests.

5. In vivo analysis of atopy (skin-prick tests)

Cutaneous allergy tests (appendix 3) were carried out using the prick technique. A battery of 14 allergens and allergen mixes was used, which includes the 35 most common aeroallergens in the region of Covilhã: house dust mites (*Dermatophagoides pteronyssinus*, *Dermatophagoides farinae)*, tree pollens (olive tree, birch), cereal pollen mix, grass pollen mix, weed pollens, *Parietaria judaica*, fungi (*Aspergillus* species, *Cladosporium* species, Mucor, *Alternaria alternata*), cat epithelium and dog epithelium. Histamine 10 mg/ml was used as positive control, and allergen extract diluent was used as a negative control. The anterior, volar, surface of the forearms was disinfected with 70% alcohol, and a small drop of each allergen extract and controls was placed upon the skin, at previously marked sites. Allergen drops were placed 3 cm away from each other, to avoid potential merging of adjacent positive reactions. In order to allow penetration of allergen extracts and controls into the dermis, drops were pricked through with a plastic sterile lancet with 1.5 mm tip (Stallerpointes; Stallergenes). Local reactions were read after 15 minutes, using a standardised ruler that measures mean weal diameters. Weal reactions larger than 3mm, with a concurrent negative control of less than 2mm of diameter and a histamine weal of at least 3mm were regarded as

positive. In the case of a discrepant or dubious result, skin prick tests were either repeated on the same day or subsequently, or the test was not validated. Volunteers who were on anti-histamines or on tricycle anti-depressants or who were applying topical corticosteroids on the skin were rescheduled after having suspended medication for at least 3 days (7 days, in the case of cetirizine).

6. Statistical analysis

Collected data was analyzed in terms of absolute and relative frequencies of each variable studied (descriptive statistics) using SPSS version 17. Sub-sequential comparison of asthma prevalence between the two population groups (elderly and young adults) was performed using Chi-square test ($\chi 2$). Mann-Whitney U test was used for non-parametric inter-group comparison of quantitative data. Associated asthma risk factors were studied by univariate regression analysis, followed by binary logistic regression. A p value of less than 0.05 was regarded as statistically significant.

RESULTS

Patient recruitment

A total sample of 1460 volunteers (735 young adults and 725 elderly) were randomly recruited. Of these, 525 were contacted by post and 986 by telephone. Only 10.5% of those contacted by letter replied and had, therefore, to be contacted by phone. Only 27.6% of the selected elderly volunteers and 14.1% of the young volunteers were studied at the Health Care Centre (Figure 1).

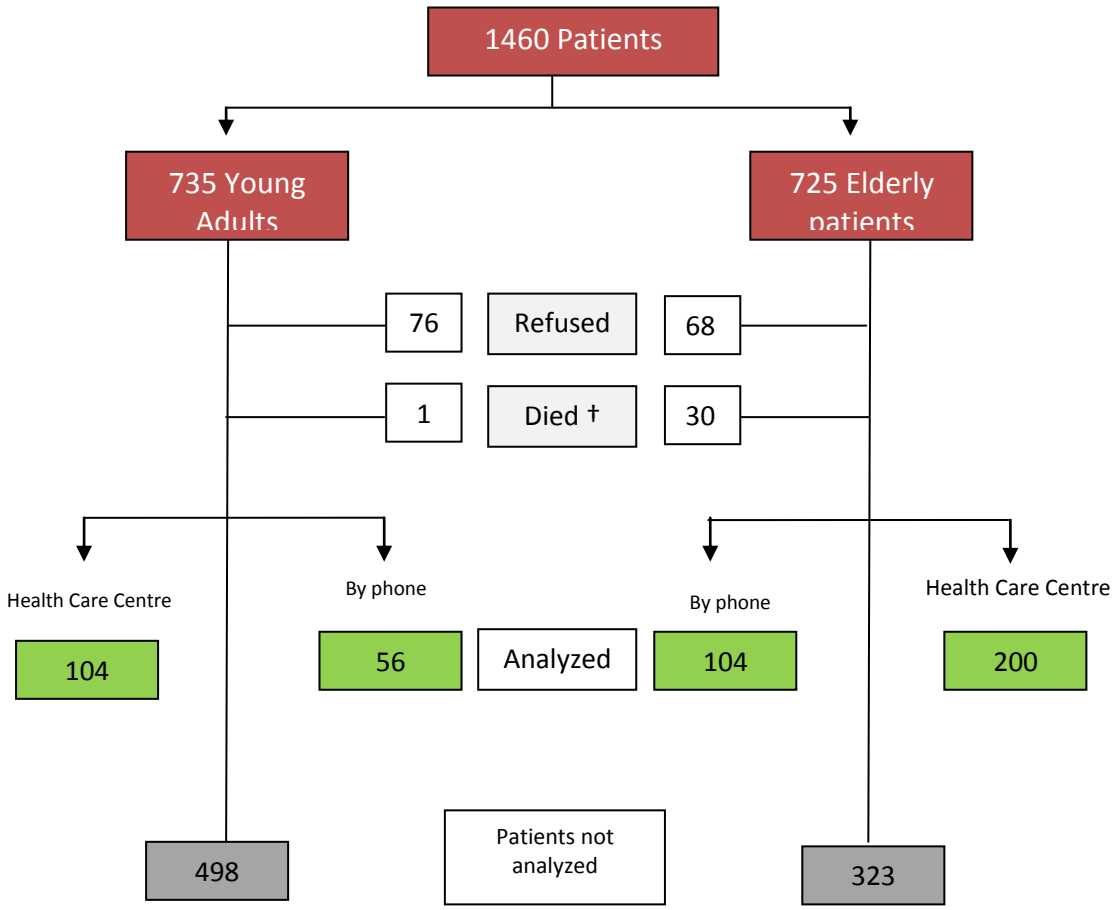

Figure 1. Flow chart showing patient selection process.

The demographic data of the volunteers from the two groups under study are shown in Table I.

Table I – Demographic characterization of elderly and young patients.

		Young Adults		Elderly	
		Health Care Centre (n=104)	Phone	Health Care Centre (n=200)	Phone
Age	Maximun	35	34	95	94
	Minimum	18	18	65	65
	Mean	28.2	27	73.3	79.5
	Median	29	27	73	72
Gender	Male	46 (44.2)	27 (48.2)	83 (41.5)	52 (50.0)
	Female	58 (55.8)	29 (51.8)	117 (58.5)	52 (50.0)
Characteristics		Health Care Centre n(%)			
Residence	City	88 (84.6)		161 (80.5)	
	Rural	10 (9.6)		34 (17.0)	
	No answer/Not valid	6 (5.8)		5 (2.5)	
Graduation	Without	0 (0)		31 (15.5)	
	Basic	17 (16.3)		126 (63.0)	
	Highschool	47 (45.2)		32 (16.0)	
	Universitary	38 (36.5)		11 (5.5)	
	No answer/Not valid	2 (1.9)		0 (0)	
Social Class	A	18 (17.3)		16 (8.0)	
	B	16 (15.4)		27 (13.5)	
	C1	22 (21.2)		23 (11.5)	
	C2	10 (9.6)		46 (23.0)	
	D	13 (12.5)		63 (31.5)	
	E	13 (12.5)		18 (9.0)	
	No answer/Not valid	1 (1.0)		7 (3.5)	

A-Upper Middle class; B- Middle Class; C1-Lower Middle Class; C2-Skilled Working class; D-working Class and E-Those at the lower level of subsistence

As previously mentioned, in those cases in which volunteers could not come to the Health Care Centre, only a simplified form of the standardised questionnaire was applied by phone. This took place in 14.3% of the elderly volunteers and in 7.6% of

young volunteers. Thus, a total of 41.9% elderly volunteers and 21.8% of the young adults were included in data analysis (Figure 1).

Elderly patients suffered from a wide variety of diseases. According to the Internationl Classification of Diseases (ICD-10) classification, the most important co-morbilities affecting elderly patients were Endocrine, Nutritional and Metabolic diseases (disorders of thyroid gland – 6%; diabetes mellitus – 14.5% and disorders of lipoprotein metabolism – 14%) and diseases of the Circulatory System (arterial hypertension – 37.5%; ischaemic heart disease – 10%). This group of patients was poly-medicated and drugs frequently included Angiotensin Converter enzyme inhibitors (ACEI) (18% of elderly patients).

Comparative prevalence of bronchial asthma in young and elderly patients

We first compared the prevalence of bronchial asthma between both groups under study, using the clinical information obtained from the questionnaire.

Taking into account only the patients that went to the Health Care Centre, we found a prevalence of asthma in the elderly group of around 26.5% and, in the young adult group, of 40.4%, a difference which was statistically significant ($p=0.019$; Chi-square test). Through the brief questionnaire by telephone we found 7 elderly and 5 young adult volunteers meeting the criteria for having asthma. Thus, taking into account the patients that went to the Health Care Centre and who answered the questions by phone, we estimated an overall prevalence of asthma in the older group of around 19.7% and in the younger group to be around 29.4%, thereby showing that asthma was significantly less prevalent in the elderly group ($p=0.02$; $\chi 2$ test).

We next compared the demographic characteristics of asthmatic groups (gender, social class and residence), tobacco habits and household characteristics (presence of carpets and animals) (Table II). In both groups, asthma was more prevalent in females and in volunteers who live in the city. Curiously, a high proportion of asthmatic young adult were current smokers.

Table II - Relevant demographic information, tobacco habits and household characteristics in asthmatic patients**.**

		Asthmatic Young Adults (total number=42) (%)	Asthmatic Elderly Patients (total number=53) (%)
Genre	Male	17 (40.5)	18 (34.0)
	Female	25 (59.5)	35 (66.0)
Social Class*	High	26 (61.9)	21 (39.6)
	Low	15 (35.7)	27 (50.9)
	No answer/not valid	1 (2.4)	5 (9.4)
Residence	City	34 (81.0)	41 (75.9)
	Rural	3 (7.1)	12 (22.6)
	No answer/not valid	5 (11.9)	0 (0)
Tabaco Habits	Current smokers	18 (42.9)	2 (3.8)
	Ex-smokers	3 (7.1)	9 (17.0)
	No smokers	21 (50.0)	42 (79.2)
Carpets	In household	2 (4.8)	11 (20.8)
	In bedroom	1 (2.4)	5 (9.4)
	No answer/not valid	0 (0)	1 (1.9)
Animals	In household	18 (42.9)	14 (26.4)
	Outside	11 (26.2)	16 (30.2)
	No answer/not valid	1 (2.4)	0 (0)

***Social Class: High (A,B,C1); Low (C2,D,E)**

Clinical Features of bronchial asthma in Young Adults and Elderly patients

We next analysed whether the clinical features of bronchial asthma differed between elderly and young adult patients studied at the Health Care Centre (Table III). Elderly patients had a significantly higher prevalence of reported wheezing than young adult patients (67.9% vs 28.6%, respectively; p= 0.0002, Chi-square test), in response to a wide variety of stimuli namely physical activity. However, elderly patients had a significantly lower prevalence of self-reported exercise-induced wheezing in the past 12 months, when compared with young adult patients (0% vs 23.8%, respectively; p=0.0001, Chi-square test). No significant differences were identified between groups in terms of the prevalence of exercise-induced cough, previous diagnosis of asthma or medication usage for the treatment of this condition.

Furthermore, elderly asthmatic patients also had a significantly higher proportion of frequent (≥12) episodes of wheezing (p=0.018, Chi-square test). The elderly group also referred soap/spray and, dust as triggers for wheezing in a higher percentage than young adults (p=0.03, p=0.006, respectively, Chi-square test). Finally, we also identified significant differences in terms of seasonal distribution of wheezing symptoms, with the elderly group showing more symptoms in winter and spring.

Rhinitis is often associated with bronchial asthma, for which it is a known risk factor. We did find a high prevalence of self-reported rhinitis in asthmatic patients in our sample, but no significant differences were observed between elderly and young adult patients (78.6% vs 71.7%; p=0.48, Chi-square test).

Table III - Comparative clinical features of young adults and elderly asthmatic patients. The characteristics considered for the diagnosis of asthma are listed bellow in red.

			Young Asthmatic Adults n = 42 (%)	Elderly Asthmatic Adults n =53 (%)	*p* value*
Wheezing			12 (28.6)	36 (67.9)	0.0002
Wheezing	Number of episodes	1 to 3	7 (16.7)	17 (32.1)	0.1007
		4 to 12	4 (9.5)	8 (15.1)	0.6164
		more than 12	1 (2.4)	11 (20.8)	**0.0180**
	Triggers	Polens	7 (16.7)	15 (28.3)	0.2250
		Tabaco	9 (21.4)	17 (32.1)	0.3543
		Other smokes	1 (2.4)	3 (5.7)	0.7825
		Emotions	4 (9.5)	14 (26.4)	0.0683
		Clothes	3 (7.1)	2 (3.8)	0.7888
		Medication	1 (2.4)	1 (2.3)	0.5801
		Soap/Sprays	1 (2.4)	10 (18.9)	**0.0299**
		Dust	8 (19.0)	23 (43.4)	**0.0154**
		Foods	0 (0)	2 (3.8)	0.5801
		Animals	4 (9.5)	2 (3.8)	0.4717
		Work	3 (7.1)	5 (9.4)	0.9748
		Exercise	6 (14.3)	15 (28.3)	0.1366
	Interference with daily activities	1 to 3	0 (0)	4 (7.5)	0.1920
		4 to 12	0 (0)	2 (3.8)	0.5801
		more than 12	0 (0)	0 (0)	———
	Frequence of symptoms	All year	5 (11.9)	14 (26.4)	0.1342
		Winter	4 (9.5)	16 (30.2)	**0.0278**
		Spring	9 (21.4)	22 (41.5)	**0.0483**
		Summer	6 (14.3)	1 (1.9)	0.0572
		Autumn	2 (4.8)	9 (17.0)	0.1271
After Exercise		Wheezing	10 (23.8)	0 (0)	0.0002
		Cough	29 (69.0)	27 (50.9)	0.0943
Diagnosed Asthma			8 (19.0)	15 (28.3)	0.3418
Visits to emergency department with asthma attacks			6 (14.3)	9 (17.0)	0.7834
Present medication for asthma			3 (7.1)	6 (11.3)	0.7356
Regular asthma treatment			3 (7.1)	5 (9.4)	0.9748
Concomitant rhinitis			33 (78.6)	38 (71.7)	0.4440
Family atopy			9 (21.4)	19 (35.8)	0.1258

***** chi-square test with/out yates' correction

Comparative prevalence of atopy in young and elderly asthmatic patients

Skin-prick test results were validated in 287 volunteers (188 from elderly volunteers and 99 from young adult volunteers), 16 were inconclusive and 10 volunteers did not undergo skin testing.

The percentage of elderly asthmatic volunteers with positive skin tests (patients with atopic bronchial asthma) was significantly lower than that of young asthmatic volunteers (32.1% versus 57.1%, respectively; p=0.02; $\chi 2$, test), suggesting that atopic allergic bronchial asthma is also less prevalent in the elderly population.

Patterns of allergen sensitization in young and elderly asthmatic patients

We next analysed whether elderly and young adult patients with atopic bronchial asthma differed in terms of sensitisation profiles to aeroallergens.

The majority of the atopic asthmatic patients were sensitised to more than one allergen in both groups of patients. The median number of allergens that young adult asthmatic patients were sensitized to was 4 (minimum of 1 and maximum of 12) and 2 for elderly asthmatic patients (minimum of 1 and maximum of 6), showing a trend for significance (p=0.055, Mann-Whitney U test).

We subsequently analysed whether there were any differences in the magnitude of the weals associated with positive responses to aeroallergens in SPTs between elderly and young adult patients with atopic bronchial asthma. Elderly patients had significantly lower median weal diameter values than young adult patients, in terms of responses to *Dermatophagoides pteronyssinus*, weed and grass pollens (p=0.019; p=0.025; p=0.042, respectively; Mann-Whitney U test).

The sensitization pattern for elderly asthmatic volunteers was 47.1% for *Dermatophagoides pteronyssinus*, 41.2% for *Dermatophagoides farina*, Parietaria Judaica and for Fungus. By contrast, the sensitisation pattern in young adults was 79.2% for *Dermatophagoides pteronyssinus*, 70.8% for grass pollens *and* 45.8% for *Dermatophagoides farinae and tree pollen*s. Comparative analysis of the global sensitization patterns with all the allergens taken into account between both groups of volunteers (Table IV) was not significant (p = 0.85; Chi-square test with Yates' correction). Nevertheless, we found a significant difference between the groups of elderly and young patients in terms of sensitization to grass pollens (70.8% vs 11.8, respectively; p=0.0006, chi square test).

Table IV - Pattern sensitization to different allergens in Young and Elderly asthmatic patients.

Allergens		Young Adults (n=24)	Elderly (n=17)
D. *Pteronyssinus*		19	8
D. *Farinae*		11	7
Pollens	Trees	11	3
	Cereal	7	2
	Grass	17	2
Weed	*Parietaria Judaica*	8	7
Fungus		11	7
Cat *Epithelium*		3	0
Dog *Epithelium*		4	2

Analysis of risk factors for asthma in young and elderly asthmatics

We next analysed each asthma risk factor through univariate regression, considering the presence of asthma as the dependent variable and each risk factor alone (sex, rural or urban residence, social class, smoking habits, carpets or animals at home, family history of atopy, personal history of rhinitis and positive skin-prick tests) as independent variables. We only found a significant relationship between the presence of asthma and concurrent rhinitis, in both groups of asthmatic patients (p=0.010 for young adults, and p=0.037, for elderly adults).

We then analysed the results using binary logistic regression, for which we used the presence of asthma as a dependent variable and the most relevant risk factors mentioned before as independent variables. Based upon univariate analysis, we regarded the presence of rhinitis as the main independent variable for logistic regression analysis. However, in the elderly group of patients, logistic regression analysis did not confirm rhinitis as a risk factor in this model. By contrast, gender fitted the model, with being a woman significantly associated with for the presence of asthma asthma (p=0.017) (Table V). By contrast, in the group of young adult patients, logistic regression showed a trend for a positive association between having concurrent rhinitis and the presence of asthma (p=0.054), potentially confirming the results from univariate analysis (Table VI).

Table V – Binary logistic regression for elderly patients with asthma as a dependent

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Sex	-1,289	,540	5,690	1	**,017**	,275
	Social_class	,711	,416	2,920	1	,087	2,035
	Residence	-,417	,525	,633	1	,426	,659
	Smoking_habits	,454	,299	2,308	1	,129	1,575
	Carpets_in_household	,643	,588	1,193	1	,275	1,901
	Carpets_in_bedroom	-,666	,799	,694	1	,405	,514
	Animals_in_household	-,053	,418	,016	1	,900	,949
	Animals_outside_household	,021	,435	,002	1	,962	1,021
	Atopy_family	,264	,422	,391	1	,532	1,302
	Rhinitis	,703	,422	2,780	1	,095	2,020
	TCA_positive	-,079	,399	,039	1	,844	,924
	Constant	-1,262	,716	3,108	1	,078	,283

a. Variable(s) entered on step 1: Sex, Social_class, Residence, Smoking_habits, Carpets_in_household, Carpets_in_bedroom, Animals_in_household, Animals_outside_household, Atopy_family, Rhinitis, TCA_positive.

Table VI – Binary logistic regression for young adult patients, with asthma as a dependent variable.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Sex	-,225	,494	,207	1	,649	,799
	Social_class	,208	,503	,170	1	,680	1,231
	Residence	-,747	,966	,598	1	,439	,474
	Smoking_habits	-,297	,371	,641	1	,423	,743
	Carpets_in_household	-1,810	1,189	2,319	1	,128	,164
	Carpets_in_bedroom	,475	1,622	,086	1	,770	1,607
	Animals_in_household	,210	,541	,151	1	,698	1,234
	Animals_outside	,000	,656	,000	1	1,000	1,000
	Family_atopy	,717	,637	1,269	1	,260	2,049
	Rhinitis	1,099	,570	3,718	1	**,054**	3,001
	TCA_positive	-,523	,517	1,024	1	,312	,593
	Constant	-,217	1,091	,040	1	,842	,805

a. Variable(s) entered on step 1: Sex, Social_class, Residence, Smoking_habits, Carpets_in_household, Carpets_in_bedroom, Animals_in_household, Animals_outside, Family_atopy, Rhinitis, TCA_positive.

Calculation of odds ratios for the detected risk factors for asthma showed that being a woman didn't increase the risk of having asthma, in the group of elderly adults, whereas the presence of rhinitis augmented the risk of having asthma 3.2 times, in the group of young adults (Table VII).

Table VII. Assessment of magnitude of risk factors for asthma in groups under study

Risk factor	Group for which it applies	Odds ratio	95% confidance interval
Gender (female gender)	Elderly adults	0.649	[0.337; 1.249]
Rhinitis	Young adults	3.222	[1.323; 7.847]

DISCUSSION

In this study, we showed that the prevalence of bronchial asthma, both global and atopic, was lower in elderly individuals than in young adults. Furthermore, we identified differences in clinical manifestations of asthma, sensitisation patterns to aeroallergens and risk factors for asthma between these two groups of individuals.

Our survey described a significantly lower overall prevalence of bronchial asthma in the elderly group, in comparison with young adults (19.7% vs 29.4%). Several factors may explain this observation. Firstly, this lower prevalence may be due to the phenomenon of immunosenescence, which is directly related to the ageing process and may underlie a lower reactivity to antigens and other triggers in elderly people (28, 29). Alternatively, elderly individuals may be more susceptible to under-diagnosis and under-treatment of this condition, not only because other possible medical conditions that may be confounding factors, but also because of the patients´ lack of awareness regarding their symptoms, thereby reducing the capacity to fully assess its true prevalence in this age group (14, 16, 18-22).

Curiously, although, overall, bronchial asthma was significantly less prevalent in the elderly, self-reported wheezing and number of its episodes, was significantly more prevalent in elderly asthmatic patients than in the young adult group. However, wheezing may be a symptom with relatively low specificity, as demonstrated in other studies that addressed the issue of the validity of asthma questionnaires (30). In fact, various types of entities other than bronchial asthma may account for a higher prevalence of self-reported wheezing in elderly patients. Such entities may include heart problems, chronic bronchitis and emphysema (14, 16, 18-22), among other, which are

more prevalent in elderly people and which may, therefore, have been confounding factors in our study. On the other hand, the increased number of wheezing episodes in the elderly may be explained in terms of a higher degree of asthma severity in older patients in our study, which was not assessed in our questionnaire. In fact, although there were no significant differences in terms of visits to emergency units due to bouts of asthma between the two groups under study, our questionnaire was not designed to assess daily control and severity of asthma symptoms. Furthermore, although there were no significant differences in terms of asthma medication usage between elderly and young adults, our questionnaire did not assess frequency of usage or dosages being used, namely in terms of topical corticosteroids. Therefore, we cannot exclude the possibility that elderly patients had more severe or more persistent asthma than younger patients, as has been demonstrated in other studies in elderly asthmatics (31), although it is most likely that most cases consisted of mild intermittent asthma. By contrast, we found that elderly patients had a lower prevalence of exercise-induced wheezing. However, this was most likely due to the fact that elderly people tend to exercise less than younger people.

The overall figure for the prevalence of asthma we detected in elderly people (19.7%) falls within the broad range seen across different studies carried out in other countries (11-16). Such broad range is most likely due to the different methods used for the detection of bronchial asthma. This fact is even further complicated by the fact that asthma, particularly in advanced ages, does not have enough sensitive and specific diagnostic criteria, which makes its diagnosis even more complex (12, 29). In our study, our questionnaire had validated questions for the detection of bronchial asthma. However, we cannot exclude the possibility that there may have been memory bias with

such approach, as happens with questionnaire-based approaches. In this regard, it would have been important to perform lung function tests (peak flow meter recordings twice daily, for 14 days or spirometry) to confirm the presence of bronchial asthma. In addition, it would have been interesting to further characterise asthma in terms of disease severity (in the case of patients on medication for asthma) and disease control (in the case of non-medicated patients). However, that was not the primary aim of our study and, as such, the questionnaire was not designed to address this issue.

Although a relatively high proportion of volunteers (either elderly or young adult) had self-reported asthma symptoms, very few stated that their symptoms interfered with their daily activities, thereby suggesting that most cases possibly consisted of mild asthma. In fact, only a minority of patients with self-reported bronchial asthma had ever been to an emergency department due to an asthma attack. Furthermore, only a minor proportion of patients were on medication for their asthma. This could have been due to under-treatment or under-diagnosis. However, when analysed in conjunction with the fact that very few patients reported interference with their daily activities, this further supports the notion that most cases of bronchial asthma in the samples under study were mild. Nevertheless, it should state that 100% of patients who declared that bronchial symptoms did interfere with their daily lives were elderly.

Rhinitis is often associated with bronchial asthma. In our survey, we did find a high prevalence of self-reported symptoms of rhinitis in both elderly and young adult asthmatic patients, but without significant differences between them. Prior studies also found a concurrence of asthma and rhinitis, with a reported prevalence of up to 100% in those with allergic asthma (7). It has been reported in other surveys that many of the

allergic asthmatic patients develop allergic rhinitis early in life and bronchial asthma later in life, which can be considered a disorder of a single airway (33).

In order to analyse the prevalence of allergic asthma within our study groups, we performed skin tests with a validated battery of aeroallergens. We found a prevalence of atopic asthma in elderly patients of about 32.1%, which was significantly lower than that in young adults. In other previous studies it has been acknowledged that atopy amongst elderly patients can vary from 13% to 40% (34, 35), although the cases of atopic allergic asthma (extrinsic asthma) in the elderly tend to be less frequent than the non-allergic ones (intrinsic asthma) (4, 36). Curiously, elderly patients in our study more frequently reported aeroallergens as specific triggers for their wheezing episodes than young adults, although this may have been due to information/memory bias or to the fact that young patients tend to be more dismissive of their symptoms and related triggers.

Although we did not identify different sensitisation patterns between elderly and young adult asthmatic patients, the overall burden of sensitisation to aeroallergens showed a trend for significance, with elderly patients apparently less frequently sensitised to aeroallergens. In addition, the size of weals in response to skin prick testing with aeroallergens was significantly lower in elderly patients. This may be due to a true decrease in reactivity to antigens, due to the phenomenon of immunosenescence (28, 29). Alternatively, it may also be due to the fact that medication may interfere with SPT responses. We do not believe that this may be ascribed to more elderly patients being on anti-histamines or tricyclic anti-depressants since such patients had their SPTs rebooked for a period when they were off such medication. However, we

cannot exclude the possibility that underlying concurrent disease states may have contributed to a lower cutaneous reactivity.

We also analysed the patterns of sensitization to aeroallergens in both study groups. The strongest sensitisation, for both groups, was to *Dermatophagoides pteronyssinus*. We found significant differences between both groups in terms of grass pollen sensitisation, with elderly patients being less sensitised. This statement is in agreement that both elderly and young adult patients were predominantly sensitised to indoor allergens such as house dust mites but fewer elderly patients were sensitised to outdoor allergens such as weed, tree or grass pollens. Our results are in agreement with the fact that elderly patients spend more time at home, having less contact than young adults with outdoor allergens. Our results are in partial contradiction with those from another Portuguese study also carried out with elderly (older than 65 years) asthmatic patients, which documented a sensitisation pattern that was very similar to what had been reported in other ages (17). Two main reasons may account for the difference in results between this study and our own. Firstly, cumulative exposure patterns to aeroallergens may be different between elderly people living in coastal areas (as happened in the other study) and those living inland (as in our study). Alternatively, differences in the results between the two studies may simply be due to the fact that the batteries of aeroallergens used for SPT were different.

Studying risk factors for the development of asthma is very important. We therefore decided to analyse whether there were any differences in risk factors for asthma between elderly and young adults. We did identify gender as a significant risk factors for asthma in elderly but not in young adult patients. In this regard, bronchial asthma was more prevalent in females (70% in elderly). However, this effect was no

longer observed when we only considered cases of allergic bronchial asthma. In any case, gender differences related to the prevalence of bronchial asthma have been described in other studies, in younger samples of patients, not only with respect to its prevalence but also to its morbidity and severity (37, 38). Nevertheless, the most probable cause for gender having been detected as a risk factor in the group of elderly patients in our study was the fact that such group of patients had a clear predominance of women, which may have biased the results. The odds ratio calculated for female gender was less than 1, so we consider that being female is not a risk for having asthma. Nevertheless, other causes may have been relevant. In fact, at least during childhood, asthma is more prevalent in boys than in girls but this tendency changes during puberty (39, 40). Hormonal status has been invoked as one of the factors most likely to be able to differentially influence the risk of asthma occurrence (40); in addition, sex differences in the rate of lung growth and in the airway size have been suggested as a potential alternative explanation (38, 39). In older age, due to unknown causes, this trend changes again with males being affected in greater proportion (40). However, this does not explain the fact that gender was not detected as a risk factor for young adult asthmatic patients. This may have been due to the smaller size of the sample of young adult asthmatic patients, which may have made the study less sensitive in terms of detecting such a difference. Alternatively, this may be due to a cohort effect, with gender differences being observed as a result of cumulative years of exposure to environmental triggers for asthma. Finally, gender may be a more significant risk factor for non-allergic than for allergic asthma and elderly patients more frequently had non-allergic asthma than young adult asthmatic patients.

Curiously, although, as mentioned before, rhinitis was highly prevalent among both elderly and young adult patients and it was detected as a significant risk factor in the univariate analyses for bronchial asthma in both groups. However, when the interference from other risk factors were analysed together by logistic regression, it became apparent that rhinitis was not significantly associated with asthma in elderly patients. However, it still showed a trend for significance (p=0.054) in young adult asthmatic patients, thereby showing the consistency of the model. Various reasons may account for the presence of rhinitis being a risk factor for asthma only in young individuals. Firstly, allergic rhinitis has been described as a significant risk factor for allergic bronchial asthma, but no such effect has been firmly described in terms of non-allergic rhinitis and bronchial asthma. Since significantly more young adults than elderly patients were atopic, such relationship between allergic rhinitis and allergic bronchial asthma may have been more easily observed in the former than in the latter group. Secondly, although the prevalence of rhinitis was similar between both groups, fewer elderly patients had allergic rhinitis. In fact, the high prevalence of rhinitis seen in the group of elderly patients may have been due to old age-related rhinitis, which has a high prevalence in the elderly (41), which may have been a confounding factor.

Our study has some limitations regarding different steps of the investigation. Firstly, although the sample selection was selected in a random fashion from three medical archives, lack of or non-updated information in the archives (regarding addresses and telephone numbers) forced us to look for frequent sequential replacements. Secondly, overall response to recruitment letters and phone calls was low, which may have produced a selection bias, making it more likely that only people who identified themselves with the problems addressed by the study (bronchial asthma

and other allergic diseases) would want to come to the Health Care Centre. This might lead to a potential asthma over-diagnosis. Thirdly, being forced by circumstances to use different recruitment approaches, by letter or by phone, made the recruitment process non uniform. The information obtained by telephone, using a brief questionnaire, found a very low prevalence of asthma amongst both groups of patients. Considering that people who suffer from asthma or allergic diseases were more receptive to participating in this kind of study, these brief questionnaires allowed us to reduce that bias, in spite of the low number of contacted patients. Furthermore, elderly patients tended to more easily accept being recruited to the study than young adults, probably because of more frequent worries concerning their health or due to the fact that young adults tend to be more dismissive of their symptoms and are also more frequently busy and working. We may also have had an information and memory bias, particularly in the case of elderly patients. Another important point is that we only studied self-reported asthma and not spirometry- or peak flow meter-diagnosed asthma. This fact may have been associated with some information bias since some of the symptoms accepted for the diagnosis of self-reported may not be sensitive enough, such as wheezing. Furthermore we did not characterise bronchial asthma in terms of disease severity or control or in terms of early- or late-onset, which might have enriched our results.

Finally, we should also mention that since this study has not been fully completed, it may be currently underpowered to detect some differences between the two groups under study and all generalizations must be extrapolated with caution.

However, we must also stress that our study has many strong points. Firstly, it is a randomised study. Secondly, both groups were initially paired, in terms of gender. Thirdly, our approach also involved skin prick tests and not just a questionnaire, thereby

allowing us to draw firmer conclusions regarding the presence of allergic bronchial asthma. Fourthly, although the criteria for the diagnosis of asthma that were questionnaire-based may have had low specificity and sensitivity (such as wheezing), they were not analysed simply on their own but also in terms of the full set of criteria for the diagnosis of this type of pathology. In addition, a proportion of the diagnoses were also based upon a medical diagnosis of asthma. In addition, our study may be used as a reference point for the current situation of bronchial asthma among elderly patients.

In summary, our study showed that elderly patients are less affected by overall (atopic plus non-atopic) bronchial as well as by atopic asthma, when compared with young patients. There were different sensitisation patterns to aeroallergens. In addition, differences in risk factors for asthma were also detected, with gender being a risk factor in elderly patients and concurrent rhinitis in young adult patients.

FUTURE PROSPECTS

This study is only a preliminary research. In the future we will analyse more volunteers at the Health Care Centre, with the aim of collecting the information necessary to extrapolate our findings with confidance to the population of Cova da Beira. Moreover, we will also confirm SPT results using a validated screening tool for the presence of atopy – Phadiatop, which detects allergen-specific IgE in serum. Finally, detected patients with asthma will be further studied using spirometry, and also classified in terms of severity and control. Their medication will also be thoroughly assessed.

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APPENDIX

Página

Appendix 1 – Informed Consent Form

FOLHA DE INFORMAÇÃO DOS VOLUNTÁRIOS

(conforme "Declaração de Helsinquia", da Associação Médica Mundial, 1964)

A alergia é uma reacção exagerada do sistema imunitário ao contacto com proteínas comuns do meio ambiente que, na maior parte das pessoas, não provocam reacção. Pode manifestar-se, entre outras doenças, por asma, rinite, conjuntivite ou dermatite atópica.

Como é importante saber a percentagem de pessoas na região da Beira Interior que têm alergias, levamos a cabo o presente estudo, desenvolvido pela Universidade da Beira Interior, para o qual agradecemos a sua participação.

Para o estudo necessitamos da sua colaboração, através do preenchimento de um questionário, da realização de testes cutâneos de alergia e ainda da colheita de uma pequena quantidade de sangue (20 ml).

Os testes cutâneos de alergia são uma técnica muito segura, frequentemente usada. Consistem na colocação de uma pequena gota de proteínas do ambiente no antebraço. Uma lanceta com uma ponta de 1mm é então usada para introduzir a gota na pele. Caso haja alergia formar-se-á uma pequena pápula associada a alguma comichão, que desaparecem passado pouco tempo.

A colheita de sangue é uma técnica de rotina, sem riscos, que acarreta um desconforto mínimo.

Os testes e a colheita de sangue serão efectuados por médicos com vasta experiência.

Este estudo poderá ajudar esclarecer melhor a frequência e tipo de doenças alérgicas na região da Beira Interior.

Caso assim o deseje, poderá recusar participar neste estudo a qualquer altura, sem que isso prejudique os seus direitos em termos de assistência hospitalar.

Os resultados deste estudo poderão ser consultados pelos responsáveis científicos do projecto de investigação e ser publicados em revistas científicas. No entanto, os dados de carácter pessoal serão mantidos confidenciais.

ESTUDO DA PREVALÊNCIA DE ATOPIA NUMA POPULAÇÃO DE IDOSOS E ADULTOS JOVENS.

Eu, abaixo assinado (nome completo do voluntário)

_____,
compreendi a explicação que me foi fornecida acerca do meu caso clínico e do método ou tratamento que se tenciona instituir, tendo-me sido dada a oportunidade de discutir e fazer as perguntas que julguei necessárias.
Por isso, consinto que me seja aplicado os métodos propostos para o estudo actual.

Data: ____/___/_____
Assinatura: _____

Testemunha (caso haja)
Data: ____/___/_____
Assinatura: _____

Eu, abaixo assinado, _____, investigador responsável, certifico que foram postas à disposição, informações respeitantes ao estudo supracitado, "de modo simples, inteligível e leal", conforme o disposto no Decreto-Lei nº 97/94, de 09 de Abril.

Data: ____/___/_____
Assinatura: _____

Questionário sobre alergias

Dados Pessoais

Nome: _____

Morada:_____

Telefone _____

Contacto Preferencial:_____

Contacto Alternativo:_____

✂----------

Questionário sobre alergias

Data __ / __ / 2008

Sexo: Feminino ❑ Masculino ❑

Local de residência:_____

Locais onde viveu anteriormente:_____

Data de Nascimento:

Local de Nascimento:_____

Habilitações Académicas:

Ensino Básico ❑

Ensino Secundário ❑

Ensino Universitário ❑

1. Questionário Sobre Asma

- Todas estas perguntas se referem a situações em que não está constipado/a ou com gripe -

1.1 Alguma vez teve pieira ou 'gatinhos no peito'?

Sim ❑ Não ❑

Se respondeu "Não", por favor passe à pergunta 1.9

1

Questionário sobre alergias

1.2 Nos últimos 12 meses, teve "gatinhos" ou "pieira" no peito?

Sim ❑ Não ❑

1.3 Nos últimos 12 meses, quantas vezes teve "gatinhos" ou "pieira" no peito?

Nenhuma ❑
1 - 3 ❑
4 – 12 ❑
Mais de 12 ❑

1.4 Nos últimos 12 meses, os "gatinhos" ou "pieira" no peito foram tão graves que obrigavam a parar de falar para respirar?

Sim ❑ Não ❑

1.5 Que factores agravam os seus "gatinhos" ou pieira?

O tempo ❑
Pólens ❑
Pó da casa ❑
Comidas/Bebidas ❑
Fumo do Tabaco ❑
Outros Fumos ❑
Emoções ❑
Roupa de Lã ❑
Medicamentos ❑
Sabões/Sprays/Detergentes ❑
Constipações/Gripes ❑
Animais de estimação ❑
Trabalho ❑
Exercício Físico ❑
Outros ❑
Quais?_____
_____

1.6 Nos últimos 12 meses, quantas vezes a "pieira" ou a "falta de ar" o/a impediram de fazer as suas actividades diárias?

Nenhuma ❑
1 - 3 ❑
4 – 12 ❑
Mais de 12 ❑

Questionário sobre alergias

1.7 Os seus sintomas de pieira ou falta de ar surgem:

Durante todo o ano ❑

Só em parte do ano: Inverno ❑
Primavera ❑
Verão ❑
Outono ❑

1.8 Nos últimos 12 meses quantas vezes acordou durante a noite por causa dos "gatinhos" ou pieira?

Nunca ❑
Menos de uma noite por semana ❑
Uma ou mais noites por semana ❑

1.9 Acordou alguma vez com a respiração agitada?

Sim ❑ Não ❑

1.10 Acordou alguma vez com uma opressão no peito?

Sim ❑ Não ❑

1.11 Acordou alguma vez com falta de ar?

Sim ❑ Não ❑

1.12 Nos últimos 12 meses teve tosse seca durante a noite quando não estava constipado/a ou com gripe?

Sim ❑ Não ❑

1.13 Alguma vez teve "pieira" ao respirar durante ou depois de fazer exercício?

Sim ❑ Não ❑

1.14 Nos últimos 12 meses teve "pieira" no peito ao respirar durante ou depois de fazer exercício?

Sim ❑ Não ❑

1.15 Alguma vez teve tosse seca durante ou depois de fazer exercício?

Sim ❑ Não ❑

Questionário sobre alergias

1.16 Nos últimos 12 meses teve tosse seca durante ou depois de fazer exercício?

Sim ❑ Não ❑

1.17 Alguma vez lhe foi diagnosticada asma por um médico (médico de família ou outro)?

Sim ❑ Não ❑

1.8.1 Se sim, há quanto tempo? _____

1.18 Alguma vez teve necessidade de recorrer a cuidados médicos/Serviço de Urgência por crises de asma?

Sim ❑ Não ❑

1.19 Nos últimos 12 meses quantas vezes teve necessidade de recorrer a cuidados médicos/Serviço de Urgência por crises de asma?

Nenhuma ❑
1 - 3 ❑
4 – 12 ❑
Mais de 12 ❑

1.20 Alguma vez tomou medicamentos para a asma?

Sim ❑ Não ❑

1.21 Toma actualmente medicamentos para a asma?

Sim ❑ Não ❑

1.21.1Se sim, quais? _____

_____

1.22 Anda algum médico a tratar a sua asma de forma regular?

Sim ❑ Não ❑

Questionário sobre alergias

1 Questionário Sobre Tosse e Expectoração

2.1 Alguma vez teve o peito congestionado ou tosse com expectoração?

Sim ❑ Não ❑

2.2 Nos últimos 12 meses teve o peito congestionado ou tosse com expectoração quando estava constipado/a?

Sim ❑ Não ❑

2.3 Nos últimos 12 meses teve o peito congestionado ou tosse com expectoração quando não estava constipado/a?

Sim ❑ Não ❑

2.4 Tem o peito congestionado ou tosse com expectoração a maior parte dos dias (4 ou mais dias por semana) pelo menos durante 3 meses por ano?

Sim ❑ Não ❑

2.5 Há quantos anos tem isto vindo a acontecer? ____anos

2 Questionário Sobre Rinite e Conjuntivite

- Todas estas perguntas se referem a situações em que não está constipado/a ou com gripe -

3.1 Alguma vez teve espirros, o nariz "a correr" ou o nariz tapado sem estar constipado ou com gripe?

Sim ❑ Não ❑

Se respondeu não por favor passe à pergunta 3.6

3.2 Nos últimos 12 meses teve espirros, o nariz "a correr" ou o nariz tapado sem estar constipado ou com gripe?

Sim ❑ Não ❑

3.3 Nos últimos 12 meses estes problemas de nariz eram acompanhados de ardor nos olhos e olhos a chorar?

Sim ❑ Não ❑

Questionário sobre alergias

3.4 Em qual ou quais dos últimos 12 meses é que teve estes problemas no nariz?

Janeiro	❑	Maio	❑	Setembro	❑
Fevereiro	❑	Junho	❑	Outubro	❑
Março	❑	Julho	❑	Novembro	❑
Abril	❑	Agosto	❑	Dezembro	❑

3.5 Nos últimos 12 meses quantas vezes os problemas de nariz o/a impediram de fazer as suas actividade diárias?

Nunca ❑
1 a 3 ❑
4 a 12 ❑
Mais de 12 ❑

3.6 Alguma vez lhe foram diagnosticadas alergias do nariz incluindo febre do feno ou rinite (por um médico de família ou outro)?

Sim ❑ Não ❑

3.6.1 Se sim, há quanto tempo? _____

3.7 Alguma vez tomou medicamentos para estes problemas do nariz e/ou dos olhos?

Sim ❑ Não ❑

3.8 Toma actualmente medicamentos para estes problemas do nariz e/ou dos olhos?

Sim ❑ Não ❑

3.8.1 Se sim, quais?

_____

_____

3 Questionário Sobre Eczema

4.1 Alguma vez teve manchas vermelhas na pele, que provocam "comichão", e que aparecem e desaparecem, pelo menos durante 6 meses?

Sim ❑ Não ❑

Questionário sobre alergias

Se respondeu não por favor passe à pergunta 4.6

4.2 Nos últimos 12 meses teve manchas vermelhas na pele, que provocam "comichão", e que aparecem e desaparecem, pelo menos durante 6 meses?

Sim ❑ Não ❑

4.3 Estas manchas vermelhas que provocam comichão alguma vez lhe apareceram em algum dos seguintes lugares?

Pregas da flexura dos braços ❑
Atrás dos joelhos ❑
Nos tornozelos ❑
Abaixo das nádegas ❑
Ao redor do pescoço, dos olhos e das orelhas ❑

4.4 Alguma vez estas manchas desapareceram completamente?

Sim ❑ Não ❑

4.5 Nos últimos 12 meses quantas vezes teve necessidade de se levantar durante a noite porque essas manchas lhe faziam comichão?

Nunca ❑
Menos de uma noite por semana ❑
Uma ou mais noites por semana ❑

4.6 Alguma vez teve zonas de grande secura na pele que fazem comichão?

Sim ❑ Não ❑

4.7 Nos últimos 12 meses teve zonas de grande secura na pele que fazem comichão?

Sim ❑ Não ❑

Questionário sobre alergias

4.8 Estas zonas de grande secura na pele que fazem comichão alguma vez lhe apareceram em algum dos seguintes lugares?

Pregas da flexura dos braços ❑
Atrás dos joelhos ❑
Nos tornozelos ❑
Abaixo das nádegas ❑
Ao redor do pescoço, dos olhos e das orelhas ❑

4.9 Alguma vez lhe foi diagnosticado eczema ou dermatite atópica por um médico (médico de família ou outro)?

Sim ❑ Não ❑

Se sim, há quanto tempo? _____

5. Questionário Sobre Alergias Alimentares

5.1 Alguma vez teve alergias a algum alimento?

Sim ❑ Não ❑

Se respondeu não por favor passe à pergunta 6.1

5.2 Que tipo de reacção teve?

Alergia na pele ("babas") ❑
Falta de ar no peito ❑
Inchaço nos lábios ❑
Comichão nos lábios ❑
Falta de ar na garganta ❑
Outra reacção ❑ Qual? _____
_____

5.3 Quanto tempo depois de ter ingerido o alimento é que teve a reacção?

Minutos ❑ Horas ❑ Dias ❑

Questionário sobre alergias

5.4 Que tipos de alimentos lhe causam alergias?

Frutas ❑ Quais? _____
Vegetais ❑ Quais? _____
Peixe ❑ Quais? _____
Carne ❑ Quais? _____
Marisco ❑
Leite ❑
Chocolate ❑
Ovo ❑
Outros ❑ Quais? _____

5.5 Tem algum medicamento para usar de alívio (em SOS), caso tenha nova reacção alérgica a algum alimento?

Sim ❑ Não ❑

6. Questionário Sobre Alergias a Medicamentos

6.1 Alguma vez teve alergias a algum medicamento?

Sim ❑ Não ❑

Se respondeu não por favor passe à pergunta 7.1

6.2 Que tipo de reacção teve?

Alergia na pele ("babas") ❑
Falta de ar no peito ❑
Inchaço nos lábios ❑
Comichão nos lábios ❑
Falta de ar na garganta ❑
Outra reacção ❑ Qual? _____
_____

6.3 Quanto tempo depois de ter tomado o medicamento é que teve a reacção?

Minutos ❑ Horas ❑ Dias ❑

6.4 Que medicamento(s) lhe causa(m) alergia(s)?

_____

_____

_____

7. Questionário Sobre Alergias a Venenos de Insectos

7.1 Alguma vez teve alguma reacção exagerada à picada de uma abelha ou vespa?

Sim ❑ Não ❑

Se respondeu não por favor passe à pergunta 8.1

7.2 Que tipo de reacção teve?

Inchaço muito grande no local da picada ❑
Falta de ar ❑
Borbulhas ("babas") no corpo ❑
Desmaio ❑
Outra reacção ❑ Qual? _____

_____

7.3 Quanto tempo depois de ter sido picado é que teve a reacção?

Minutos ❑ Horas ❑ Dias ❑

7.5 Tem algum medicamento para usar de alívio (em SOS), caso seja picado de novo por uma abelha ou vespa?

Sim ❑ Não ❑

8. Questionário Sobre a Profissão e Passatempos

8.1 Qual é a sua profissão? _____

8.1.1 Neste momento encontra-se:

No activo ❑ Reformado ❑

8.2 Que outras profissões teve e qual a sua duração?

Profissão	Duração

8.3 Que passatempos tem?_____

_____

_____

_____

9. Questionário Sobre a Residência

9.1 Como é a sua residência?

Apartamento em cidade ou vila ❑
Quinta ❑
Moradia em cidade ou vila ❑
Moradia em aldeia ❑
Lar em cidade ou vila ❑
Lar em aldeia ❑

9.2 A sua casa é alcatifada?

Sim ❑ Não ❑

9.3 O seu quarto é alcatifado?

Sim ❑ Não ❑

9.4 Tem animais dentro de casa?

Sim ❑ Não ❑

9.4.1 Se sim, quais?_____

9.5 Tem animais no seu quintal, jardim ou quinta?

Sim ❑ Não ❑

9.5.1 Se sim, quais? _____

Questionário sobre alergias

10. Questionário Sobre Hábitos Tabágicos

10.1 Alguém fuma regularmente dentro de sua casa?
Sim ❑ Não ❑

10.2 Alguém fuma regularmente dentro no seu local de trabalho?
Sim ❑ Não ❑

10.3 É fumador/a?
Sim ❑ Não ❑

10.3.1 Se sim:
10.3.1.1 Quantos cigarros fuma por dia? _____
10.3.1.2 Com que idade começou a fumar?_____

10.4 É Ex-fumador/a?
Sim ❑ Não ❑

10.3.2 Se sim:
10.3.2.1 Idade de início _____
10.3.2.2 Idade de Fim _____
10.3.2.3 Quantos cigarros fumava por dia? _____

11. Questionário Sobre Medicação

11.1 Actualmente toma medicamentos?
Sim ❑ Não ❑

Questionário sobre alergias

11.2 Indique na seguinte tabela os medicamentos que toma e há quanto tempo:

Medicamento	Duração

12. Questionário Sobre Antecedentes Familiares de Alergias /Atopia

12.1 Assinale com um X na seguinte tabela as alergias que conheça na sua família:

Familiar	Asma / Bronquite asmática	Rinite alérgica	Eczema	Alergias a alimentos	Alergias a medicamentos
Pai					
Mãe					
Irmãos					
Avós Paternos					
Avós Maternos					

Chegou ao fim do nosso questionário!
Muito obrigada pela sua colaboração ☺

Appendix 3– Skin Prick tests – register form

TESTES CUTÂNEOS

REGISTO DE RESULTADOS

NOME:.....

CÓDIGO:.....

DATA:.....

Tomou antihistaminicos ou antidepressivos triciclicos há menos de 7 dias?.....

Tem aplicado corticosteróides tópicos na pele? .....

BATERIA STANDARD

1- CONTROLO NEGATIVO..... → _____
2- HISTAMINA..... → _____
3- DERMATOPHAGOIDES PTERONYSSINUS..... → _____
4- DERMATOPHAGOIDES FARINAE..... → _____
5- OLIVEIRA..... → _____
6- BÉTULA..... → _____
7- POLENS III (cereais)..... → _____
8- POLENS IV (gramineas)..... → _____
9- POLENS V (ervas)..... → _____
10- PARIETARIA JUDAICA..... → _____
11- ASPERGILUS..... → _____
12- CLADOSPORIUM..... → _____
13- MUCOR..... → _____
14- ALTERNARIA ALTERNATA..... → _____
15- EPILTÉLIO DE GATO..... → _____
16- EPILTÉLIO DE CÃO..... → _____

Conclusões

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Assinatura

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