PPAD: A tool for presumption of atopic dermatitis

Laurent MISERY, Jean-Paul ORTONNE, Frédéric CAMBAZARD, Gérard GUILLET, Luc THOMAS, Gérard LORETTE, Vincent DUROSIER, Nora RAHHALI, Marie AUGES, Charles TAIEB

1Dermatology Department, Brest University Hospital, Brest, 2Dermatology Department, Nice University Hospital, Nice, 3Dermatology Department, Saint-Etienne University Hospital, Saint Priest en Jarez, 4Dermatology Department, Poitiers University Hospital, Poitiers, 5Dermatology Department, Lyons University Hospital, Pierre-Bénite, 6Dermatology Department, Tours University Hospital, Chambray les Tours, 7Laboratoires Dermatologiques A- Derma, Lavaur, and 8Department of Public Health, Laboratoires Pierre Fabre, Boulogne, France

ABSTRACT

Although it is a frequent disease, atopic dermatitis is poorly recognised and therefore under-diagnosed. The aim of this study was to define and validate a convenient tool allowing presumption of atopic dermatitis for non-dermatologists. A 20-item questionnaire (PPAD) and an 8-item short version (PPAD-S) were developed in French by a board of experts, then tested on outpatients presenting with atopic dermatitis or not. Diagnosis was confirmed by a dermatologist, who measured the severity of the disease by using SCORAD. PPAD and PPAD-S proved to be efficient tools for presumption of atopic dermatitis, but not tools for diagnosis. Scores were correlated to the severity of the disease. PPAD and PPAD-S can be considered useful tools for orientating patients with undiagnosed atopic dermatitis to a specialised consultation, all the more quickly since atopic dermatitis is severe.

Key words: atopic dermatitis, diagnosis, patient, scale.

INTRODUCTION

The prevalence of atopic dermatitis (AD) is increasing. Thirty years ago, fewer than 5% of newborns presented with AD. The prevalence of AD has increased two- to threefold over the past 30 years. AD now affects 10–20% of children and 1–3% of adults.1,2 For reasons that are poorly understood, but which seem to be connected with changes in the environment and lifestyles, increasing numbers of patients are suffering from AD.

Early diagnosis and treatment are a necessity, as much for the immediate comfort of patients2 and those around them,3 whose quality of life is greatly affected, as for preventing the AD from worsening or even asthma from occurring if it is not treated.4

Unfortunately, AD is probably underdiagnosed as diagnosis is not always obvious for non-dermatologists, its clinical manifestations being polymorphous, varying with age and sometimes being confused with other inflammatory dermatoses.5 This is why we conceived the idea of constructing a tool to aid simple diagnosis and capable of being used by non-dermatologist health professionals (trainee nurses, pharmacists) and by parents of children who may be suffering from AD: a scale of presumption of AD.

METHODS

An initial set of items was developed following a review of international published work,6,7 interviews with health professionals known for working with atopic patients and a set of structured interviews carried out with young or adult patients suffering from AD and presenting with different levels of severity. Parents of young children suffering from AD were questioned in order to supplement verbatim accounts. This group enabled a rich, structured verbatim account to be obtained. These items were subsequently regrouped using keywords to avoid redundancies, then reformulated in question form.

An initial questionnaire using simple vocabulary was thus constructed around 20 questions. The questionnaire was called “PPAD”, standing for “Presumption of Possible Atopic Dermatitis”.

The responses to each question were dichotomic, the subject replying: “yes”, “no” or “don’t know”. The “don’t know” response proved necessary during the investigations to avoid any confusion between intentional non-responses and non-responses due to lack of comprehension. Eight of the twenty questions evaluated the history of the subject and his family (ancestry and siblings), two
**PATIENT QUESTIONNAIRE**

You or your child has a skin problem.
This questionnaire will help your pharmacist or you, to determine the risk of whether or not it is an 'Atopic Eczema' also called 'Atopic Dermatitis', thus requiring a consultation with a dermatologist.

This questionnaire can be completed by an adult or a child. For children, it is preferable that it be completed with the help of the parents.

Once you have completed the questionnaire, please give it to your dermatologist at the beginning of the consultation.

**Date of birth: — / — / —— Who is filling the questionnaire: □ The atopic patient □ The parent □ An other adult, specify ………………

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Do you have any itching?</td>
<td>□ Yes □ No □ I don’t know</td>
</tr>
<tr>
<td>2) Do you have scratch marks on your skin?</td>
<td>□ Yes □ No □ I don’t know</td>
</tr>
<tr>
<td>3) Do you have sleep troubles?</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>4) Do you have difficult sleep?</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>5) Do you think you may have eczema?</td>
<td>□ Yes □ No □ I don’t know</td>
</tr>
<tr>
<td>6) Is your skin red?</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>7) Is your skin swollen?</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>8) Is your skin peeling?</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>9) Are the lesions symmetric (right/left)?</td>
<td>□ Yes □ No □ I don’t know</td>
</tr>
<tr>
<td>10) Do the scratch marks tend to come and go?</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>11) Which are the affected areas on your body?</td>
<td>□ Hands, □ Wrists, □ Ankles, □ Feet, □ Cheeks, □ Scalp, □ Thighs, □ Legs, □ Calves, □ Arm, □ Forearm, □ Belly, □ Back, □ Elbows creases, □ Knee creases, □ Neck creases, □ Other …</td>
</tr>
<tr>
<td>12) Has your skin been generally dry over the last year?</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>13) Have you ever had allergies?</td>
<td>□ Yes □ No □ I don’t know</td>
</tr>
<tr>
<td>14) Have you ever had hay fever?</td>
<td>□ Yes □ No □ I don’t know</td>
</tr>
<tr>
<td>15) Have you ever had asthma?</td>
<td>□ Yes □ No □ I don’t know</td>
</tr>
<tr>
<td>16) Have you ever had eczema before?</td>
<td>□ Yes □ No □ I don’t know</td>
</tr>
<tr>
<td>17) Do your parents, and/or your brothers and sisters have history of allergy?</td>
<td>□ Yes □ No □ I don’t know</td>
</tr>
<tr>
<td>18) Do your parents, and/or your brothers and sisters have history of hay fever?</td>
<td>□ Yes □ No □ I don’t know</td>
</tr>
<tr>
<td>19) Do your parents, and/or your brothers and sisters have history of asthma?</td>
<td>□ Yes □ No □ I don’t know</td>
</tr>
<tr>
<td>20) Do your parents, and/or your brothers and sisters have history of eczema?</td>
<td>□ Yes □ No □ I don’t know</td>
</tr>
</tbody>
</table>

**FRENCH**

Avez-vous des démangeaisons ?
Avez-vous des traces de grattage sur la peau ?
Pensez-vous qu’il s’agisse d’un eczéma ?
La peau est-elle rouge ?
Les lésions ont-elles tendance à disparaître et à revenir ?
Depuis 1 an, avez-vous tendance à avoir la peau desséchée ?
Avez-vous déjà eu de l’eczéma ?

**SPANISH**

¿Sientes picor?  Al rascarse, ¿deja marcas sobre la piel?
¿Cree que se trata de un ecema?  ¿Se le enrojece la piel?
¿Las marcas tienden a desaparecer y reaparecer?
¿Ha notado que tiene la piel seca en el último año?
¿Ha tenido anteriormente un ecema?

**ITALIAN**

Soffre di prurito?  La pelle presenta traccia di graffi?
Pensa che si tratti di eczema?
La pelle è arrossata?
La pelle si scrofa?
I graffi provocati dal grattarsi tendono a sparire e ricomparire?
Da un anno a questa parte, la pelle tende a essere secca?
Ha già sofferto di eczema?

**ENGLISH**

Do you have any itching?
Do you have scratch marks on your skin?
Do you think you may have eczema?
Is your skin red?
Is your skin peeling?
Do the scratch marks tend to come and go?
Has your skin been generally dry over the last year?
Have you ever had eczema before?

**Figure 1. PPAD questionnaire.**

Questions evaluated sleeping difficulties and quality of sleep, one question described the location of the atopy and nine questions assessed skin condition (Fig. 1).

A psychometric validation or cognitive debriefing was carried out in compliance with recommendations in two successive stages: administration of the questionnaire for patients belonging to the target population, then conducting of individual structured interviews with each participant. The purpose of the cognitive debriefing is to identify and resolve any problems encountered, such as the translation of a question or a form of phrasing that causes confusion or is difficult to understand. The aim is to express the question clearly so that it is fully understood and to optimize the acceptability of the questionnaire without altering the meaning of the original question.

In order to consolidate validation of the questionnaire by a description of the levels of decision scores, it was tested out during the same week in outpatient consultations in six university hospital dermatology departments (Brest, Lyon, Nice, Poitiers, Saint-Etienne, Tours). In order to avoid administering the questionnaire to "over-informed" or "over-educated" atopic patients, all patients consulting during that week were invited by hospital staff to reply to the questionnaire regardless of the reason for the consultation.
The way in which the hospital departments were organized made it possible to test out the questionnaire with an adult population (>16 years) as well as with a younger population (≤16 years).

In order to avoid the partiality of a diagnosis of AD not being confirmed by a dermatologist, once subjects had completed the questionnaire they gave it to the dermatologist at the start of the consultation who declared the absence or presence of AD. In the latter case, the dermatologist evaluated the severity of the disease using SCORAD.5

The patients’ sex and age as well as how long they had had AD were recorded. If patients were not capable of replying to the questionnaire themselves, the person accompanying them replied to the questionnaire.

SCORAD5 (“SCORing Atopic Dermatitis”) is an index enabling the severity of AD to be evaluated. It was worked out by the European Task Force on Atopic Dermatitis. SCORAD makes it possible to standardize measurement of the severity of AD using a global approach by taking objective and subjective signs into account. Three different factors are evaluated:

A Extent of the AD (scale of 0–102), evaluating the extent of the inflammatory lesions.

B Intensity of the atopic dermatitis (scale of 0–18), evaluated according to six items: erythema, edema and papules, crusts and oozing, excoriations, lichenification, skin dryness.

C Subjective signs of the AD (scale of 0–20), evaluating the intensity of the pruritus and loss of sleep.

The score is then calculated according to the formula: 
\[(A/5) + (7B/2) + C\]. The AD is considered slight if the score is below 15, moderate if the score is between 15 and 40, and severe if it is over 40.

Subsequently, and in order to make application of the questionnaire easier for non-dermatologists, we wanted to create a short version of the PPAD questionnaire: the PPAD-S. To do this, we identified, then selected, the questions in respect of which a significant statistical difference clearly showed up between those subjects presenting with AD and those who did not.

The quantitative variables were compared using Student’s t-test or ANOVA in more than two groups. In the event of the conditions required for implementing these tests not being met, non-parametric tests were carried out (Mann–Whitney Wilcoxon in comparing two groups and Kruskal–Wallis in comparing more than two groups). The qualitative variables were compared using \(\chi^2\)-test or Fisher’s exact test if the implementation conditions were not met. All the statistical analyses were carried out with the aid of the SAS ver. 8.2 software.

RESULTS

Approximately 2000 questionnaires were made available; 1667 were handed out and 1412 subjects replied to the questionnaire and returned it to the dermatologist. While the average age was 40.63 years, 332 subjects were 16 years and under and 1080 were over 16.

Among those aged 16 years and under, approximately one subject in four had AD (24.1%). The average age was 6.75 years for patients with AD compared with 9.27 years for patients without AD.

The sex ratio was 45.42–54.58% in favor of girls. The mean SCORAD score in patients with AD was 33.15 (±18.32), with no significant difference in terms of sex (\(P = 0.0789\)). The AD was slight in 4.52%, moderate in 10.84% and severe in 8.73% of subjects aged 16 years and under.

The mean PPAD score (score including the exact number of sites affected) was 7.02 ± 5.38 for all patients aged 16 years and under. The mean score was higher in those suffering from AD (12.13 ± 5.43) than in those without AD (5.36 ± 4.19), the difference being significant (\(P < 0.0001\)). The PPAD score was all the higher when the AD was severe (\(P < 0.0001\)) (Fig. 2).

The responses to certain questions were particularly interesting. Thus, it was found that 85.33% of patients with AD complained of pruritus compared with 38.24% of those without AD. Similarly, 72.00% compared with 22.88% said they scratched themselves and 29.73% compared with 17.01% said they had difficulty sleeping (\(P < 0.05\)). With regard to the other atopic diseases, 10.53% compared with 8.97% said they suffered from hay fever.

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fever ($P > 0.05$) and 25.86% compared with 11.03% said they had asthma ($P < 0.05$). A history of eczema was reported by 51.72% of patients with AD compared with 32.41% of those who did not have AD ($P < 0.05$). Allergies in the family were reported in 52.63% compared with 46.21% of cases ($P > 0.05$). A family history of hay fever was found in 36.84% compared with 30.56% of cases.

In those over 16 years, approximately one subject in 25 had AD (4.63%). The average age was 35.54 years for patients with AD compared with 51.18 years for patients without AD. The sex ratio was 45.96% to 54.05% in favor of women. The mean SCORAD score in patients with AD was 31.92 (±24.60), with no significant difference in terms of sex ($P > 0.05$). The AD was slight in 1.39%, moderate in 1.76% and severe in 1.48% of subjects aged 16 years and over.

The mean PPAD score was 7.04 ± 5.36 for all patients aged 16 years and over. The mean score was higher in those suffering from AD (13.98 ± 7.07) than in those without AD (6.67 ± 4.99), the difference being significant ($P < 0.0001$) (Fig. 2).

As for subjects aged 16 years and under, the responses to certain questions were particularly interesting. Thus, it was found that 75.56% of adult patients with AD complained of pruritus, while only 48.92% of those without AD did so. Similarly, 67.39% compared with 30.54% said they scratched themselves ($P < 0.01$) and 44.44% compared with 31.45% said they had difficulty sleeping ($P > 0.05$). With regard to the other atopic diseases, 51.35% compared with 25.19% said they suffered from hay fever ($P < 0.01$) and 47.50% compared with 13.68% said they had asthma ($P < 0.01$). A history of eczema was reported by 35.90% of patients with AD compared with 17.89% of those who did not have AD ($P < 0.05$). Allergies in the family were reported in 48.78% compared with 18.60% of cases ($P > 0.05$). A family history of hay fever was found in 35.90% compared with 13.68% of cases.

In order to optimize application of the questionnaire and make it accessible to the greatest number, it seemed appropriate and advisable to create a short version of it. To this end, a statistical analysis made it possible to identify the questions in respect of which a significant difference clearly showed up between those subjects presenting with AD and those who did not. Eight questions were decided upon.

![Figure 3. Presence or non-presence of atopic dermatitis (AD) according to age.](image)
1 Do you have any itching?
2 Do you have scratch marks on your skin?
3 Do you think you may have eczema?
4 Is your skin red?
5 Is your skin peeling?
6 Do the scratch marks tend to come and go?
7 Has your skin been generally dry over the last year?
8 Have you ever had eczema before?

The first two questions concerning itching and scratching were coded 0 = “no”, 2 = “yes” and were omitted for the “don’t know” response. The six other questions were coded 0 for “no”, 1 for “yes” and omitted for “don’t know”. The score was therefore between 0 and 10.

The mean PPAD-S score was then 7.20 (±2.36) in patients aged 16 years and under with AD and 2.48 (±2.46) in those without (P < 0.0001). It was 8.50 (±1.53) in cases of severe AD, 7.03 (±1.99) in cases of moderate AD and 5.00 (±2.86) in cases of slight AD (P < 0.0001).

The mean PPAD-S score was then 6.76 (±3.21) in patients over 16 with AD and 3.27 (±2.77) in those without (P < 0.0001). It was 7.79 (±2.69) in cases of severe AD, 7.11 (±3.45) in cases of moderate AD and 5.29 (±3.02) in cases of slight AD (P < 0.0001).

There was no significant difference in terms of age (Fig. 3).

DISCUSSION

The aim of the PPAD questionnaire was to enable diagnostic orientation for AD, in other words, to allow a presumption of AD, but in no way to establish a diagnosis of AD. This aim is achieved because the score is clearly higher if AD is present (nearly 13) than if it is not (nearly 7).

The short version of the PPAD, the PPAD-S, developed because the PPAD questionnaire could be somewhat tiresome to use, seemed simpler but just as efficient and can replace the PPAD.

The mean PPAD-S score is approximately seven in patients with AD and three in those without. Similarly, it is approximately eight in cases of severe AD, seven in cases of moderate AD and five in cases of slight AD. A score higher than four can indicate possible presumption and a score higher than six likely presumption. The PPAD-S was linguistically and culturally translated according to the recommendations in force in English, Italian and Spanish, thus making it available and valid in four languages.

When this study was carried out, it is relevant to note that pruritus was very often present at the time of a dermatology consultation: this was so in nearly half the patients. This figure should be compared with that of the existence of pruritus in the general population, which concerns approximately one-third of the population, according to a Norwegian study. Conversely, nearly one patient in five with AD seems not to complain of pruritus even if pruritus is a diagnostic criterion for the disease. If it is present, pruritus is not necessarily accompanied by scratching, but is so more continually during AD, which may be a fact suggesting more intense pruritus, but also suggests pruritus of a different kind according to its etiology.

In conclusion, the PPAD appears as a convenient tool to have a presumption of AD and its severity for non-professionals. However, it is not a scale for diagnosis and we do not recommend it as an alternative to diagnosis criteria like those of the UK Working Party. After a presumption of AD is detected, there is a need to confirm diagnosis by a medical doctor. If the PPAD score is higher, it suggests that a consultation is needed shortly.

REFERENCES