



Original Article

# Knowledge, attitudes and practices in the management of atopic dermatitis amongst allergists, dermatologists and pediatricians: A nation-wide survey

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## ABSTRACT

**Objectives:** Atopic dermatitis (AD) is a chronic, inflammatory cutaneous disorder that presents with typical morphology and distribution of lesions. This disorder is commonly treated by dermatologists, allergists, and pediatricians. The objective of this study was to facilitate the integration of practices and attitudes in AD with physicians who most commonly treat this disease. Our study consisted of mapping medical knowledge in AD through research aimed at these three specializations.

**Material and Methods:** Using the electronic platform SurveyMonkey<sup>®</sup>, an online questionnaire about AD was created and sent to the participants' digital media and E-mail by their respective national medical societies.

**Results:** Around, 1924 questionnaires were answered by dermatologists (41.8%), pediatricians (41.8%), and allergists (16.5%); the latter being those who achieved the highest average score (79.2%  $P < 0.0001$ ). Question (Q) 13 was the one with the highest overall score (96.8%;  $P = 0.040$ ), and the best pediatric performance (95.6%;  $P = 0.040$ ). The one with the lowest overall score was Q19 (23.2%;  $P < 0.0001$ ). Q30 achieved a higher score by allergists (92.4%;  $P < 0.0001$ ), and dermatologists, Q21 (87.6%;  $P = 0.002$ ).

**Conclusion:** The exchange of knowledge of AD among the three specialties can be beneficial in contributing to greater expertise in AD management, due to the possibility of a rich exchange of experiences between these professionals. Since this was an online survey, 100% participation could not be achieved.

**Keywords:** Atopic dermatitis, Attitudes, Knowledge, Practices, Questionnaires, Surveys

## INTRODUCTION

Atopic dermatitis (AD) is a chronic inflammatory disease of the skin, with typical morphology and distribution of lesions, with intense itching as a characteristic feature.<sup>[1]</sup> AD, being a heterogeneous and chronic condition is characterized by erythematous to eczematous plaques with varying degrees of lichenification.<sup>[2]</sup> To facilitate both the integration of practices and attitudes in AD among the medical specialists who treat this disease the most, enabling the improvement of quality of care to the Brazilian population with AD, and to know the reality of medical knowledge in AD in the national territory, our study consisted of mapping medical knowledge in AD

through national research aimed at allergists, dermatologists, and pediatricians.

### Medical understanding regarding AD

A comparative study conducted in 2014 examined the primary international guidelines established by allergists/immunologists, dermatologists, and pediatricians, revealing discrepancies in the approaches employed by the various physician groups treating AD, as they adopt different strategies and consequently achieve varying outcomes.<sup>[3]</sup> The guidelines from several global organizations of allergists/immunologists, dermatologists, and pediatricians were compared, revealing

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**Table 1:** Differences between the recommendations of the AAD Guidelines, JTF Guidelines, European Guidelines, and APA Guidelines in relation to the management of AD.

Treatment	Guideline			Asia-pacific (APA)
	AAD	JTF	European	
<b>Topical therapies</b>				
TCS+TCI combination	Combination TCS and TCI therapy may be more effective than either alone	Not discussed	Contraindicates combined TCS and TCI therapy, concluding that it is not useful	Not discussed
“Dip and rub” technique	Soaking and smearing technique with TCS or TCI recommended	Soaking technique and smear with recommended moisturizers	Not discussed	Recommended soaking and smearing technique with TCS
Fear of corticosteroid use	Counseling on fear of corticosteroid use	Not discussed	Not discussed	Concerns about fear of corticosteroid use
Bleach baths	Effective as a therapy to decolonize <i>Staphylococcus aureus</i>	They are promising, but require more studies	May be helpful in reducing the severity of AD	Effective in AD patients who have secondary bacterial infection
Tar topical	There is insufficient data to recommend the topical use of tar	May be beneficial, but should not be used on skin with inflammation	Not discussed	Not discussed
Oral medications	Recommendations on dosage, adverse effects, follow-up, drug interactions, and contraindications of oral immunomodulatory therapies	Recommendations on dosage, adverse effects, initial and follow-up tests, drug interactions, and contraindications of oral therapies	Recommendations on dosage, adverse effects, initial and follow-up tests, drug interactions, and contraindications of oral therapies	Recommendations on dosage, adverse effects, initial and follow-up tests, drug interactions, and contraindications of oral therapies
<b>Treatment</b>	<b>Guideline</b>			<b>Asia-pacific (APA)</b>
<b>Other recommendations</b>	<b>AAD</b>	<b>JTF</b>	<b>European</b>	
Systemic therapy				
Antibiotics for secondary infection, with or without skin culture or without skin culture	Skin culture if initial antibiotic therapy fails	Suggested skin culture for methicillin-resistant <i>S aureus</i> before prescribing antibiotics initially	Not discussed	Not discussed
Silver-impregnated garments and silk garments	Effectiveness of silver or silk impregnated clothing is unclear	Silver or silk impregnated clothing can help patients	Clothes impregnated with silver or silk can help	Not discussed
Additives in the bath	There is not enough evidence to support bath additives	Bath additives such as oatmeal and baking soda) may have antipruritic effects	Not discussed	Emollient can be used during bathing
Vitamin D	There is no evidence to recommend the use of vitamin D	Recommends the use of vitamin D	There is not enough evidence to recommend the use of vitamin D	Not discussed
Environmental modifications	There is no evidence to support the laundry modifications; changes in temperature and humidity not discussed	Recommend environmental modifications (temperature and humidity control and laundry modifications)	It is recommended to avoid irritating fabrics and occlusive clothing	Not discussed

(Contd...)

**Table 1: (Continued)**

<b>Treatment</b>	<b>Guideline</b>			<b>Asia-pacific (APA)</b>
<b>Topical therapies</b>	<b>AAD</b>	<b>JTF</b>	<b>European</b>	
Allergen-specific immunotherapy	Testing required before indicated aeroallergen minimization; recommends only house mite covers	Recommends minimizing exposure to aeroallergens without testing and using covers and weekly washing of bedding and carpet removal	Supports minimization of exposure to house dust mites without testing	Not discussed
Aeroallergens	There is not enough evidence to support immunotherapy	Tests required before using immunotherapy for specific allergens	Tests required before using immunotherapy for specific allergens	Not discussed
Food allergy test	Recommends diagnostic elimination diet for 4–6 weeks or controlled oral food challenge if specific food allergy is clinically suspected	Recommends food-specific IgE testing if there is clinical suspicion of specific food allergy; oral food challenge only if IgE test results are negative	Recommends controlled oral food challenge if specific food allergy is clinically suspected	Not discussed
<b>Treatment</b>	<b>Guideline</b>			<b>Asia-pacific (APA)</b>
<b>Other recommendations</b>	<b>AAD</b>	<b>JTF</b>	<b>European</b>	
Systemic therapy				
Psychological care	Not discussed	Recommends psychological evaluation and treatment for patients with emotional distress if it is affecting treatment adherence	Psychosomatic counseling may be helpful for patients	Not discussed

AAD: American academy of dermatology, JTF: Joint task force on practice parameters, APA: Asia pacific allergy, TCI: topical calcineurin-inhibitors, TCS: topical corticosteroids. Source: Adapted. IgE: Immunoglobulin E, AD: Atopic dermatitis

that while there are similarities in established therapies and fundamental principles of AD, such as the use of emollients and topical corticosteroids, significant differences exist in recommendations, particularly concerning adjuvant therapies and auxiliary treatments, including preventive strategies for allergic triggers that exacerbate AD, which are more frequently implemented by allergists<sup>[3]</sup> [Table 1]. A French survey conducted in 2004 also assessed physicians' knowledge and practices regarding the treatment of AD.<sup>[4]</sup> Barbarot and his team conducted telephonic interviews with a sample of 100 dermatologists, 100 pediatricians, 100 general practitioners, and 100 allergists. The survey aimed to create an inventory of reported practice intentions concerning AD among a representative sample of physicians, facilitating the assessment of future changes in practices following the release of new consensus recommendations for AD at the time of the survey. The study concluded that treatment modalities differ by specialty; specifically, only dermatologists utilize the full spectrum of topical corticosteroid activity levels for local treatment. Conversely, environmental and hygiene measures

are frequently recommended similarly across all specialties. Notably, no general practitioner, dermatologist, or pediatrician systematically conducts food allergy testing, irrespective of the patient's age. Allergists/immunologists are more likely to recommend substituting allergenic foods with alternatives.<sup>[4]</sup> A subsequent study conducted in Cameroon assessed the knowledge, attitudes, and practices regarding the treatment of AD among physicians and other healthcare professionals. The findings revealed the following:<sup>[5]</sup>

- A notable discrepancy when compared to the outcomes of the 2004 Enquête Nationale Française.
- Interviewees struggled to define the chronic phase of AD.
- There was an inability to establish the genetic associations related to the condition.
- The study highlighted inadequate management practices for AD among the surveyed physicians and healthcare professionals.
- There is a pressing need for the development of guidelines and the organization of regular continuing medical education sessions for healthcare professionals.<sup>[5]</sup>

The aforementioned findings underscore the necessity for further studies to enhance the understanding of best practices in managing AD, as well as the need to facilitate the integration of knowledge from diverse guidelines addressing the same condition.

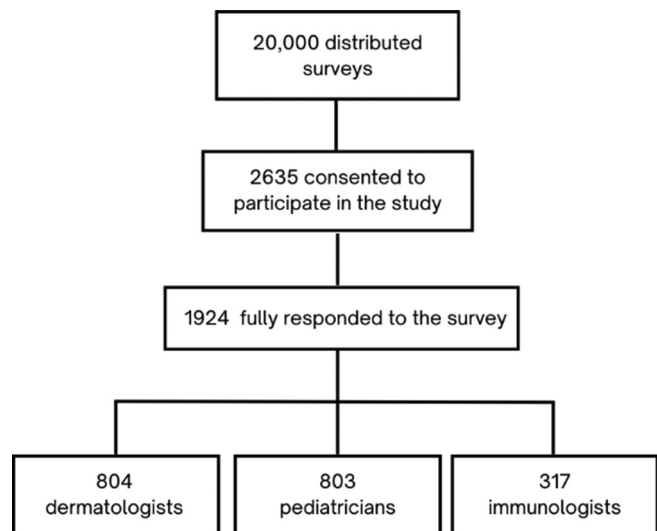
## MATERIAL AND METHODS

A nationwide cross-sectional study from August 2020 through August 2021 was conducted, using the SurveyMonkey<sup>®</sup> electronic platform. A questionnaire was prepared for online distribution, authored by the researchers, and built in two stages. The first stage consisted of 11 questions about the sociodemographic aspects of the participants, and the following variables were collected: Age, gender, medical specialty, profile of the place of care, educational level, and updated knowledge about AD (time since the participating physician last attended a lecture on AD, and the evaluation of self-knowledge in AD). The second stage included 20 questions addressing the major areas of knowledge in AD (epidemiology, pathophysiology, diagnostic methods, treatment, and complications), aligned with current consensus on the disease. The Likert scale served as a framework for formulating the questions, which were categorized based on their complexity: Questions of fundamental knowledge (the essential knowledge required for a physician to diagnose and treat a patient with AD at a basic level), questions of adequate knowledge (the knowledge necessary for a physician to diagnose and treat a patient with AD satisfactorily), and questions of desirable knowledge (the knowledge required for a physician to diagnose and treat a patient with AD with excellence) were delineated. For questions of fundamental knowledge, the primary topics presented in the introductions and abstracts of scientific articles related to AD, without a cutoff date, were considered during selection. For questions of adequate knowledge, recurring themes from bibliographic review articles on AD, also without a cutoff date, were utilized. In contrast, for questions of desirable knowledge, topics exclusively addressed in systematic reviews of the literature from the past 4 years were selected, in addition to information from the principal national and international consensuses on AD. The subject descriptor "AD" was employed, utilizing electronic data from journals indexed in the National Library of Medicine (MEDLINE - PubMed) and the Scientific Library Online. The questionnaire was applied to allergists, dermatologists, and pediatricians, being distributed by the respective medical societies, the *Associação Brasileira de Alergia e Imunologia* (ASBAI), the *Sociedade Brasileira de Dermatologia* (SBD), and the *Sociedade Brasileira de Pediatria* (SBP). The questionnaire was also sent by the authors to the social media profiles of the medical specialists. The sample calculation was based on a study conducted in 2018, by the *Federal University of São Paulo* (UNIFESP), on Brazilian medical demography.<sup>[6]</sup> It

was considered that a representative sample should include at least 800 pediatricians, 800 dermatologists, and 300 allergists. For data analysis, the Chi-square test ( $\chi^2$ ) (association between sociodemographic variables, and correct answer of the survey with the specialty) and the adjusted  $\chi^2$  were performed, at the level of 1.7%, aiming to control the type I error ( $\alpha$  error), and analysis of variance (one-way) followed by Tukey's multiple-way comparison test.

## RESULTS

Approximately 20,000 surveys were distributed to medical specialists through Email and social media. Of these, 2635 participants consented to engage in the study, with 73%, or 1924 respondents, completing the survey in its entirety. For the total sample, 1924 questionnaires were included (73% of the 2,635 surveys), all of which were fully answered, comprising: 804 (41.8%) from dermatology; 803 (41.7%) from pediatrics; and 317 (16.5%) from immunology [Figure 1]. Allergy was the specialty with the highest mean score in our test, presenting a percentage of 79.2% of correct answers [Table 2]. Dermatologists had the second highest score, with an average of 68.9%, and pediatricians had 61.0%. Our findings found that specialists who had been recently updated in their understanding of AD achieved a higher



**Figure 1:** Organisation chart of questionnaire responses.

**Table 2:** Descriptive of the percentage of questionnaire setting by speciality.

Sample	<i>n</i>	Average	SD	Median
Total	1924	67.3	14.9	68.4
Allergists	317	<b>79.2</b>	11.7	78.9
Dermatology	804	68.9	14.1	68.4
Pediatrics	803	61.0	13.4	63.2

SD: Standard deviation, Bold values: Medical speciality with highest mean score in the test.

**Table 3:** Sociodemographic variables in the total sample and according to the specialty.

Variable	Total		Dermatology (E1)		Pediatrics (E2)		Allergists (E3)		P-value <sup>a</sup>	Significant differences <sup>b</sup>
	n	%	n	%	n	%	n	%		
Schooling										
Doctor of philosophy	70	3.6	19	2.4	22	2.7	29	<b>9.1</b>	<b>&lt;0.0001</b>	<b>E1≠E2≠E3</b>
Masters	207	10.8	87	10.8	70	8.7	50	<b>15.8</b>		
Expert	847	44.0	392	<b>48.8</b>	302	37.6	153	48.3		
Residency+graduation	800	41.6	306	38.1	409	<b>50.9</b>	85	26.8		
Works most of the time										
Private/polyclinic clinic	1184	61.5	662	<b>82.3</b>	326	40.6	196	61.8	<b>&lt;0.0001</b>	<b>E1≠E2≠E3</b>
Private hospital	156	8.1	24	3.0	110	<b>13.7</b>	22	6.9		
Public hospital	345	17.9	53	6.6	240	<b>29.9</b>	52	16.4		
Basic Health Unit	132	6.9	40	5.0	82	<b>10.2</b>	10	3.2		
Private/public university	107	5.6	25	3.1	45	5.6	37	<b>11.7</b>		
Preferred work activity										
Care	1731	90.0	731	<b>90.9</b>	731	<b>91.0</b>	269	84.9	<b>0.0001</b>	<b>E1≠E3 e E2≠E3</b>
Undergraduate teacher	73	3.8	15	1.9	35	4.4	23	7.3		
Lecturer in postgraduate/Advisor professor	68	3.5	36	4.5	16	2.0	16	5.0		
Health management	52	2.7	22	2.7	21	2.6	9	2.8		
Update in AD										
<6 months	978	50.8	432	<b>53.7</b>	281	35.0	265	<b>83.6</b>	<b>&lt;0.0001</b>	<b>E1≠E2≠E3</b>
up to 2 years	588	30.6	252	<b>31.3</b>	291	36.2	45	14.2		
>2 years/don't remember	358	18.6	120	14.9	231	<b>28.8</b>	7	2.2		
Personal knowledge about AD										
Insufficient	47	2.4	13	1.6	30	<b>3.7</b>	4	1.3	<b>&lt;0.0001</b>	<b>E1≠E2≠E3</b>
Regular	374	19.4	117	14.6	242	<b>30.1</b>	15	4.7		
Good	1271	66.1	575	<b>71.5</b>	490	61.0	206	65.0		
Great	232	12.1	99	12.3	41	5.1	92	<b>29.0</b>		

The data were expressed by frequency (n) and percentage (%). (a) General  $\chi^2$  test. (b) significant differences according to the adjusted statistical test, at the level of 1.7% (comparison 2 to 2), AD: Atopic dermatitis, Bold values: Higher level of education and academic interest on the part of allergists. Identification of notable distinctions among the three medical specialties.

percentage of correct answers as compared to those who had not attended any recent academic sessions on AD [Table 3]. Regarding the self-assessment of the participating physicians, there was a confirmation of the individual perception of personal knowledge in AD. Consequently, individuals who regarded their knowledge as excellent achieved the highest average percentage of correct responses, while the participants' scores diminished as they were assigned a lower self-assessment [Table 3]. Dermatology and immunology had a higher percentage of physicians with a specialist degree (48.8% and 48.3%, respectively), with immunology having the highest percentage of physicians with master's degrees (15.8%) and Doctor of Philosophy (9.1%) [Table 3]. Allergists considered themselves the most updated (<6 months) with 83.6% compared to 53.7% of dermatologists and 35% of pediatricians [Table 3]. Of the allergists participating in the study, 11% answered that they had university affiliations and

were most related to the academic environment. According to our study of the questionnaire's second stage, Q13 ("The prevalence of AD is higher in:") had the greatest overall percentage of accurate answers (96.8%), followed by Q18 ("The typical clinical picture of AD is characterized by:"), which had 95.7% accurate answers. Both questions were regarded as essential AD information [Table 4]. Q19 ("What can we not associate the pathogenesis of pruritus in AD to?") and Q25 ("In the healthy skin of patients with AD we can observe, except:") had the lowest mean percentage of accurate responses (23.2% and 32.2%, respectively) [Table 4]. Allergists had a higher percentage of correct answers in Q30 ("Dupilumab is an immunobiological drug, recently approved by the FDA for the treatment of AD. Regarding its mechanism of action, it prevents which substances from binding to its target receptors?") and Q24 ("What are the main allergens participating in the etiopathogenesis of

Survey question	Correct answer	Total		Dermatology		Pediatrics		Immunology	
		n	%	n	%	n	%	n	%
Q13: The prevalence of atopic dermatitis is higher in:	✓ Children	1863	96.8	786	97.8	768	95.6	309	97.5
Q14: Atopic dermatitis is characterized by	✓ Immune activation and epithelial barrier dysfunction	1821	94.6	767	95.4	738	91.9	316	99.7
Q15: Which of the following signs or symptoms is NOT suggestive of atopic dermatitis?	✓ Pain	1811	94.1	767	95.4	740	92.2	304	95.9
Q16: Is it considered major criterion for the diagnosis of atopic dermatitis?	✓ Personal or/and family history of atopy	1004	52.2	426	53.0	422	52.6	156	49.2
Q17: Which of the following factors is NOT considered a trigger for worsening atopic dermatitis?	✓ Use of soaps with low pH	945	49.1	417	51.9	345	43.0	183	57.7
Q18: The typical clinical picture of atopic dermatitis is characterized by	✓ Erythema. Flaking in areas of flexure and itching	1842	95.7	783	97.4	749	93.3	310	97.8
Q19: What cannot we associate the pathogenesis of pruritus in atopic dermatitis?	✓ Inhibition of IL31	446	23.2	173	21.5	137	17.1	136	42.9
Q20: It is considered the most relevant and frequent pathogen responsible for aggravating an atopic dermatitis	✓ <i>Staphylococcus aureus</i>	1659	86.2	742	92.3	618	77.0	299	94.3
Q21: Which of the following statements is false in relation to the use of moisturizers in the treatment of atopic dermatitis?	✓ Do not change the intensity of itching	1629	84.7	704	87.6	654	81.4	271	85.5
Q22: Regarding the use of topical corticosteroids in the treatment of atopic dermatitis. we can state that	✓ Controls itching and eczematous lesions	1368	71.1	625	77.7	503	62.6	240	75.7
Q23: Are filaggrin gene changes associated with the following findings in atopic dermatitis, except?	✓ Increased ceramide production	1059	55.0	539	67.0	300	37.4	220	69.4
Q24: What are the main allergens participating in the etiopathogenesis of atopic dermatitis?	✓ Mites, milk and egg	1484	77.1	558	69.4	615	76.6	311	98.1
Q25: On the apparently healthy skin of patients with atopic dermatitis we can observe, except	✓ Greater diversity of the microbiota	619	32.2	230	28.6	243	30.3	146	46.1
Q26a e Q26b: If you answered yes, which statement best defines this score?	✓ It's a gravity score	1194	62.1	494	61.4	418	52.1	282	89.0
Q27: In patients diagnosed with atopic dermatitis, refractory to treatment, which should NOT be considered	✓ Low serum vitamin B12 levels	1467	76.2	630	78.4	541	67.4	296	93.4
Q28: Regarding the use of systemic immunomodulators in atopic dermatitis (AD), we can state that	✓ Cyclosporine is potentially nephrotoxic	1053	54.7	545	67.8	257	32.0	251	79.2
Q29: About complementary tests on atopic dermatitis, what can we say?	✓ The specific IgE dosage assesses allergen awareness	1411	73.3	566	70.4	550	68.5	295	93.1

(Contd...)

**Table 4:** (Continued).

Survey question	Correct answer	Total		Dermatology		Pediatrics		Immunology	
		n	%	n	%	n	%	n	%
Q30: Dupilumab is an immunobiological drug, recently approved by the FDA for the treatment of atopic dermatitis. Regarding its mechanism of action, it prevents which substances from binding to its target receptors?	✓ IL-4 e IL-13	1061	55.1	417	51.9	351	43.7	293	92.4
Q31: On the complications in atopic dermatitis (AD), we can state that	✓ Exfoliative erythromycin may be related to <i>Staphylococcus</i> spp. infections.	867	45.1	352	43.8	361	45.0	154	48.6

The data were expressed by frequency (n) and percentage (%). IgE: Immunoglobulin E, FDA: Food and drug administration, IL: Interleukin, Q26a: Does doctor know the term SCORAD (Scoring Atopic Dermatitis)?  
 Note: Questions 1 through 12 pertained to the initial stage of the study questionnaire, with the consent form as the first question, followed by questions 2 to 12, which gathered personal and professional information from the research participants.

atopic dermatitis?”), scoring 92.4% and 89%, respectively. Dermatologists had a higher percentage of correct answers in Q21 responses (“Which of the following statements is false in relation to the use of moisturizers in the treatment of atopic dermatitis?”) and Q22 responses (“Regarding the use of topical corticosteroids in the treatment of atopic dermatitis, we can state that:”), with 87.6% and 77.6%, respectively. Pediatricians coincided with the best performance in the questionnaire precisely in the questions with the best overall score of our study, questions 13 and 18, respectively [Table 4].

## DISCUSSION

AD is commonly treated by dermatologists, allergists, and pediatricians. Although physicians are not fully aware of the guidelines created by specialized organizations other than their own, the knowledge and updating of these professionals on AD are fundamental to ensuring a good quality of life for patients with this disease.<sup>[3,7]</sup> In our study, we can attribute three factors to allergists having performed the highest score in our questionnaire among the three medical specialties researched: the higher education of allergists (higher percentage of master’s and Doctor of Philosophy degrees), attachment, and affiliation in teaching institutions, and recent participation in any academic event associated with AD. In the three variables mentioned above in the questionnaire, it can be assumed that concerned participants are inclined to update themselves academically. Regarding the self-assessment of the participating physicians, there was a confirmation of the individual perception of their knowledge in AD due to a proportional relationship of this with the performance in our survey, thus demonstrating the interest of parties in this research by responding correctly and sincerely [Table 5]. In the analysis of the second stage of the questionnaire, we observed that the questions with the highest general percentage of correct answers (Q13 and Q18)

**Table 5:** Percentage of questionnaire setting (%) according to update variable and personal knowledge in AD.

Variable	n	Percentage of correct answers in the questionnaire
		Average±SD
Update on AD		
1		
<6 months	978	72.3±14.2
2		
up to 2 years	588	64.1±13.4
3		
>2 years/do not remember	358	58.9±13.4
Personal knowledge about AD		
1		
Insufficient	47	55.6±14.3
2		
Regular	374	59.6±13.7
3		
Good	1271	68.3±14.2
4		
Great	232	76.5±13.0

SD: Standard deviation, AD: Atopic dermatitis

(areas of knowledge in epidemiology and pathophysiology, respectively) can be considered fundamental knowledge of AD because both its prevalence in the infantile age group and the clinical characteristic of eczema related to allergic mechanisms (questions themes) can be identified in the scientific literature since 1933 as the description of AD.<sup>[8-10]</sup> The questions with the most correct answers by allergists were Q30 and Q24 (areas of knowledge in diagnostic methods

and treatment, respectively), which involve the management and immunopathological knowledge of AD, with atopic hypersensitivity being an important cause of eczematous eruptions in this disease.<sup>[8]</sup> Although dupilumab operates through an immune-mediated mechanism,<sup>[11]</sup> which may enhance its familiarity among allergists and immunologists, it has garnered significant global attention. This drug has been extensively described and promoted by numerous specialty organizations, including Brazilian entities such as SBD, ASBAI, and SBP<sup>[1,12]</sup> We also observed that the questions with the highest percentage of correct answers from dermatologists were Q21 and Q22 (areas of knowledge in treatment). Both address the practice in the therapy of AD with topical medications. Studies show that dermatologists base their management of AD on skin hydration, the use of topical anti-inflammatory drugs, the prevention of triggering factors, and educational programs.<sup>[1,13,14]</sup> The lowest percentage of correct answers from dermatologists was in Q24 and may be related to a less common practice of these specialists to allergic tests. According to a study conducted with eighteen specialists with experience in AD, indicated by SBD, 89% reported not performing the prick test or RAST as part of their routine evaluation in patients of AD.<sup>[1]</sup> The questions with the highest percentage of correct answers in pediatrics were also those with the highest overall score of this study (Q13 and Q18), which had as their central theme, basic concepts of AD (the essential knowledge required for a physician to effectively diagnose and manage a patient with AD at a fundamental level).<sup>[4]</sup> A hypothesis for pediatricians to have scored less in our test among the three specialties can be that pediatricians have a common practice of referring the most severe cases of AD to dermatology. In general, pediatricians do not have the practice in second-line treatments and the necessary knowledge to deal with a more resistant and prolonged AD. Our study pioneered the evaluation of medical knowledge on AD in Brazil through an online survey. Our research, highlights the importance of continuously updating the academic knowledge of medical specialists to ensure optimal management and therapeutic approach for AD. Brazilian allergists not only demonstrated strong performance across all areas assessed in our study but also exhibited greater expertise in managing and prescribing therapies related to immunoallergic mechanisms. Dermatologists, in contrast, had a deeper understanding of AD management, particularly regarding medications and topical therapies. Pediatricians displayed solid knowledge of the fundamental characteristics that define AD. However, dermatologists and pediatricians lacked the level of expertise that allergists had in allergy testing and the use of immunobiological drugs.

## CONCLUSION

We conclude that the exchange of medical knowledge on AD among the three specialties examined in this study,

present both in the training courses of medical specialists and, in academic meetings, can be beneficial in contributing to a greater expertise of allergists, dermatologists, and pediatricians in their management of AD, due to the possibility of a rich exchange of experiences between these professionals. Empowering these medical professionals to manage their patients with more complete AD knowledge might improve the quality of life of patients and also upgrade medical education in AD.

**Ethical approval:** The research/study was approved by the Institutional Review Board at Research Ethics Committee of the Federal University of Rio de Janeiro, number 33551420.2.0000.5257, dated 08th July, 2021.

**Declaration of patient consent:** Although the research was not conducted with a sample of patients but rather with volunteer medical professionals, the authors affirm that they obtained all necessary consent from the physicians involved in the study.

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**Use of artificial intelligence (AI)-assisted technology for manuscript preparation:** The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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