

ORIGINAL ARTICLES

## Validity of a Telephone Survey for Determining the Prevalence of Atopic Dermatitis and its Seasonal Variation in Spain

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**Abstract.** *Background.* Atopic dermatitis is an eczematous disease of the skin with onset during childhood and subsequent flares. The UK Working Party (UKWP) defined the diagnostic criteria normally used for atopic dermatitis. The objective of this study was to assess the prevalence of atopic dermatitis according to these criteria.

*Methods.* This was a 2-phase cross-sectional, epidemiologic computer-assisted telephone survey. Parents of children aged 14 years or less participated in the first phase to determine the prevalence of atopic dermatitis in Spain. In the second phase, 6 months later, parents of children with diagnosis of atopic dermatitis according to the UKWP diagnostic criteria in phase 1 were interviewed to assess seasonal variations in disease activity between the 2 phases.

*Results.* In total, 1979 parents participated; 8.6% of the children (95% confidence interval, 7.4%-9.8%) were diagnosed with atopic dermatitis by telephone. Of these, 49.2% had a family history of atopy and 41.3% had been diagnosed with atopic dermatitis by a physician. Diagnosis by the physician and that made by interview agreed in 75.3% of these cases. Of the factors associated with atopic dermatitis, it was found that increased body temperature, periods of stress, dust, use of/contact with wool or fiber clothes, and use of certain soaps and hygiene products showed seasonal variations.

*Conclusions.* The estimated prevalence of atopic dermatitis in children between 0 and 14 years old in Spain was 8.6%.

Certain factors associated with disease flares showed seasonal variations.

**Key words:** atopic dermatitis, prevalence, seasonal variation.

### VALIDEZ DE UNA ENCUESTA TELEFÓNICA PARA DETERMINAR LA PREVALENCIA Y LA ESTACIONALIDAD DE LA DERMATITIS ATÓPICA EN ESPAÑA

**Resumen** *Introducción.* La dermatitis atópica (DA) es una enfermedad eczematosa de la piel que debuta en la infancia cursando a brotes. La UK Working Party definió los criterios diagnósticos de DA utilizados habitualmente. El objetivo de este estudio fue evaluar la prevalencia de DA según estos criterios.

*Métodos.* Estudio epidemiológico, transversal, mediante entrevista telefónica asistida por ordenador, con dos fases. Primera fase: participaron padres de niños  $\leq 14$  años, con objeto de calcular la prevalencia de la DA en España. Segunda fase: realizada 6 meses después, se entrevistó a aquellos padres con diagnóstico de DA en la primera fase según la UKWP, para determinar la existencia de estacionalidad en las lesiones de DA entre ambas fases.

*Resultados.* Participaron 1.979 padres. Un total de 8,6 % (intervalo de confianza [IC] 95 %: 7,4-9,8) de los niños fue diagnosticado de DA mediante entrevista telefónica. El 49,2 % de los niños tenía antecedentes familiares de atopia. El 41,3 % de los niños había sido diagnosticado de DA por un médico. En un 75,3 % coincidió el diagnóstico del médico con el realizado mediante entrevista. En este estudio se observó que, de los factores asociados a la DA, el aumento de la temperatura corporal, los periodos de estrés, el polvo, el uso/

contacto con prendas de lana o fibras y el uso de determinados jabones o productos de higiene personal presentan diferencias estacionales.

*Conclusiones.* La prevalencia estimada de DA en niños de 0-14 años en España fue del 8,6 %. Algunos factores asociados a la exacerbación de la DA presentan carácter estacional.

**Palabras clave:** dermatitis atópica, prevalencia, estacionalidad.

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## Introduction

Atopic dermatitis (AD) is an inflammatory skin disease characterized by the presence of pruritic eczematous lesions of a chronic, recurrent nature.<sup>1</sup> Onset is in childhood and the location of lesions varies in children of different ages. In children under 2 years of age, the lesions—which are generally exudative red plaques—are mainly located on the cheeks, around the neck, and on the extensor surfaces of the arms and legs (elbows and knees), while in older children, they tend to occur on flexor surfaces, in the cubital or popliteal fossae, as also occurs in adults with AD.

The estimated prevalence of AD in adolescents in Spain is 6.2%<sup>2</sup> but there is little information available for younger children. There has been an increase in the worldwide prevalence of AD in recent years.<sup>3</sup>

The etiology of AD is not fully understood, although it is known that genetic predisposition plays a role. Children with 1 parent with a history of atopy have a risk of over 50% of developing AD and this figure increases to 80% when both parents are affected.<sup>4</sup>

Several risk factors have been described for the onset of AD. The main one is a personal or family history of atopy (allergic rhinitis, asthma, etc) but other factors have been described including environmental exposures (tobacco smoke, living in a rural or urban environment), family socioeconomic status, exposure to pet dander (especially that of cats and dogs), excessive use of antibiotics, and food allergies.<sup>5</sup> Several of these risk factors are present in the everyday life of patients with AD, although their association with the condition has not been clearly demonstrated.

Approximately 50% to 80% of children with AD develop asthma or allergic rhinitis.<sup>6</sup>

According to the widely accepted<sup>7</sup> criteria established by the UK Working Party for the clinical diagnosis of AD,<sup>8</sup> AD should only be diagnosed in children with a history of skin pruritus and 3 or more of the following features: onset of lesions before 2 years of age, flexural involvement, a history of generally dry skin, a history of atopic disease, and visible flexural dermatitis. These diagnostic criteria have been translated into Spanish and validated in a Spanish population by Ortiz et al.<sup>9</sup>

Patients with AD also report variations in lesion severity throughout the year. These variations might be related to climate changes and associated factors such as humidity and allergen exposure,<sup>10</sup> although seasonal variations in AD have been seen to have a greater effect in children who also have pollen sensitization.<sup>11</sup>

Treatment depends on the intensity of the episode and the lesions present at the time of treatment. The first step in any treatment program is the application of hygiene

and dietary measures aimed at eliminating or reducing exposure to environmental and food allergens and ensuring that the skin is kept well moisturized.

These measures can be followed by topical treatment with the addition of systemic drugs if the lesions persist.<sup>12</sup>

Topical treatments include a range of products such as moisturizers, emollients, tars, topical corticosteroids, and the more recent topical immunomodulators. Systemic drugs include antihistamines and corticosteroids, and antibiotics may be required to prevent and treat infected lesions (particularly those caused by scratching).

The aim of the present study was to determine the prevalence of AD in Spain using the UK Working Party diagnostic criteria. We also wished to obtain more information on the risk factors associated with AD, the possible seasonal nature of exacerbations, and the use of different treatments.

## Materials and Methods

The study was conducted in 2 phases. The first phase consisted of a cross-sectional epidemiologic study to determine the prevalence of AD in children via a structured computer-assisted telephone interview (Figure 1). The questionnaire used consisted of closed questions and was purpose-designed for the study and agreed on by a panel of experts (Figure 2). For ethical and legal reasons, the questionnaire was answered by the parents of the children selected for the study. It consisted of 2 parts: one designed to determine the prevalence of AD and associated risk factors and the other to analyze a series of parameters (factors associated with AD, seasonal variations in exacerbations, and treatments) only in children with AD

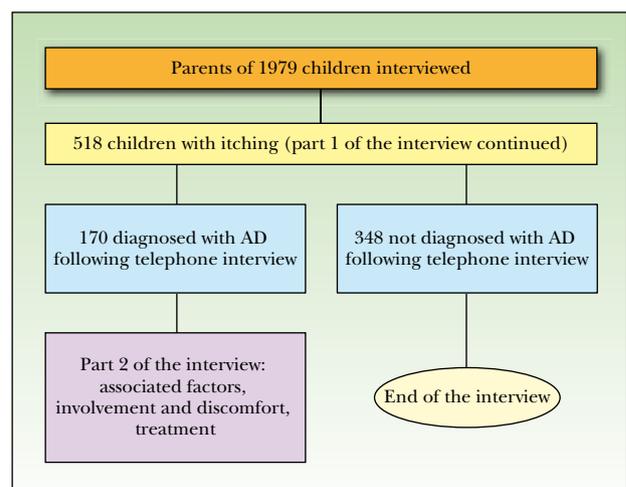


Figure 1. Study design. AD indicates atopic dermatitis.

I am now going to ask you about signs and symptoms relating to your child's skin

**1 Has he/she ever had itchy skin?**  
 (By itchy skin we mean does he/she scratch or rub his/her skin very often or continuously for whatever reason)  
 Yes  No   
*Interviewer:* If the answer is "No", go to sociodemographic data.

**1.1. Has he/she had this type of itching in the last 12 months?**  
 Yes  No

**1.2. And has he/she had it in the last 7 days?**  
 Yes  No

**2 How old was he/she when his/her skin started itching?**  
*Interviewer:* If he/she answers that this is the first time, note down the current age of the child.  
 Years or  Months  
*Interviewer:* If the child is under 4, go to question 3.2.  
 If the child is 4 or older, go to question 3.1.

**3.1. Has this itching ever affected skinfolds or the hollow of a joint?**  
 (By skinfolds we mean where you bend your arm, behind the knees, the front part of your ankle, around your neck, or around your eyes).  
 Yes  No   
 If the child is 4 or older, go to question 4.

**3.2. 3.2 And has this itching ever affected skinfolds, hollows of a joint, or cheeks?**  
 (By skinfolds we mean where you bend your arm, behind the knees, the front part of your ankle, around your neck, or around your eyes).  
 Yes  No   
 If the child is 3 or younger, go to question 6.

**4 Has your child ever had "asthma"?**  
 (By asthma we mean difficulty breathing in the form of attacks with whistling in the chest).  
 Yes  No

**5 Has your child ever had pollen allergy or "allergic rhinitis"?**  
 (Pollen allergy, allergic rhinitis, or spring allergy causes frequent sneezing, a constantly runny nose, or irritated, itchy eyes).  
 Yes  No

**6 Have you, your spouse, or any of the child's brothers and sisters ever had itchy skin or eczema, asthma, or allergic rhinitis/pollen allergy?**

Skin eczema	<input type="checkbox"/>
Asthma	<input type="checkbox"/>
Allergic rhinitis/pollen allergy	<input type="checkbox"/>
No/None	<input type="checkbox"/>

**7 In the last year, has your child had dry skin?**  
 Yes  No   
 If the child is 4 or older, go to question 8.2.  
 If the child is 3 or younger, go to question 8.1.

**8.1. Does your child have atopic eczema or atopic dermatitis TODAY, ie, is there redness and inflammation with flaking or crusts in the area of the cheeks, the back of the arms or front of the legs, and/or the forehead?**  
 Yes  No   
 Go to question 9.

**8.2. Does your child have atopic eczema or atopic dermatitis TODAY, ie, is there redness and inflammation with flaking or crusts on the flexor surfaces?**  
 By flexor surfaces we mean behind the knees, elbow crease, around the neck or around the eyes).  
 Yes  No   
 Go to question 9.

**9 Is there carpeting in any of the rooms where your child lives/studies?**  
 (We are referring to places where the child spends a lot of time).  
 Yes  No

**10.1. Does your child have regular contact with pets?**  
 Yes  No   
 If the answer is "No", go to question 11.

**10.2. Please specify which:**

Dog/cat	<input type="checkbox"/>
Other animals with hair	<input type="checkbox"/>
Bird/similar (animals with feathers)	<input type="checkbox"/>
Other types of animals	<input type="checkbox"/>

**11 Has the discomfort caused by the itching on your child's skin caused you to take him/her to the doctor?**  
 Yes   
 No, I've never considered it necessary to go to a doctor for this reason

**12.1. Has a doctor ever said that your child has atopic eczema or atopic dermatitis?**  
 Yes  No  DK/DA   
 If the answer is "NO", end the interview.

**12.2. What specialty did the doctor that made this diagnosis belong to?**

Family doctor/general practitioner	<input type="checkbox"/>
Dermatologist	<input type="checkbox"/>
Allergologist	<input type="checkbox"/>
Pediatrician	<input type="checkbox"/>
Other. Please specify. _____	<input type="checkbox"/>

**12.3. How old was your child when he/she was diagnosed?**  
 If the child is younger than 2 years, ask about months rather than years).  
 Years or  Months

**Figure 2.** Questionnaire used in structured computer-assisted telephone interview. (The English translation is provided only for purposes of understanding the present study).

**Table 1.** UK Working Party Diagnostic Criteria for Atopic Dermatitis<sup>8</sup>

Definition of AD: a history of pruritus (obligatory) plus 3 of the features listed below
<b>Obligatory condition</b>
Pruritus
<b>Additional features</b>
Onset before the age of 2 years (not applicable to children under 4 y)
Flexural involvement (including cheeks in children under 10 years)
A history of generally dry skin
A personal history of atopic disease (or a history of atopic disease in a first-degree relative of children under 4 years)
Visible flexural dermatitis (or dermatitis on the cheeks/forehead and extensor surface of joints in children under 4 years)

diagnosed according to the UK Working Party criteria (Table 1).

In the initial phase of the study, we interviewed parents of children aged up to 14 years living in Spain who had been selected from random sampling points with stratification by sex, age, and geographical area (autonomous community). The data used for sampling corresponded to figures for 2001 published by the Spanish National Statistics Institute.

We also tested the reliability of the questionnaire by reinterviewing a sample of parents selected using a systematic random method.

The second phase of the study consisted of conducting a second telephone survey among parents who, in the first interview, had reported that their children had symptoms that were compatible with AD. The first interview was performed in the winter and the second one in the summer, and we were thus able to evaluate seasonal variations through determination of the level of agreement between the answers obtained in the 2 phases.

All the respondents were asked for their verbal consent to be called for the retest phase or for a second interview 6 months later.

The interviewers were trained by the experts who had designed the study and a pilot test was performed to ensure the quality and suitability of the questionnaire.

The SPSS software package version 10.0 for Windows was used for statistical analysis. The level of agreement between results from the first phase and the retest phase was analyzed.

The study was performed according to the requirements for cross-sectional epidemiologic studies in Spain and in compliance with the provisions of the Spanish organic law 15/1999 (December 13) on the protection of personal

data. The study was approved by the ethics committee at Hospital Clínic i Provincial de Barcelona, Spain and notified to the Spanish Agency for Medicines for purely informational purposes.

## Results

### Phase 1

#### *Sociodemographic Characteristics*

A total of 1979 parents were interviewed for the first phase of the study, with observance of the quotas established per geographical area. The mean (SD) age of the parents was 38.7 (5.9) years and 79.9% were mothers. The mean age of the children that participated in the study was 7.3 (4.3) years; 70.3% were aged between 0 and 10 years, and 51.6% were boys.

The mean family size was 3.9 (0.9) members. At the time of the interview, 94.8% of the parents reported that they were currently working, with the majority (43.9%) belonging to the job category of employees, administrative staff, and manual or craft workers. Table 2 shows the other demographic characteristics of the families interviewed.

#### *Clinical Characteristics*

Almost three-quarters of the children (73.8%) had no history of pruritus. Of those who did, 68.5% had experienced itching in the 12 months prior to the interview and 30.9% had done so in the preceding week. The mean age of onset of symptoms was 3.4 (3.5) years.

Eczema was observed in 42.1% of the children. On stratifying the group by age, we found that eczema was more common in children under 4 years than in those aged over 4 years ( $P = .03$ ). As can be seen in Figure 3, 61% of the children had dry skin in the year before the interview.

Of the 425 children aged over 4 years, 21.2% had asthma and 22.8% had allergic rhinitis.

Thirty-seven (39.8%) of the 93 children aged under 4 years had AD or eczema on the cheeks, on the extensor surface of the arms or legs, or on the forehead, while 102 (24%) of the 425 children aged over 4 years had AD or atopic eczema on the flexor surfaces.

Almost half (49.2%) of the parents reported that they had experienced symptoms of atopy. The corresponding percentages were 27% for eczema, 12.5% for asthma, and 23.2% for allergic rhinitis or pollen allergy.

With regards to risk factors for AD, 11.8% of the children had carpeting in their rooms and 32% had regular contact with animals (mostly dogs and cats), but there were no statistically significant differences in this regard

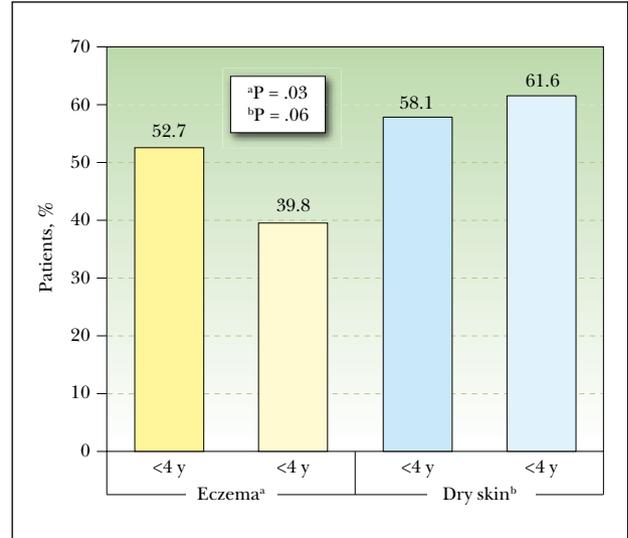
**Table 2.** Demographic Characteristics of Families That Participated in the Study

Sociodemographic Characteristics	N	%
<b>Level of education obtained by head of family</b>		
Pre-primary	22	1.1
Primary	156	7.9
Secondary (vocational training)	238	12.0
Lower secondary	643	32.5
Upper secondary	354	17.9
Post-secondary (vocational training)	191	9.7
University	348	17.6
DK/DA	27	1.4
<b>Social class</b>		
Upper	52	2.7
Upper-middle	379	19.9
Middle-middle	1087	57.1
Lower-middle	300	15.8
Lower	64	3.4
DK/DA	22	1.2
<b>Size of town, no. of inhabitants</b>		
<10 000	437	22.1
10 001-100 000	773	39.1
100 001-250 000	319	16.1
>250 000	450	22.7
<b>Place of Residence</b>		
Rural	498	25.2
Urban	1456	73.6
DK/DA	25	1.3

Taken from López-Aldeguer J et al.<sup>17</sup>

between children with or without a diagnosis of AD based on the information collected during the interview.

Of the children that participated in the first phase of the interview, 41.3% had a medical diagnosis of AD; this was made by a pediatrician in 57.5% of cases, by a dermatologist in 41.6%, and by a general practitioner or



**Figure 3.** Presence of eczema during lifetime and of dry skin in the past year for the whole group shown by age.

allergologist in the remainder. The mean age at diagnosis was 2.3 (2.9) years.

**Prevalence of AD**

Based on the information collected during the telephone interview and the diagnostic criteria of the UK Working Party, 8.6% of the children in our series had AD.

As can be seen in Table 3, this diagnosis coincided with that made by a physician in 75.3% of the cases. Significant differences were observed between the percentage of diagnoses made by a physician and of those made on the basis of the telephone interview (P = .01).

**Table 3.** Comparison Between Diagnoses of Atopic Dermatitis (AD) Made on the Basis of a Telephone Interview and by a Physician<sup>a</sup>

P = .01		AD Diagnosed Following Telephone Interview				Total		
		Yes		No				
		Frequency, No.	%	Frequency, No.	%	Frequency, No.	%	
AD Diagnosed by a Physician	Yes	128	75.3	24.7	214	214	41.3%	
	No	40	23.5	71	287	287	55.4%	
	DK/DA	2	1.2	4.3	17	17	3.3%	
Total		170	100	348	518	100	518	100%

Abbreviation: DK/DA, doesn't know, doesn't answer.

<sup>a</sup>Statistically significant difference between diagnoses (P = .01)

Based on our findings, we calculated a prevalence of 8.6% (95% confidence interval, 7.4-9.8) for AD in Spain.

## Characteristics of the Retest Group

Of the 1979 participants in the first phase of the telephone interview, 110 were randomly selected for participation in the retest phase.

The prevalence of AD in the retest group was 9.1%.

Of the children diagnosed with AD in the first phase, 1.8% did not meet the diagnostic criteria in the retest phase. In contrast, 6.4% of those who did not meet the criteria in the first phase did so in the retest phase.

Test-retest agreement was 91.8%, with a  $\kappa$  statistic of 0.36.

## Phase 2

### Sociodemographic Characteristics

The parents of 170 children diagnosed with AD on the basis of the information collected during the first interview and the criteria of the UK Working Party (Table 1) participated in the second phase.

Over half (58.2%) of the children diagnosed with AD were boys and 78.2% were aged between 0 and 10 years.

We found significant differences within this group in terms of social class, with a higher percentage of children from middle-middle class families (51.5%) than from upper-class families (2.4%) ( $P = .01$ ).

### Clinical Characteristics

Almost half (45.3%) of the children had a history of asthma and 42.3% of allergic rhinitis/pollen allergy; 62.4% had a family history of eczema, asthma, or allergic rhinitis/pollen allergy.

The most common sites for lesions were the flexures of the arms and the legs, followed by the extensor surface of the arms and the legs, and the face.

Itch intensity in the week prior to the interview was graded on a scale of 0 (no discomfort) to 10 (greatest imaginable discomfort); the mean score for this group was 2.5 (2.5).

The children had experienced a mean of 16.2 (60.5) exacerbations in the year before the interview and had been free of symptoms for a mean of 6.5 (3.9) months.

The factors reported as causing or exacerbating the itching/eczema were season (74.1%), body temperature (47.1%), dry atmosphere (42.4%), and the use of woolen or synthetic clothing (41.2%).

## Treatment

A quarter (25.3%) of the parents reported that their children had been treated with oral corticosteroids, although when they named these drugs, it became apparent that they were not all corticosteroids. A similar confusion occurred with topical corticosteroids, reportedly used by 57.6% of the children, and with oral and topical noncorticosteroids.

Based on the information collected during the telephone interview, we calculated that 38.8% of the children with AD had been treated with corticosteroids.

## Seasonal Variations

Of the 170 children diagnosed with AD based on the information collected during the telephone interview, 103 were analyzed for seasonal variations. Of these, 79.6% were under 10 years old and 38.8% were girls.

Statistically significant differences between winter (phase 1 of the study) and summer (phase 2) were found for increase in body temperature ( $P = .01$ ), periods of stress ( $P < .01$ ), dust ( $P < .01$ ), use of or contact with woolen or synthetic clothing ( $P < .05$ ), and use of certain soaps or personal hygiene products ( $P < .05$ ) (Table 4).

There were also significant differences between winter and summer in terms of the location of lesions. Neck involvement was reported in 41.5% of the children in the winter and in 46.2% in the summer ( $P < .01$ ); the corresponding figures for the extensor surface of the arms and the legs were 52.3% and 61.5%, respectively ( $P < .05$ ).

Agreement between the percentage of children with eczema in winter (64.9%) and in summer (27.7%) was 54.3% and the  $\kappa$  statistic was 0.19 ( $P < .011$ ).

## Discussion

The prevalence of AD detected in our series (8.6%) is similar to that reported for Spanish teenagers in the International Study of Asthma and Allergies in Childhood<sup>2</sup> (ISAAC) and to figures published for school children in Madrid, Spain,<sup>13</sup> and for other European countries.<sup>14</sup>

Our findings corroborate the association between AD and a family history of atopy<sup>15</sup> as almost half of the relatives of the children studied had some form of atopic disease. This, combined with the fact that we found similar lesion distribution patterns to those described in the literature for different age groups, support the reliability of our results.

A limitation of our study is that there were discrepancies between the diagnoses made by the children's physicians and those made on the basis of the telephone interview. In the case of the telephone interview, however, we might

**Table 4.** Presence of Factors Associated With Atopic Dermatitis (AD) in Study Phases 1 and 2

Factors	Phase 1, % of Patients	Phase 2, % of Patients	P
Increase in body temperature	53.8	69.2	.010 <sup>a</sup>
Periods of greater stress	20.0	47.7	.003 <sup>a</sup>
Seasonal exacerbation	80.0	83.1	.382
Dry atmosphere	41.5	36.9	.094
Dust	32.3	29.2	.006 <sup>a</sup>
Use of/contact with woolen or synthetic clothing	47.7	50.8	.030 <sup>a</sup>
Certain foods	21.5	12.3	.059
Certain soaps or personal hygiene products	36.9	24.6	.017 <sup>a</sup>
None of the above	0.0	3.1	
Carpeting in room where child lives/studies	11.8	7.8	
Regular contact with pets	32.0	24.3	

<sup>a</sup>Statistically significant difference between phase 1 and phase 2.

have detected mild cases or cases of recent onset in which the parents had not yet had the opportunity to consult a doctor.

We also might not have detected certain cases during the telephone interview because the children's symptoms had improved with the prescribed treatment, making it impossible to detect the condition using the telephone questionnaire. Another possibility is that certain parents might have confused signs or symptoms of AD, including the eczematous lesions, with other inflammatory skin diseases such as seborrheic dermatitis or psoriasis, which, like AD, are common in the general population.

All of the parents interviewed might have forgotten or even been unaware of mild symptoms that their child might have had before the interview. This, however, would not have introduced bias into the study as it would have affected all the respondents and all the questions similarly.

Finally, some parents might also have exaggerated the symptoms of their children. It has indeed been reported that some parents believe that, by exaggerating their

child's condition, they are attaching greater importance to the problem.<sup>16</sup>

The test-retest reliability was low, with a  $\kappa$  statistic of 0.36. A low  $\kappa$  value is obviously a serious limitation, as it indicates poor reliability of the measurement tool. Nonetheless, a deeper analysis of the data shows a certain degree of agreement between the answers given in first and second phases, leading us to believe that the low  $\kappa$  value obtained was simply due to the small number of participants in the retest phase (less than 6% of the original group).

The demographic characteristics of the parents and children from the second phase were homogeneous and similar to those of the participants in the first phase, corroborating the robustness of our results.

We found the presence of several risk factors for DA (such as carpeting in rooms where the child lives or studies or regular contact with cats or dog) in the lives of a considerable proportion of the children studied, although no significant associations were found in any of the cases. Exposure to environmental risk factors has also been found to be associated with allergic diseases other than AD.<sup>17,18</sup>

We found that parents were poorly informed regarding the treatment their children were receiving for AD; this was particularly evident with regard to corticosteroid and noncorticosteroid treatments, which were confused in some cases. In 2003, Beattie et al<sup>19</sup> demonstrated that parents and/or carers of children with AD were unfamiliar with the topical treatments their children were using. They also showed that the majority of parents did not read product inserts. This could explain why the parents in our study confused corticosteroids with noncorticosteroids as such information is contained in these leaflets.

Knowing what treatment one's child is taking could be a relatively important factor as it has been shown that parental fears regarding the use of corticosteroids in children with AD is associated with a reduction in treatment adherence and a corresponding increase in related morbidity.<sup>20</sup>

We found that AD severity increased in winter. The main reasons given for these exacerbations were exposure to dust and the use of certain soap and personal hygiene products. In the summer, there was a greater prevalence of typical AD lesions in exposed areas (face and arms and legs) than in the winter. The main reasons reported were an increase in body temperature, stress, and the use of synthetic clothing.

In a recently published article, onset of AD was found to be unrelated to both seasonality and contact with pets or food.<sup>11</sup> The authors, however, did find 2 distinctive patterns of seasonal variations, with one group of patients experiencing worsening of symptoms in the winter and another experiencing these exacerbations in the summer.

This would explain why no significant differences were observed for the group as a whole. One of the main criticisms of the study in question is that only 38 children were analyzed.<sup>21</sup>

We also found that there were no significant differences from one season to the next in terms of the percentage of patients that experienced symptoms during the 7 days before the interview (48.9% in winter and 33.1% in summer). We did not analyze whether there were distinctive patterns within the group but if there were, this would explain why we did not find significant seasonal variations in our series.

In conclusion, further studies are required to analyze seasonal variations in exacerbations of AD, taking into account the possible existence of at least 2 distinct seasonal patterns. Finally, we suggest that parents and carers of children with AD should be provided with better information about the disease and in particular about prescribed treatments.

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## Conflicts of Interest

The authors declare that they have a working relationship with Novartis Farmacéutica, S.A.

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