



Is corticophobia spreading among pediatricians? – Insights from a self-efficacy survey on the management of pediatric atopic dermatitis

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Background: Atopic dermatitis (AD) is a chronic dermatological condition, often diagnosed and managed by pediatricians. However, pediatricians have difficulties with adhering to guidelines, which recommend the use of topical corticosteroids (TCS) as a first-line treatment and oral corticosteroids (OCS) for resistant cases. Our aim was to assess pediatricians' self-confidence in using steroids in the management of pediatric AD, and investigate which characteristics are related to high self-confidence in prescribing corticosteroids (CS).

Methods: We conducted a cross-sectional questionnaire study among Israeli pediatricians between April 2022 and June 2022. Participants were asked to answer questions dealing with self-assessment of prescribing CS in the management of AD.

Results: A total of 171 residents and pediatricians participated in the survey; 86.6% and 28.1% admitted feeling either average or below-average confidence in the prescription of OCS and TCS, respectively. Physicians who were exposed to higher AD patients ($P=0.048$) and worked at the clinics (88.2% vs. 60.4%, $P<0.001$) had high self-confidence in treating AD with TCS. Males (20.3% vs. 8%, $P=0.03$), and having gone to medical school outside Israel (22.2% vs. 10.4%, $P=0.09$) were all related to high self-efficacy in prescribing OCS. In total, 11.7% of participants confessed to refraining from prescribing steroids because of fear of side effects.

Conclusions: Most pediatricians have below-average confidence in prescribing OCS for the treatment of AD. Males, working in a community setting, and previous exposure improve the confidence level and can be easily considered in future pediatric training programs.

Keywords: Atopic dermatitis (AD); corticophobia; medical education; pediatrician

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Introduction

Atopic dermatitis (AD), or eczema, is a highly common dermatological condition characterized by a rash and intense pruritus that significantly impairs quality of life (1-3). In Western countries, the current prevalence of AD is approximately 2–10% in adults and 10–30% in children (4), with 85% of them presenting before the age of 5 years (4). Current treatments include proactive maintenance therapy during remission phases (5), liberal use of emollients and daily bathing with soap-free cleansers (6), and topical corticosteroids (TCS) during flares (4). Systemic immunosuppressive treatments such as cyclosporine or azathioprine may also be used, especially in resistant cases (4). Though no longer recommended by guidelines, oral corticosteroids (OCS) are still commonly used for management of moderate to severe cases (4,7-10).

In most cases, cutaneous manifestations precede the onset of type 2 (t2)-driven diseases (11). Based on the development of t2 pathologies in atopic march, in general, dermatologists and pediatricians represent the sentinels for

the early identification and treatment of patients with AD. However, lack of proper training in dermatology during pediatric residency hinders pediatricians from adhering to guidelines and pushes them to be more conservative in their use of corticosteroids (CS), particularly in terms of potency and duration (12). This ultimately incites them to refer even mild AD patients to dermatologists (3,13,14) which further increases waiting time and deepens an already growing shortage (13).

The cautious approach of pediatricians to CS use also resonates with a widely described phenomena currently happening in the general population called corticophobia (15). Present mainly in patients and caregivers, this phobia is characterized by a systematic avoidance of CS out of fear of potential side effects such as skin atrophy, hypopigmentation or acneiform eruptions (15,16). Social media may contribute to steroid phobia: much of this content consists of patients describing negative personal experiences with TCS and subsequently discouraging viewer use (17). As topical corticophobia prevalence worldwide is increasing, poor compliance to treatment, especially in pediatric patients, may result in persistent AD disease and early escalation to systemic agents (18). It is, however, still unclear whether pediatricians' self-confidence regarding the use of CS in AD might influence the corticophobia found in the general population.

One common and appropriate method to assess medical personnel's confidence is self-efficacy surveys which evaluate an individual's belief in their ability to complete a specific task (19-21). Self-efficacy refers to the assurance in one's ability to execute the necessary steps towards achieving a desired goal. It significantly influences the achievement outcomes by interacting with environmental and behavioral factors in a dynamic manner (22). Self-efficacy assessments have proven to correlate with clinical performance and success of physicians and residents (23). Studies have shown that higher self-efficacy beliefs are related to mastery of activity and can motivate people to perform a task more frequently. This helps build successful experiences which in turns reinforce high self-efficacy beliefs and future behavior (24,25). Our study estimates the self-efficacy of pediatricians regarding the action of prescribing steroids specifically for AD, in order to achieve the desired goal, referred by

Highlight box

Key findings

- Most pediatricians have below-average confidence in prescribing oral corticosteroids for the treatment of atopic dermatitis (AD). Males, working in a community setting, and previous exposure improve the confidence level and can be easily considered in future pediatric training programs.

What is known and what is new?

- Lack of proper training in dermatology during pediatric residency hinders pediatricians from confidently using steroids in AD, as guidelines suggest. This might aggravate an already existing corticophobia in the general population which may ultimately lead to poorer AD care.
- We investigated pediatricians' self-confidence level in using steroids when managing AD and analyzed various characteristics pertaining to pediatricians' training and practice that might influence their confidence.

What is the implication, and what should change now?

- Factors involved in low confidence for steroid prescription are easy to address and should be considered as the focus of future pediatric training program modifications.

Bandura as the future outcome (26), of patient healing.

Expanding on recent data published on corticophobia in pediatricians (27), we investigated pediatricians' self-confidence in using CS specifically in the management of AD. We estimated the self-efficacy of pediatricians when treating AD with CS. Additionally, we analyzed whether various characteristics pertaining to pediatricians' training and practice correlate with their confidence in using CS when dealing with AD.

Our main hypothesis is that specific attributes can characterize pediatricians with average or low self-efficacy. Those attributes are helpful in the adjustment of pediatric training programs. We present this article in accordance with the SURGE reporting checklist (available at <https://tp.amegroups.com/article/view/10.21037/tp-23-271/rc>).

Methods

This study is a cross-sectional questionnaire study conducted among Israeli pediatricians between April 2022 and June 2022. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The Institutional Review Board of Soroka University Medical Center granted an exemption as the responses were anonymous and no patients or data related to patients were involved.

Participants

Our population was composed of pediatricians. That incorporated pediatric residents and board-certified pediatric specialists which included attendings, fellows or double board-certified pediatricians who worked either in community clinics or hospitals, in Israel. Resident trainees in other specialties than pediatrics or physicians also involved in children care without prior pediatric specialization, including general practitioners and pediatric dermatologists, were excluded from our selection process. Participation and completion of the questionnaire were voluntary. All subjects expressed consent when entering and completing the questionnaire in the link sent by email or message. Subject confidentiality was maintained throughout the study and all the information collected by the questionnaire was anonymous.

Questionnaires

Data was collected by a Google-based questionnaire. The

questionnaire used in our study is original and copyrighted as acceptable. The questionnaire was comprised of three different parts. The first section focused on participants' self-assessment regarding their ability to treat and diagnose skin disorders in general and specifically AD. This study will mainly focus on the questions dealing with self-assessment of AD management with steroids. The second section dealt with educational tools participants experienced during their training course. The third section contained demographic questions regarding participants' age, gender, religion, location of medical school (Israeli/non-Israeli medical school), level of training (resident/specialist), current workplace (hospital/community/private clinics), and job seniority. Participants were also asked to roughly estimate how many children with skin disorders and/or AD they encountered during the past year. Our questionnaire aimed to identify and compare the characteristics of respondents with high *vs.* low self-efficacy regarding their confidence to use TCS or OCS when managing skin disorders, particularly AD. The questionnaire can be found in [Appendix 1](#).

Statistical analysis

All tests were conducted using SPSS version 20. *T*-tests were done for quantitative variables that were normally distributed in the population and Mann-Whitney tests were performed for quantitative variables that were not normally distributed in the population, as well as for ordinal variables. All qualitative variables such as gender, religious group, medical school, or stage in residency were analyzed by Chi-square tests. Associations between the level of self-efficacy and suspected confounders were examined using a multivariate logistic regression. This calculation included all variables that were found to be statistically significant or of clinical significance.

Results

Of the 350 pediatricians who received the questionnaire, 171 participated and filled it out (48.9%). Our respondents consisted primarily of females (59.1%) and the average age of the overall population was 41.05 ± 10.55 years. While the proportion of residents amounted to 38.6%, pediatric specialists were represented at 60.2%. In total, 78.4% of respondents went to medical school in Israel, and 62.2% of participants declared to be working in a hospital setting. Details about all the baseline characteristics of our

Table 1 Baseline characteristics of the study population

Characteristics	Statistic results
Age (years)	41.05±10.55
Gender (n=171)	
Male	69 (40.4)
Female	101 (59.1)
Other/do not want to answer	1 (0.6)
Religion (n=171)	
Jewish	134 (78.4)
Christian	2 (1.2)
Muslim	21 (12.3)
Other/do not want to answer	14 (8.2)
Marital status (n=171)	
Bachelor	21 (12.3)
Married	142 (83.0)
Divorce	2 (1.2)
Other/do not wish to answer	6 (3.5)
Country of medical school (n=171)	
Israeli medical school	134 (78.4)
Non-Israeli medical school	37 (21.6)
Medical status (n=171)	
Resident	66 (38.6)
Specialist	50 (29.2)
Fellowship	16 (9.4)
Specialist with sub-specialty	37 (21.6)
Other/do not want to answer	2 (1.2)
Stage in residency [†] (n=70)	
Before stage 1 exam	49 (70.0)
After stage 1 exam	4 (5.7)
After stage 2 exam	17 (24.3)
Years of residency [†] (n=70)	
1	12 (17.1)
2	13 (18.6)
3	25 (35.7)
4	11 (15.7)
5	6 (8.6)
Other/do not want to answer	3 (4.3)
Current place of work [‡] (n=193)	
Hospital	120 (62.2)
Community based clinic	66 (34.2)
Private practice	7 (3.6)

Data are presented as mean ± standard deviation or n (%). [†], only residents could answer this question. [‡], respondents could pick more than one answer.

population can be found in *Table 1*.

In the questionnaire, three questions regarding pediatricians' self-confidence to prescribe and use steroids when managing AD were asked. The first question had participants rate on a scale from 1 to 5, 1 being the lowest score, 5 the highest score and 3 the average, how confident they were advising and prescribing TCS when dealing with AD without consulting with a dermatologist. In total, 28.1% of respondents declared to have a below or average confidence in prescribing TCS while 71.9% declared to be above average. We further analyzed these data according to the demographic characteristics obtained as well as according to the training methods and training duration participants have had. The univariate analysis showed a significant difference in the number of pediatric residents feeling above average-confident to advise and prescribe TCS compared to pediatric specialists when managing AD (61.5% vs. 77.7% respectively, P=0.03). A significant difference of participants reporting a high confidence in prescribing TCS was also found in participants working in clinics ('community work') compared to those not working in clinics (88.2% vs. 60.4%, P<0.001). Additionally, when asking participants to estimate the number of children they monitor with skin disorders in general and specifically AD, both analyses showed a statistically significant increase of confidence when higher numbers of children with skin disorders were monitored by the physician (*Figure 1*).

Multivariable logistic regressions on these parameters showed that working in a community setting and having a higher number of patients with AD were statistically significant in the confidence pediatricians had in prescribing TCS [odds ratio (OR): 2.97, P=0.036 and OR: 1.7, P=0.048, respectively]. However, training level (being resident or attending) and the estimated number of children with skin disorders other than AD, failed to reach significance (OR: 0.8, P=0.608 and OR: 1.18, P=0.531, respectively). Detailed results and statistics about this first question can be found in *Tables 2,3*.

Similarly, the second question asked participants to rate, on the same scale, their confidence in prescribing OCS treatments to AD patients, without consulting with a dermatologist. In total, 86.6% of respondents judged their confidence to be equal to or below average while 12.9% judged themselves confident in using systemic steroids. In our sub-analysis of above-average confident participants, the univariate analysis revealed that older age (48.81±11.72 vs. 39.97±9.95, P=0.003), being a male (20.3% vs. 8.0%, P=0.03), and being a specialist (19.4% vs. 3.1% of residents,

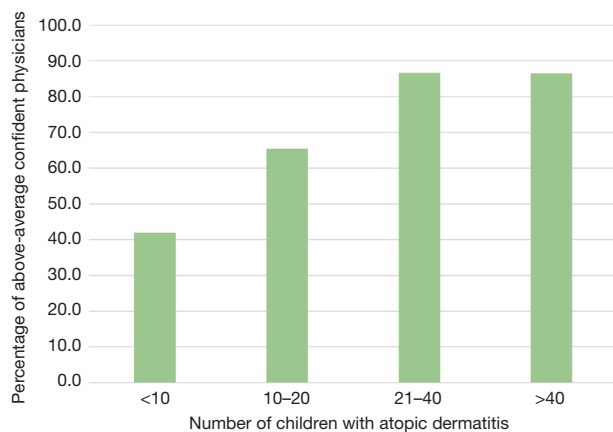


Figure 1 Percentage of physicians that are above-average confident in prescribing topical steroids according to the number of atopic dermatitis patients they monitor.

Table 2 Self-assessment evaluation in advising and prescribing topical steroid treatment without consulting a dermatologist

Scale	N (%)
1	6 (3.5)
2	21 (12.3)
3	21 (12.3)
4	80 (46.8)
5	42 (24.6)

1: strongly disagree; 3: average; 5: strongly agree.

$P=0.002$) were all factors that were found statistically significant in the higher confidence of prescribing OCS in children with AD. Although not significant, having gone to medical school outside of Israel was trending towards relevance (22.2% *vs.* 10.4% who went to medical school in Israel, $P=0.09$). However, multiple logistic regressions conducted on these parameters showed that only gender (OR: 0.25, $P=0.011$) and going to medical school outside of Israel (OR: 3.72, $P=0.021$) managed to reach significance in the way pediatricians judged their confidence in prescribing OCS (see *Tables 4,5*).

The third and last question aimed to assess the fear of prescribing steroids because of potential side effects. In this way, we assumed that at least part of the possible hesitancy related to CS use concerned the possible adverse effects. Participants were asked to rate on the same scale of 1 to 5 how likely they were to avoid prescribing steroids because

of side effects. In total, 88.4% of respondents declared to be below or equal to average, while 11.7% of respondents were above average-likely to avoid steroids by fear of side effects. In our univariate analysis, only religion was found to be significant variable in steroid treatment avoidance due to fear of side effects. Jewish participants were less likely to report side effects as a reason to avoid steroid prescription in the management of AD (91.8% *vs.* 75.7% of 'Other religion', $P=0.01$) (*Tables 6,7*). Finally, it is worth noting that no statistical difference was found between the two confidence level groups when comparing prior training methods in dermatology, in any of the three questions.

Discussion

Recent scientific literature has shown that though TCS remains the gold standard for AD therapy, many AD therapeutic failures appear to be attributable to poor adherence to treatment due to corticophobia (18). This apprehension is motivated by various sources but has been tightly linked to a lack of information, on the one hand, and deliberate online misinformation, on the other hand (16,18). Exposure to conflicting information between physicians and informal internet searches along with discrepancies in management between pediatricians and dermatologists, may cause up to 80% of AD patients to be afraid of using TCS in the management of their disease (15,28). In their study, Li *et al.* reported that 95.7% of parents whose children used TCS were worried about side effects and 92.7% delayed medical treatment because of corticophobia (29). Though our study does not bring evidence of such influence in the prescription of CS by pediatricians, Aubert-Wastiaux *et al.* showed that in their study group, health professionals admitted that their own fears might be responsible for inadequate information and inappropriate warnings given to patients (28). Because patients' compliance to prescribed CS is one of the most important factors in the mitigation of AD (30), confident prescription of these medications by pediatricians along with a strong patient-doctor relationship appears to be essential in ensuring treatment adherence of patients (18,28).

Our study is, to our knowledge, the first study to explore pediatricians' self-efficacy on CS use specifically in the management of AD. Our study gathered data from a large cohort of practicing pediatricians across Israel ($n=171$) and was able to pinpoint characteristics that influence how confident these physicians feel in prescribing CS when treating AD patients. Almost a third of our participants

Table 3 Characteristics of participants' confidence in advising and prescribing topical steroid treatment

Characteristics	Confidence scoring ≤ average	Confidence scoring > average	Univariate analysis P value	Multivariable logistic regression P value
Age (years)	40.47±10.83	41.33±10.49	0.63	
Gender (n=169)			0.72	
Male	21 (30.4)	48 (69.6)		
Female	27 (27.0)	73 (73.0)		
Religion (n=170)			0.83	
Jewish	37 (27.8)	96 (72.2)		
Other	11 (29.7)	26 (70.3)		
Country of medical school (n=170)			0.68	
Israeli medical school	39 (29.3)	94 (70.7)		
Non-Israeli medical school	9 (24.3)	28 (75.7)		
Medical status (n=168)			0.03	0.608
Resident	25 (38.5)	40 (61.5)		
Specialist	23 (22.3)	80 (77.7)		
Stage in residency (n=69)			0.18	
Before stage 1 exam	20 (41.7)	28 (58.3)		
After stage 1 exam	5 (23.8)	16 (76.2)		
Community work (n=169)			<0.001	0.036
Yes	8 (11.8)	60 (88.2)		
No	40 (39.6)	61 (60.4)		
Hospital department (n=121)			0.84	
One department	26 (34.7)	49 (65.3)		
More than one department	17 (37.0)	29 (63.0)		
Estimated children with skin disorder (n=167)			<0.001	0.531
<10	6 (42.9)	8 (57.1)		
10–20	20 (54.1)	17 (45.9)		
21–40	12 (26.0)	34 (73.9)		
>40	10 (14.3)	60 (85.7)		
Estimated children with atopic dermatitis (n=168)			<0.001	0.048
<10	18 (58.1)	13 (41.9)		
10–20	19 (34.5)	36 (65.5)		
21–40	6 (13.3)	39 (86.7)		
>40	5 (13.5)	32 (86.5)		
Dermatology training in medical school or internship (n=168)			0.98	
Yes	25 (28.4)	63 (71.6)		
No	23 (28.8)	57 (71.3)		
Dermatology training in residency (n=170)			0.84	
Yes	10 (26.3)	28 (73.7)		
No	38 (28.8)	94 (71.2)		

Respondents who did not provide an answer to the statement 'I prescribe topical steroidal treatment as needed to a patient with atopic dermatitis even without a dermatologist consult' were counted out of this analysis. In Addition, practitioners were not obligated to answer all questions. Therefore, the cumulative number of responses may be less than the total count for some of the questions. Non-responders were not included in the statistical analysis. Data are presented as mean ± standard deviation or n (%).

Table 4 Self-assessment evaluation in advising and prescribing systemic steroid treatment without consulting a dermatologist

Scale	N (%)
1	53 (31.0)
2	73 (42.7)
3	22 (12.9)
4	16 (9.4)
5	6 (3.5)

1: strongly disagree; 3: average; 5: strongly agree.

(28.1%) admitted feeling either average or below-average confident in the prescription of TCS when dealing with AD patients, regardless of age, gender, or dermatology training during pediatric residency. This proportion increases to up to 87% when considering OCS prescription. Certain factors such as working in a community setting and having a higher number of patients with AD seem to positively influence pediatricians' confidence level for TCS prescription while other factors such as gender and going to medical school outside of Israel were involved in boosting confidence level

Table 5 Characteristics of participants' confidence in advising and prescribing systemic steroid treatment

Characteristics	Confidence scoring ≤ average	Confidence scoring > average	Univariate analysis P value	Multivariable logistic regression P value
Age (years)	39.97±9.95	48.81±11.72	0.003	0.104
Gender (n=169)			0.03	0.011
Male	55 (79.7)	14 (20.3)		
Female	92 (92.0)	8 (8.0)		
Religion (n=170)			0.58	
Jewish	117 (88.0)	16 (12.0)		
Other	31 (83.8)	6 (16.2)		
Country of medical school (n=170)			0.09	0.021
Israeli medical school	120 (89.6)	14 (10.4)		
Non-Israeli medical school	28 (77.8)	8 (22.2)		
Medical status (n=168)			0.002	0.071
Resident	63 (96.9)	2 (3.1)		
Specialist	83 (80.6)	20 (19.4)		
Community work (n=169)			0.16	
Yes	55 (80.9)	13 (19.1)		
No	92 (91.1)	9 (8.9)		
Hospital department (n=121)			0.76	
One department	65 (87.8)	9 (12.2)		
More than one department	43 (91.5)	4 (8.5)		
Estimated children with skin disorder (n=167)			0.86	
<10	12 (92.3)	1 (7.7)		
10–20	33 (89.2)	4 (10.8)		
21–40	40 (85.1)	7 (14.9)		
>40	60 (85.7)	10 (14.3)		

Table 5 (continued)

Table 5 (continued)

Characteristics	Confidence scoring ≤ average	Confidence scoring > average	Univariate analysis P value	Multivariable logistic regression P value
Estimated children with atopic dermatitis (n=168)			0.17	
<10	27 (90.0)	3 (10.0)		
10–20	51 (91.1)	5 (8.9)		
21–40	34 (75.6)	11 (24.4)		
>40	34 (91.9)	3 (8.1)		
Dermatology training in medical school or internship (n=168)			0.12	
Yes	80 (90.9)	8 (9.1)		
No	66 (82.5)	14 (17.5)		
Dermatology training in residency (n=169)			0.58	
Yes	32 (84.2)	6 (15.8)		
No	115 (87.8)	16 (12.2)		

Respondents who did not provide an answer to the statement 'I prescribe systemic steroidal treatment as needed to a patient with atopic dermatitis even without a dermatologist consult' were counted out of this analysis. In Addition, practitioners were not obligated to answer all questions. Therefore, the cumulative number of responses may be less than the total count for some of the questions. Non-responders were not included in the statistical analysis.

Table 6 Self-assessment evaluation of steroid treatment avoidance due to side effects

Scale	N (%)
1	55 (32.2)
2	60 (35.1)
3	36 (21.1)
4	16 (9.4)
5	4 (2.3)

1: strongly disagree; 3: average; 5: strongly agree.

for OCS use. Prior dermatology training either during medical school or residency did not seem to influence pediatricians' confidence level in using TCS or OCS when dealing with AD patients. Interestingly, it does not seem to be an influential factor on side effect apprehension, either.

Consequently, our study does not find corticophobia as prominent in pediatricians as in the public, given the rather low level of physicians refraining from prescribing CS out of fear of side effects (11.6%). Nevertheless, considering our high proportion of pediatricians feeling average or below-average confident about TCS or OCS use, we gather that many other factors may exert influence on physicians'

confidence level when prescribing medications. These include, but are not limited to, physicians' educational background [such as initial training (31), continuing education (32) and/or academic involvement (33)], patient preferences, information sources pediatricians use, prescription habits, and experience managing a particular disease (32). The latter is further verified by our findings that first, indicate a more assertive use of TCS when pediatricians report managing a higher number of AD patients, and second, when physicians work in community clinics. This might be due to the fact that ambulatory settings favor higher exposures to patients with chronic diseases, including AD, as found in previous studies (34,35). Thus, experience in the mitigation of this disease gives pediatricians a better grasp on the efficacy and safety of TCS and may help them be more confident in adhering to steroid prescription guidelines in AD care.

This notion of clinical experience is all the more emphasized when considering that 88.4% of our participants reported not being confident in using OCS without consulting a dermatologist beforehand. As guidelines no longer recommend OCS use except in special cases, it is unsurprising that such a high number was found. However, recent literature has shown that OCS are still widely used in clinical practice, with a significant

Table 7 Characteristics of participants regarding steroid treatment avoidance

Characteristics	Confidence scoring \leq average	Confidence scoring $>$ average	P value
Age (years)	10.6 \pm 10.82	12.83 \pm 11.04	0.75
Gender (n=170)			0.63
Male	62 (89.9)	7 (10.1)	
Female	88 (87.1)	13 (12.9)	
Religion (n=171)			0.01
Jewish	123 (91.8)	11 (8.2)	
Other	28 (75.7)	9 (24.3)	
Country of medical school (n=171)			0.98
Israeli medical school	118 (88.1)	16 (11.9)	
Non-Israeli medical school	33 (89.2)	4 (10.8)	
Medical status (n=169)			0.46
Resident	60 (90.9)	6 (9.1)	
Specialist	89 (86.4)	14 (13.6)	
Community work (n=170)			0.34
Yes	58 (85.3)	10 (14.7)	
No	92 (90.2)	10 (9.8)	
Hospital department (n=122)			0.36
One department	66 (88.0)	9 (12.0)	
More than one department	44 (93.6)	3 (6.4)	
Estimated children with skin disorder (n=168)			0.6
<10	11 (78.6)	3 (21.4)	
10–20	33 (89.2)	4 (10.8)	
21–40	43 (91.5)	4 (8.5)	
>40	61 (87.1)	9 (12.9)	
Estimated children with atopic dermatitis (n=169)			0.27
<10	25 (80.6)	6 (19.4)	
10–20	52 (92.9)	4 (7.1)	
21–40	41 (91.1)	4 (8.9)	
>40	31 (83.8)	6 (16.2)	
Dermatology training in medical school or internship (n=169)			0.34
Yes	80 (90.9)	8 (9.1)	
No	69 (85.2)	12 (14.8)	
Dermatology training in residency (n=170)			0.77
Yes	33 (86.8)	5 (13.2)	
No	117 (88.6)	15 (11.4)	

Respondents who did not provide an answer to the statement 'I avoid prescribing steroidal treatment due to its adverse effects' were counted out of this analysis. In Addition, practitioners were not obligated to answer all questions. Therefore, the cumulative number of responses may be less than the total count for some of the questions. Non-responders were not included in the statistical analysis.

number of dermatologists using this therapy as first-line for severe cases (7,8). As these cases are mostly referred to dermatologists for a more precise management (3), it may be that the initial lack of proper adherence to guidelines regarding flare management worsened the condition and drives dermatologists to ultimately prescribe OCS. This also exposes a reality that has been found across many specialties which is the lack of preparedness and training during the initial and continuing education of physicians (36). Studies focusing on how pediatric residency translates into general pediatric practice have reported shortcomings and low confidence in the management of such medical areas as mental health, sports medicine or dermatological disorders (37,38). Though our results failed to demonstrate a relationship between training and higher confidence level in CS use, they clearly show that higher exposure to AD patients has a favorable impact on this confidence. This suggests that pediatric residents could greatly benefit from managing higher volumes of AD cases during their training and be better prepared to manage these patients later as specialists. Practically, this could translate into residents spending more time in community-based ambulatory settings as part of their residency program, where they would get valuable experience caring for AD patients, as our findings suggest.

While it may be difficult to draw any conclusion on the relevance of medical school location in how confident pediatricians are in using OCS, our results show that physician gender plays into this level of confidence, with male practitioners feeling more comfortable to prescribing systemic CS than female practitioners. This expands on recently published articles that show a difference in prescription habits according to physician gender. As such, Eggermont *et al.* showed for instance that because of differences in patient concordance and medical practice, female physicians were more likely to apply a 'wait and see policy' when dealing with common affections such as sore throats than male physicians who were quicker at prescribing antibiotics (39). Female physicians are generally more risk averse than male physicians (40) which usually lead them to have a more patient-centered approach along with a more restrictive attitude towards pharmacotherapy for the benefit of preventive medicine (41). Because both dermatology and pediatrics are primarily female-dominated fields (with up to 75% of pediatricians and about 70% of dermatologists being female in the US (42,43), we estimate that the risk of gender bias in the management of AD across these two specialties should be minimal, which further

reinforces our belief that gender differences may truly play into the dynamics of our results. This finding further suggests that physicians' training cannot be modeled after a one-size-fits-all design but should be considerate of these clear differences and ultimately be gender sensitive.

Our study has several strengths. First, the large number of participants offer a unique opportunity for an in-depth analysis of pediatricians' perceptions regarding AD management. It additionally helps us mitigate a possible sampling bias, as our large sample gives a true reflection of the Israeli pediatrician population regarding various characteristics such as gender, workplace, or past dermatological training. Moreover, our study could be easily replicated in different settings should other research teams wish to reexamine and expand on our results. However, our study also contains limitations. First, our questionnaire has not been validated yet. Nevertheless, we hope our study will encourage the use of our questionnaire as a prototype for future studies. Second, questionnaire studies might predispose to selection bias (those who answer the questionnaire might be different than those who don't). We believe our large sample size might mitigate this limitation.

Conclusions

Our data shows that most pediatricians have below-average confidence in prescribing OCS for treating AD, with smaller proportion having below-average confidence in prescribing TCS for the same indication. Males, working in a community setting, and having previous exposure to AD patients improve the confidence level and can be easily addressed and remedied via a future pediatric training program. This may in turn help improve patient's education regarding these therapies which would benefit the management of flares and help mitigate the growing corticophobia seen in the population. Further international studies warranted to the understanding of this significant subject across different countries and residency programs are needed.

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Footnote

Reporting Checklist: The authors have completed the SURGE reporting checklist. Available at <https://tp.amegroups.com/>

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Peer Review File: Available at <https://tp.amegroups.com/article/view/10.21037/tp-23-271/prf>

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <https://tp.amegroups.com/article/view/10.21037/tp-23-271/coif>). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The Institutional Review Board of Soroka University Medical Center granted an exemption as the responses were anonymous. All subjects expressed consent when entering and completing the questionnaire in the link.

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References

1. Fishbein AB, Silverberg JI, Wilson EJ, et al. Update on Atopic Dermatitis: Diagnosis, Severity Assessment, and Treatment Selection. *J Allergy Clin Immunol Pract* 2020;8:91-101.
2. Horii KA, Simon SD, Liu DY, et al. Atopic dermatitis in children in the United States, 1997-2004: visit trends, patient and provider characteristics, and prescribing patterns. *Pediatrics* 2007;120:e527-34.
3. Saavedra JM, Boguniewicz M, Chamlin S, et al. Patterns of clinical management of atopic dermatitis in infants and toddlers: a survey of three physician specialties in the United States. *J Pediatr* 2013;163:1747-53.
4. Kellogg C, Smogorzewski J. Update on Atopic Dermatitis. *Adv Pediatr* 2023;70:157-70.
5. Suehiro M, Numata T, Murakami E, et al. Real-world efficacy of proactive maintenance treatment with delgocitinib ointment twice weekly in adult patients with atopic dermatitis. *Dermatol Ther* 2022;35:e15526.
6. Frazier W, Bhardwaj N. Atopic Dermatitis: Diagnosis and Treatment. *Am Fam Physician* 2020;101:590-8.
7. Proudfoot LE, Powell AM, Ayis S, et al. The European TREATment of severe Atopic eczema in children Taskforce (TREAT) survey. *Br J Dermatol* 2013;169:901-9.
8. Drucker AM, Eyerich K, de Bruin-Weller MS, et al. Use of systemic corticosteroids for atopic dermatitis: International Eczema Council consensus statement. *Br J Dermatol* 2018;178:768-75.
9. Simpson EL, Bieber T, Eckert L, et al. Patient burden of moderate to severe atopic dermatitis (AD): Insights from a phase 2b clinical trial of dupilumab in adults. *J Am Acad Dermatol* 2016;74:491-8.
10. Taylor K, Swan DJ, Affleck A, et al. Treatment of moderate-to-severe atopic eczema in adults within the U.K.: results of a national survey of dermatologists. *Br J Dermatol* 2017;176:1617-23.
11. Russo F, Santi F, Cioppa V, et al. Meeting the Needs of Patients With Atopic Dermatitis: A Multidisciplinary Approach. *Dermatitis* 2022;33:S141-3.
12. Le Roux E, Powell K, Banks JP, et al. GPs' experiences of diagnosing and managing childhood eczema: a qualitative study in primary care. *Br J Gen Pract* 2018;68:e73-e80.
13. Silverberg NB. Pediatric dermatology workforce shortage explained. *Cutis* 2018;102:305-6.
14. Croce EA, Lopes FCPS, Ruth J, et al. Interventions to improve primary care provider management of atopic dermatitis: A systematic review. *Pediatr Dermatol* 2021;38:1004-11.
15. El Hachem M, Gesualdo F, Ricci G, et al. Topical corticosteroid phobia in parents of pediatric patients with atopic dermatitis: a multicentre survey. *Ital J Pediatr* 2017;43:22.
16. Finnegan P, Murphy M, O'Connor C. #corticophobia: a review on online misinformation related to topical steroids. *Clin Exp Dermatol* 2023;48:112-5.
17. Nickles MA, Coale AT, Henderson WJA, et al. Steroid phobia on social media platforms. *Pediatr Dermatol* 2023;40:479-82.
18. Contento M, Cline A, Russo M. Steroid Phobia: A Review of Prevalence, Risk Factors, and Interventions. *Am J Clin Dermatol* 2021;22:837-51.
19. Gupta A, Lockeman K, Edwards C. Increasing Knowledge

- and Self-Efficacy on Differences in Sex Development (DSD): A Team-Based Learning Activity for Pediatric Residents. *MedEdPORTAL* 2021;17:11105.
20. Kuscuo OO, Ozcelik SM, Kucuktepe C, et al. Effect of self-efficacy and empathy characteristics of post-graduate residents on local anesthesia administration performances: Pilot study. *J Dent Educ* 2022;86:38-46.
 21. Bandura A, Freeman WH, Lightsey R. Self-efficacy: The exercise of control. *J Cogn Psychother* 1999. doi: 10.1891/0889-8391.13.2.158.
 22. Klassen RM, Klassen JRL. Self-efficacy beliefs of medical students: a critical review. *Perspect Med Educ* 2018;7:76-82.
 23. Bandura A. *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ, US: Prentice-Hall, Inc; 1986.
 24. Opacic DA. The relationship between self-efficacy and student physician assistant clinical performance. *J Allied Health* 2003;32:158-66.
 25. Bandura A, Locke EA. Negative self-efficacy and goal effects revisited. *J Appl Psychol* 2003;88:87-99.
 26. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev* 1977;84:191-215.
 27. Lambrechts L, Gilissen L, Morren MA. Topical Corticosteroid Phobia Among Healthcare Professionals Using the TOPICOP Score. *Acta Derm Venereol* 2019;99:1004-8.
 28. Aubert-Wastiaux H, Moret L, Le Rhun A, et al. Topical corticosteroid phobia in atopic dermatitis: a study of its nature, origins and frequency. *Br J Dermatol* 2011;165:808-14.
 29. Li Y, Han T, Li W, et al. Awareness of and phobias about topical corticosteroids in parents of infants with eczema in Hangzhou, China. *Pediatr Dermatol* 2018;35:463-7.
 30. Hamideh N, Venkatesh P, Zhao S, et al. Perceptions on Management of Atopic Dermatitis in Children Under 2 Years by Community Pediatricians: A Focus Group Study. *Clin Pediatr (Phila)* 2023;62:1176-85.
 31. de Oliveira C, Iwajomo T, Gomes T, et al. The Role of the Medical School Training on Physician Opioid Prescribing Practices: Evidence from Ontario, Canada: Le rôle de la formation à la faculté de médecine à l'égard des pratiques de prescription d'opioïdes des médecins: données probantes d'Ontario, Canada. *Can J Psychiatry* 2020;65:710-20.
 32. Davari M, Khorasani E, Tigabu BM. Factors Influencing Prescribing Decisions of Physicians: A Review. *Ethiop J Health Sci* 2018;28:795-804.
 33. Theodorou M, Tsiantou V, Pavlakis A, et al. Factors influencing prescribing behaviour of physicians in Greece and Cyprus: results from a questionnaire based survey. *BMC Health Serv Res* 2009;9:150.
 34. Shalom G, Babaev M, Kridin K, et al. Healthcare Service Utilization by 116,816 Patients with Atopic Dermatitis in Israel. *Acta Derm Venereol* 2019;99:370-4.
 35. Chen JG, Saidi A, Rivkees S, et al. University- Versus Community-Based Residency Programs: Does the Distinction Matter? *J Grad Med Educ* 2017;9:426-9.
 36. Anderson TN, Payne DH, Dent DL, et al. Defining the Deficit in US Surgical Training: The Trainee's Perspective. *J Am Coll Surg* 2021;232:623-7.
 37. Rosenberg AA, Kamin C, Glick AD, et al. Training gaps for pediatric residents planning a career in primary care: a qualitative and quantitative study. *J Grad Med Educ* 2011;3:309-14.
 38. Khorsand K, Brandling-Bennett HA. Deficiencies in Dermatologic Training in Pediatric Residency: Perspective of Pediatric Residency Program Directors. *Pediatr Dermatol* 2015;32:819-24.
 39. Eggermont D, Smit MAM, Kwestroo GA, et al. The influence of gender concordance between general practitioner and patient on antibiotic prescribing for sore throat symptoms: a retrospective study. *BMC Fam Pract* 2018;19:175.
 40. Marianne B. Chapter 17 - New Perspectives on Gender. In: Ashenfelter OC, Card D. editors. *Handbook of Labor Economics*. Elsevier; 2011. doi: 10.1016/S0169-7218(11)02415-4
 41. Méndez SJ, Scott A, Zhang Y. Gender differences in physician decisions to adopt new prescription drugs. *Soc Sci Med* 2021;277:113886.
 42. Ehrlich J, Burla L, Sanz AC, et al. As Few Pediatricians as Possible and as Many Pediatricians as Necessary? *J Pediatr* 2018;202:338-339.e1.
 43. MD Physician-Dermatologist Demographics and Statistics in The US. Number of MD Physician-Dermatologists [Internet]. 2021 [cited 2023 Feb 25]. Available online: <https://www.zipppia.com/md-physician-dermatologist-jobs/demographics/>

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Appendix 1 Demographic questions

Please complete the following questions according to your current status:

1. Age ____
2. Gender M/F
3. Religion
 - A. Jewish
 - B. Christian
 - C. Muslim
 - D. Other/Do not wish to answer.
4. Marital Status
 - A. Bachelor
 - B. Married
 - C. Divorcee
 - D. Widower
 - E. Other/Do not wish to answer.
5. Number of Children ____
6. Where did you attend medical school?
 - A. Israel
 - B. Europe
 - C. USA
 - D. Asia
 - E. Other
7. Place of pediatric training
 - A. list of different hospitals
 - B. Abroad
8. Medical status
 - A. Resident
 - B. Specialist
 - C. Fellowship
 - D. Specialist with sub-specialty
9. If resident, then:
 - What stage in residency?
 - A. Before stage 1 exam
 - B. after stage 1 exam
 - C. after stage 2 exam
 - What year of residency
 - A. 1
 - B. 2
 - C. 3
 - D. 4
 - E. 5
10. Current place of work (you can choose more than one)
 - A. Hospital
 - B. Community based clinic
 - C. Private practice

11. If hospital, which department: (if resident Ped. Department is automatically chosen)
 - A. Intensive Care Unite
 - B. Emergency Department
 - C. Neonatology
 - D. Day hospitalization
 - E. Clinics
 - F. Pediatric department
12. Number of years as a pediatrician (including training) ____
13. In your estimation how many children with skin disorder have you encountered in the last year?
 - A. Under 10
 - B. 10-20
 - C. 20-40
 - D. Above 40
14. In your estimation how many children with Atopic Dermatitis have you encountered in the last year?
 - A. Under 10
 - B. 10-20
 - C. 20-40
 - D. Above 40
15. Have you had dermatology training as part of your medical school or internship? Yes/No
16. Have you had dermatology training during your residency? Yes/No

Please rate the following questions on a scale of 1-5 (1 represents strongly disagree to 5 represents strongly agree)

	1-Strongly disagree	2-Disagree	3-Neutral	4-Agree	Strongly agree
1. I prescribe topical steroidal treatment as needed to a patient with Atopic Dermatitis even without a dermatologist consult					
2. I prescribe systemic steroidal treatment as needed to a patient with Atopic Dermatitis even without a dermatologist consult					
3. I avoid prescribing steroidal treatment due to its adverse effects					