












ORIGINAL

Seasonal allergies in Morocco: “A cross-sectional study of prevalence, clinical manifestations and impact on quality of life”

Alergias estacionales en Marruecos: “Estudio transversal de prevalencia, manifestaciones clínicas e impacto en la calidad de vida”

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ABSTRACT

Introduction: seasonal allergies are a public health problem because of their prevalence (with a clear upward trend), their morbidity, their impact on quality of life, and the costs they generate. This immune system reaction is manifested by several symptoms, generally respiratory and cutaneous.

Objectives: the study aims to identify the prevalence and impact of seasonal allergies in rural and urban settings, and to find out key factors influencing allergy symptoms and quality of life.

Method: in this context, a questionnaire was carried out among 100 people suffering from seasonal allergies in order to determine its prevalence, causes, symptoms, aggravating factors, and impact on daily life.

Results: the results showed that seasonal allergy is frequent during the spring season, associated with symptoms of rhinoconjunctivitis. Among the causes of allergy, pollen was found to be the main one, influenced by genetic and environmental factors, and climate change, which could aggravate the situation by increasing the quantity of pollen and prolonging the pollen season.

Conclusion: this condition requires regular monitoring and treatment, and the results could help the medical profession diagnose and improve allergy sufferers' daily lives.

Keywords: Seasonal Allergic Rhinitis; Pollen; Allergens; Population; Morocco.

RESUMEN

Introducción: las alergias estacionales son un problema de salud pública por su prevalencia (con una clara tendencia al alza), su morbilidad, su impacto en la calidad de vida y los costes que generan. Esta reacción del sistema inmunitario se manifiesta por diversos síntomas, generalmente respiratorios y cutáneos.

Objetivos: el objetivo del estudio es identificar la prevalencia y el impacto de las alergias estacionales en entornos rurales y urbanos, y averiguar los factores clave que influyen en los síntomas de la alergia y en la calidad de vida.

Método: en este contexto, se realizó un cuestionario a 100 personas que padecían alergia estacional para determinar su prevalencia, causas, síntomas, factores agravantes e impacto en la vida diaria.

Resultados: Los resultados mostraron que la alergia estacional es frecuente durante la estación primaveral, asociada a síntomas de rinoconjuntivitis. Entre las causas de la alergia, el polen resultó ser la principal, en la que influyen factores genéticos y ambientales, y el cambio climático, que podría agravar la situación al aumentar la cantidad de polen y prolongar la estación polínica.

Conclusión: esta afección requiere un seguimiento y un tratamiento regulares, y nuestros resultados podrían

ayudar a la profesión médica a diagnosticar y mejorar la vida cotidiana de los alérgicos.

Palabras clave: Alergia Estacional; Polen; Alérgenos; Población; Marrueco.

INTRODUCTION

The World Health Organization (WHO) considers allergy to be the 4th most common disease in the world, after cancer cardiovascular diseases, and acquired immunodeficiency syndrome(AIDS).⁽¹⁾ It also estimates that by 2050, half the world's population will be allergic.⁽²⁾ The term allergy was defined by Von Piquet in 1906 as *"an alteration in the body's ability to react to a foreign substance."*⁽³⁾

Seasonal allergies manifest themselves mainly by ENT (ear, nose, throat) symptoms, dominated by allergic rhinitis. Also known as hay fever, which occurs in spring and is caused by the development of immunoglobulin E (IgE)-dependent inflammation in response to different allergens. Allergic rhinitis is a sudden onset with sneezing, nasal pruritus, hydrorrhea (clear nasal discharge), nasal obstruction, and anosmia (absence of smell).

It is frequently associated with allergic conjunctivitis, irritation and itching of the eyelids, redness, and edema of the conjunctiva, but also watering and a sensation of tingling sensation.^(4,5)

In spring, trees - oaks, olives, birches, and poplars are most likely to provoke allergic reactions. In summer, grasses and herbs are the cause of seasonal allergies. For an allergy to be triggered, there must be a genetic predisposition to allergies and exposure to the allergenic substance.

Pollen dispersal is influenced by humidity, wind, precipitation, daily sunshine duration, and temperature.⁽⁶⁾

Indeed, numerous studies have demonstrated that the prevalence of asthma and allergies has increased considerably over at least four decades of the 20th century, and this in all industrialized countries.^(7,8) Studies in France in 2006 showed that one in 4 people suffers from respiratory allergy;⁽⁹⁾ 1 in 3 has allergic rhinitis,⁽¹⁰⁾ 4 million people are asthmatic, and 80 % of asthma is allergic in origin.^(11,12) Its prevalence in the general population varies from region to region, ranging from 5 to 50 % in Europe⁽¹³⁾ and from 10 to 35,7 % in Africa.^(14,15)

In Morocco, according to a survey of 336 subjects living in a rural area of the town of Settat. The prevalence of allergic rhinitis was 37,8 %.⁽¹⁶⁾ Another study including 154 patients consulting for the first time for asthma and/or rhinitis and/or conjunctivitis and/or skin manifestations (eczema, urticaria) showed that 120 patients had rhinitis or 77,92 %.⁽¹⁷⁾

Seasonal allergies, or allergic rhinitis, represent a major public health challenge, affecting a large proportion of the world's population. The scientific problem of seasonal allergies lies in the complexity of the pathophysiology, which can result in a significant burden on patients' quality of life by affecting their ability to work, sleep and carry out daily activities, and a substantial economic impact in terms of both direct medical costs and indirect costs due to reduced productivity and absenteeism. In this context, the study of seasonal allergies in Morocco is justified by the need to identify the major allergens that cause symptoms and their aggravating factors, as well as their impact on the quality of life of the Moroccan population. The results may help health professionals in their diagnosis, improve the daily lives of people suffering from seasonal allergies, and provide guidance for further studies in the future.

METHOD

Seasonal allergies represent a major public health problem requiring ongoing surveillance. In this context, a descriptive quantitative cross-sectional observational study was carried out on 100 people diagnosed with seasonal allergies.

Inclusion criteria included a diagnosis confirmed by a healthcare professional, age 5 years or older, informed consent and availability during the study period, from May 26 to March 26.

People without seasonal allergies were excluded from the study.

Sampling was carried out for convenience using an online survey, which yielded 70 responses. In addition, purposive sampling was used with a self-administered questionnaire sent to 30 seasonal workers in the Brachoua region.

Data were collected on several variables such as demographic characteristics (age, gender, region of residence), family history of seasonal allergies, seasonal allergy symptoms, triggers and impact on quality of life.

A power analysis was performed to determine the appropriate sample size. With a confidence level of 95 % and a margin of error of 5 %, the required sample size was calculated at 80 participants. However, a target size of 100 participants was set to ensure sufficient representation and account for potential drop-outs.

Statistical analysis was carried out using SPSS, JAMOVI and Excel. Descriptive statistics, such as proportions and frequencies, were used to summarize data on the variables studied. These were used to describe the characteristics of the sample, including proportions of different modalities for categorical variables (e.g. gender, family history, regions of residence; age categories) and frequencies of values for continuous variables

(e.g. symptoms, triggers, impact on quality of life, etc.).

Finally, concerning ethical considerations, participants were informed of the purpose of the study and gave their informed consent, which was guaranteed. Data confidentiality was guaranteed throughout the study.

RESULTS

Socio-demographic characteristics

The study included 100 people, 66 % of whom were women, while men accounted for 34 % (figure 1A). In terms of age distribution, the 18 to 30 age group predominates with a percentage of 54 %, followed by the 30 and over age group with a percentage of 33 %, while the 5 to 18 age group represents only 13 % (figure 2B). Most respondents were from the Rabat-Salé-Kénitra region (56 %), followed by Casablanca-Settat, Marrakech-Safi and Fès-Meknès with percentages of (19 %), (17 %) and (3 %) respectively. While the less frequent regions of Guelmim, Tangier-Tetouan, Sous Massa, Daraa-Tafilalt and Bénimellal-Khénifra account for only (1 %) (figure 1C).

Gender	Quantities	% of Total	% cumulative
Female	66	66,0 %	66,0 %
Male	34	34,0 %	100,0 %

(A) Breakdown of the target population by gender

Age category	Quantities	% of Total	% cumulative
18 years to 30 years	54	54,0 %	54,0 %
30 years and over	33	33,0 %	87,0 %
5 years to 18 years	8	8,0 %	95,0 %
5 years to 18 years	5	5,0 %	100,0 %

(B) Breakdown of the target population by age category

Region of residence	Quantities	% of Total	% cumulative
Béni Mellal Khénifra	1	1,0 %	1,0 %
Casablanca-Settat	19	19,0 %	20,0 %
Daraa Tafilalt	1	1,0 %	21,0 %
Fès- Meknes	3	3,0 %	24,0 %
Guelmim	1	1,0 %	25,0 %
Marrakech- Safi	17	17,0 %	42,0 %
Rabat-Salé-Kénitra	56	56,0 %	98,0 %
Sous massa	1	1,0 %	99,0 %
Tanger- Tetouan	1	1,0 %	100,0 %

(C) Breakdown of the target population by region of residence

Figure 1. Socio-demographic characteristics of the target population

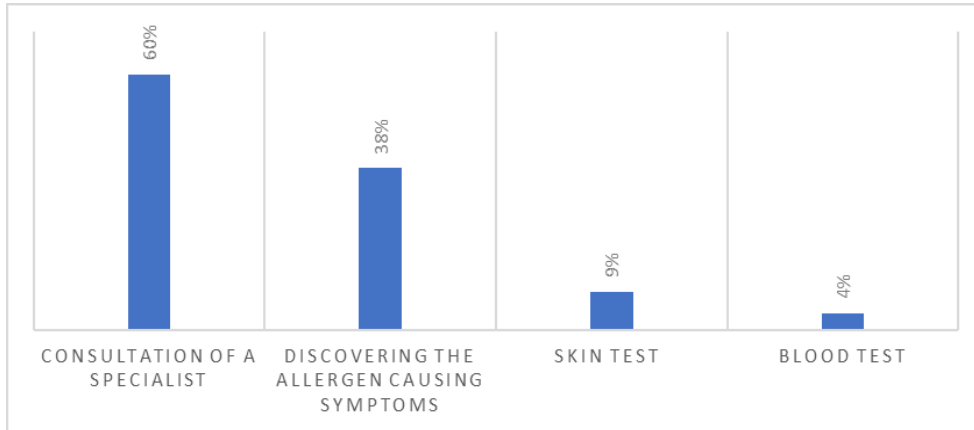
Clinical symptoms in the study population

60 % of respondents were diagnosed after consulting a specialist, and 38 % discovered the allergen triggering the symptoms. The diagnosis was also confirmed by a skin test and a blood test in (9 %) and (4 %) of respondents respectively (figure 2 A).

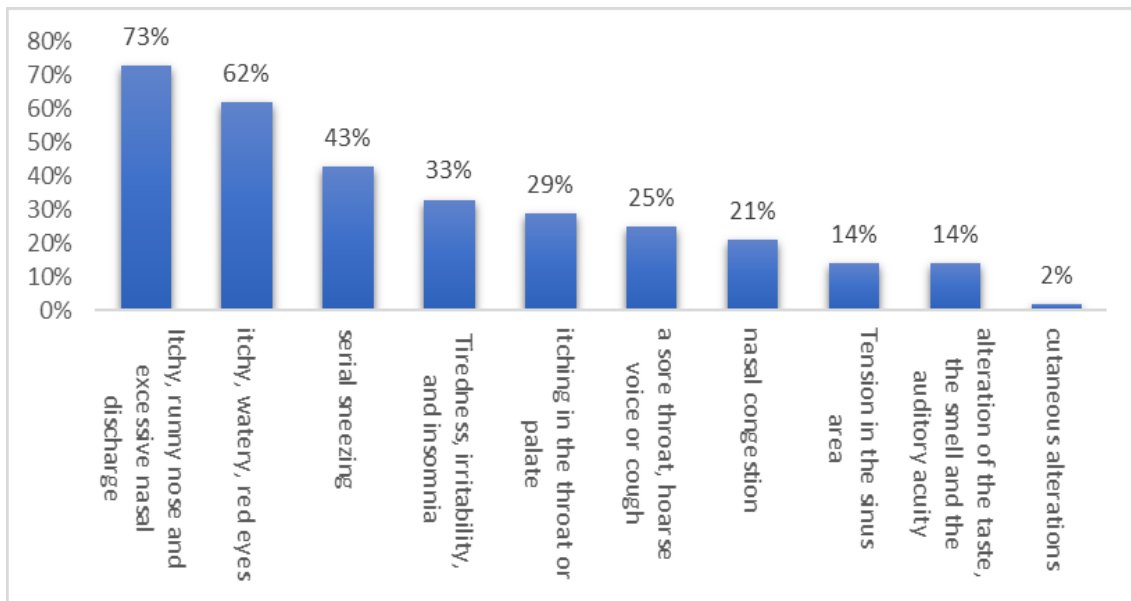
Symptoms of allergic rhinitis among the participants in this survey included an itchy, runny nose and very

watery secretions (73 %), itching, tearing, and redness of the eyes (62 %) and a series of sneezes (43 %); fatigue, irritability, and insomnia when symptoms last several days (33 %); itching in the throat or palate (29 %); sore throat, hoarseness or cough (25 %); nasal congestion (21 %); tension in the sinus area (14 %); changes in taste, smell, and hearing (14 %) (figure 2 B).

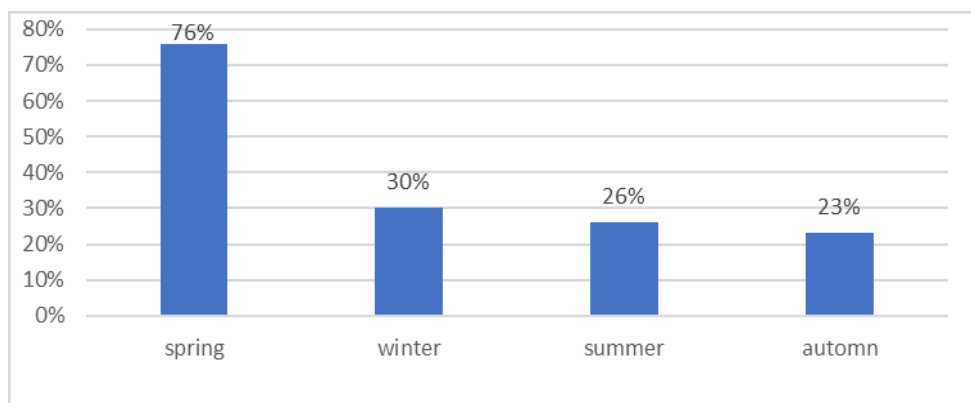
These symptoms are felt most during the spring season by (76 %) of the target population, followed by the winter, summer, and autumn periods with percentages of (30 %), (26 %) and (23 %) respectively (figure 2 C).



(A) Distribution of target population by diagnostic procedure



(B) Distribution of the cible population by symptoms



(C) Proportion of seasonal allergies by season

Figure 2. Clinical symptoms in the study population

Family history

In this context, 52 % of seasonal allergy sufferers in this study have a family history of seasonal allergy (table 1).

Table 1. Distribution of target population according to having or not having a family history of seasonal allergy

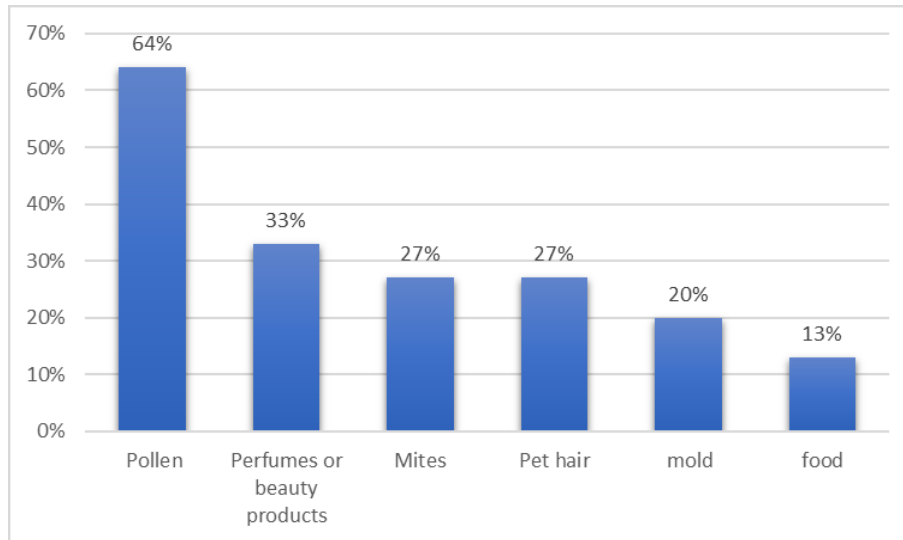
		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	No family antecedents	48	48,0	48,0	48,0
	Family Antecedents	52	52,0	52,0	100,0
	Total	100	100,0	100,0	

Allergens responsible for symptoms

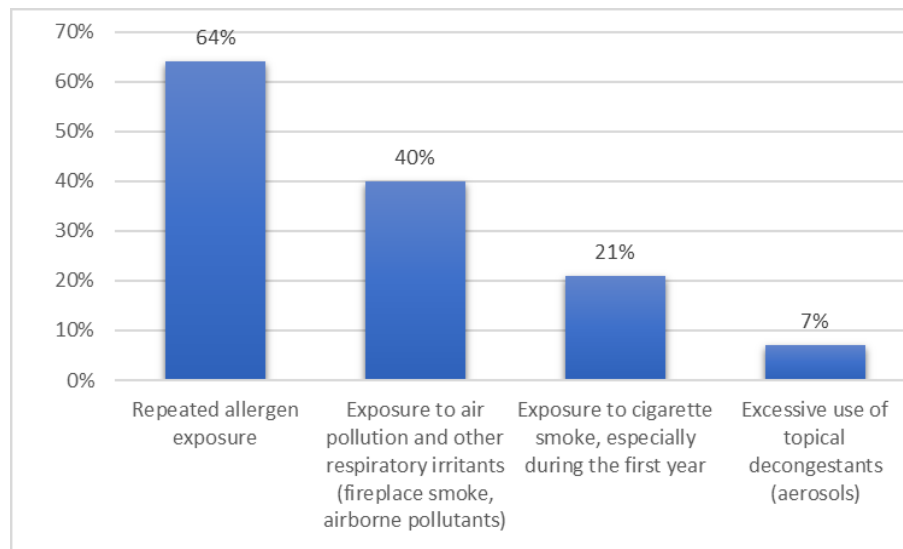
Regarding the triggers or so-called allergens responsible for symptoms according to the target population; the most dominant pneumallergen is pollen (64 %), followed by perfumes or cosmetics (33 %), then animal hair and dust mites (27 %), followed by molds (20 %) and lastly food (13 %) (figure 3 A).

The risk factors

Among the factors identified by the survey participants as contributing to this upward trend are repeated exposure to airborne allergens (64 %), followed by exposure to air pollution and other respiratory irritants (fireplace smoke, airborne pollutants) (40 %), then exposure to cigarette smoke, especially during the first year of life (21 %), and misuse of topical decongestants (airborne) (7 %) (figure 3 B).



(A) Percentage of seasonal allergens causing symptoms



(B) Identifying factors associated with aggravating seasonal allergies

Figure 3. Representation of allergens and factors aggravating seasonal allergy symptoms

Drug treatments

71 % of respondents consulted specialists who prescribed treatments to relieve symptoms. Indeed (43 %) of participants were put on antihistamines, (42 %) on corticosteroids, (38 %) were prescribed steroid nose drops, (22 %) avoided allergens. As part of allergy management also (21 %) used Ventolin, (12 %) received vitamin C and (7 %) used other treatments. While zinc, allergen immunotherapy (desensitization), decongestants and omega-3s were used by only (5 %), (5 %), (4 %) and (3 %) respectively (figure 4).

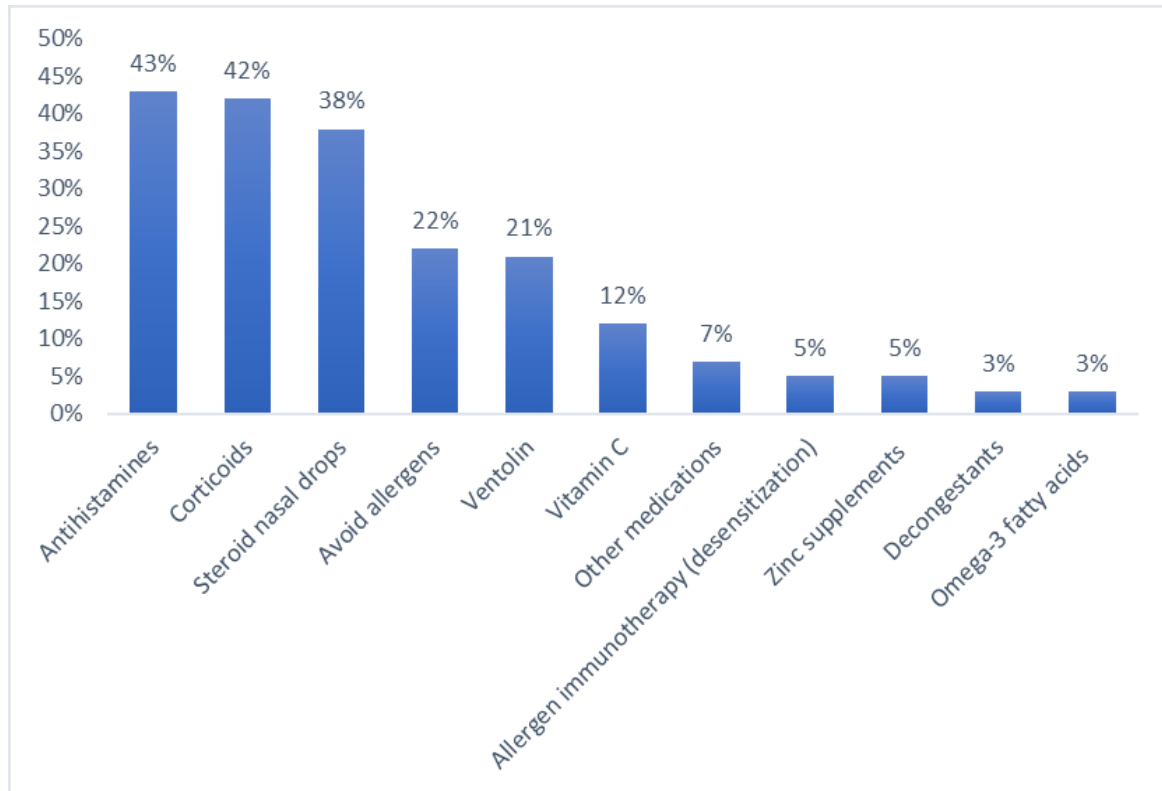


Figure 4. Showing the percentage of treatments used by the targeted population

The impact of seasonal allergies on quality of life

Concerning the impact of seasonal allergies on quality of life, environ (55 %) of participants in this study reported suffering from difficulty sleeping, (46 %) suffering from reduced productivity at work or school and (45 %) having difficulty concentrating because of symptoms (42 %) of respondents were obliged to limit outdoor activities and (11 %) suffering from social isolation (figure 5).

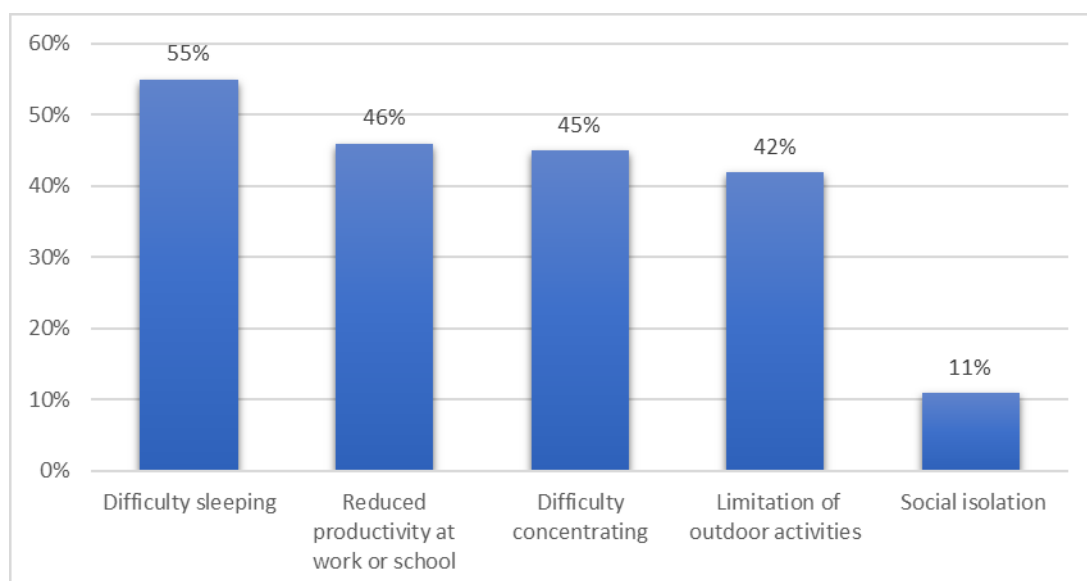


Figure 5. Representing the impact of seasonal allergies on quality of life

DISCUSSION

Seasonal allergies are an everyday problem that affects a wide range of people. People with seasonal allergies are aged between 18 and 30, with a percentage of 54 %. In a study carried out in Settat, the prevalence of allergic rhinitis was higher in people aged between 15 and 49.⁽¹⁶⁾

In the MARRALLERG study, which was carried out on 866 patients who consulted us for a clinical picture suggestive of allergic rhinitis and/or asthma and/or conjunctivitis, a predominance of women was noted at 68,8 %, ⁽¹⁸⁾ as was this study, which found a predominance of women at 66 %.

Seasonal allergy most often occurs in a predisposing background, called atopy,⁽¹⁹⁾ which is defined as “a personal and/or familial genetic predisposition, generally appearing during childhood or adolescence, to sensitize and produce excess IgE after ordinary exposure to allergens. As a result, these individuals may develop typical symptoms of asthma, rhinoconjunctivitis, or eczema”.⁽²⁰⁾ In this context, studies have shown that the risk of having an asthmatic child was three times higher in families where one parent had asthma.⁽²¹⁾ Similarly, this study found that around half the people with seasonal allergies in this study had a family history of seasonal allergies.

Regarding the clinical symptoms of seasonal allergy, the MARRA-LERG study of 866 consulted patients presenting a clinical picture suggestive of allergic rhinitis and/or asthma and/or conjunctivitis. Asthma, rhinitis and conjunctivitis (isolated or associated conditions) were noted in 62,2 %, 83,7 % and 57,8 % respectively.⁽¹⁸⁾

Among the allergens triggering symptoms, pollen ranks first in this study. Pollen is a major risk factor for respiratory allergies, contributing to the worsening of asthma symptoms,⁽²²⁾ which currently affects 20-30 % of Moroccan adults.⁽²³⁾ In this respect, a study in Tunisia aimed to determine the prevalence of sensitization to different pneumallergens using 120 semi-quantitative blood IgE assays specific to the 30 most common pneumallergens. Among positive tests, sensitization to pollens was the most frequent (62 %).⁽²⁴⁾ Another Tunisian study spanning from January 1997 to December 2016 was carried out on 336 files of subjects with confirmed allergic asthma to pollens and showed that pollen allergy ranked second (22,4 %) after house dust mites.⁽²⁵⁾ In Canada, in 2014-2015, around 15 % of Quebecers had symptoms of pollen allergy.⁽²⁶⁾

In the same context, a study whose aim was to determine the prevalence of respiratory allergy to 20 pneumallergens in the Marrakech region was carried out between 2013 and 2015 including 866 patients who consulted for a clinical picture suggestive of allergic rhinitis and/or asthma and/or conjunctivitis. Positivity rates according to pneumallergens were dominated by house dust mites with a rate of 38,4 % followed by olive pollen with a rate of 20,4 %. Pollinosis was noted in 30,1 % and was isolated in 12,5 %.⁽¹⁸⁾

It is claimed that respiratory allergies are largely linked to the environment.⁽³⁾ Indeed, according to the participants in this survey, repeated exposure to airborne allergens and exposure to air pollution and other respiratory tract irritants (fireplace smoke, airborne pollutants) are the main factors that aggravate symptoms. Indeed, it has been shown that pollution may increase the duration of pollination and the concentration of respirable allergenic particles in the atmosphere.⁽²⁷⁾

Similarly, it was proved in Japan in the 1980s that populations living near Japanese cedars in urban areas suffered more often from allergy to this tree's pollen than populations living in rural areas.⁽²⁸⁾ In England, the sensitization of children to various allergens (from dust mites or pollen) appears to be greater in polluted areas than in non-polluted areas.⁽²⁹⁾

In addition to the abovementioned factors, studies have shown that rising average temperatures lengthen the cypress pollination period. This, in turn, leads to a redistribution of allergenic species such as Cupressaceae towards northern regions, resulting in the sensitization of more individuals.⁽²⁸⁾ Other studies predict a future extension of areas favorable to the presence of ragweed (whose pollen is particularly allergenic), which could contribute to a fourfold increase in atmospheric concentrations of ragweed pollen in Europe by 2050.⁽³⁰⁾

In terms of the impact of seasonal allergy symptoms on the quality of life of the participants in this survey, the major consequences were difficulties in sleeping, reduced productivity at work or school, concentration problems and restrictions on outdoor activities. Similarly, a French survey of 504 patients with allergic rhinitis found that around 50 % of patients reported that allergic rhinitis symptoms had some impact on their sleep, in the form of difficulty falling asleep (53,6 %; n = 270) and night-time awakenings (53,0 %; n = 267).

For most patients with intermittent and persistent forms, allergic rhinitis had an impact on daily activities (73,9 % [n = 187] and 79,5 % [n = 186], respectively), as well as on productivity at work/school (70,2 % [n = 106] and 76,1 % [n = 124]). Allergic rhinitis symptoms had an impact on patients' mood: 51,8 % (n = 261) felt tired, 29,2 % (n = 147) were irritable and 2,6 % (n = 13) were generally unhappy.⁽³⁰⁾

Another study of 12420 patients in France showed that seasonal allergic rhinitis affected the daily lives of around half the patients, and also had an impact on sleep (56,7 %).⁽³¹⁾

CONCLUSIONS

The results show that seasonal allergy is frequent during the springtime season, associated with symptoms of

rhinoconjunctivitis. The presence of a family history is also striking among the participants in this survey. Pollen is a major cause of allergy, influenced by genetic and environmental factors, and climate change can aggravate the situation by increasing the amount of pollen and prolonging the pollen season. Seasonal allergies have an impact on the quality of life of sufferers, with consequences such as sleep disorders, reduced productivity at work or school, concentration problems, and restrictions on outdoor activities.

Follow-up treatment must be regular to ensure patients' quality of life and professional activity. Further studies based on environmental botanical analyses will provide essential information tools for clinicians in the diagnosis of seasonal allergy pathology. Further work based on molecular biology studies will characterize the structural variability of allergen molecules in pollens isolated from different allergenic plants.

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The authors declare that there is no conflict of interest.

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