**Pediatricians' confidence level in diagnosing and treating children with Atopic Dermatitis, based on a self-efficacy survey**

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**ABSTRACT**

Background: Atopic dermatitis (AD) is one of the most common skin diseases in childhood, often diagnosed and managed by pediatricians. However, more than half of pediatricians refer even mild cases to dermatologists.

Objective: To evaluate pediatric residents' and specialists' self-efficacy regarding their ability to diagnose and manage Atopic dermatitis.

Methods: a cross-sectional questionnaire study among Israeli pediatric residents and specialists was conducted in 2022. The questionnaire was formed to identify participants with high vs. low self-efficacy characteristics regarding their ability to diagnose and treat AD.

Results: 171 participants filled out the questionnaire (59.4% females, age of 41.05±10.55 years). 39.1% of the participants were residents, while 60.9% were board-certified pediatricians. 64.4 % reported below or average confidence in diagnosing and treating AD in children. The higher self-efficacy group was significantly older (44.39 vs. 39.14 years, P=0.003), had more years of experience in evaluating children with AD (p=0.004), was trained in dermatology during their residency (p=0.02), with longer training period (p=0.01), and had more than three training methods (p=0.009). A larger proportion of the participants with average/ low ability to teach their colleagues belonged to the low self-efficacy group (86.8% vs. 13.2%, P<0.001). Multivariable logistic regressions showed that age above 40 and training in dermatology at the residency were significantly higher in the high self-efficacy group (OR=5.63, P=0.04, and OR=3.36, P=0.05, respectively).

Conclusion: Most pediatric residents and specialists were less confident in treating children with AD. Those with high self-efficacy were older, exposed to more patients, and were trained in dermatology during their residency with various methods for longer periods. We, therefore, encourage the implementation of a training program in dermatology during pediatric residency.

**INTRODUCTION**

Atopic dermatitis (AD) is one of the most common skin diseases in childhood, affecting up to 25% of children in the United States, as well as over a million children in more than 90 other countries.1-4 AD is a chronic inflammatory disease, characterized by recurrent eczematous lesions and intense pruritus.5 85% of children present before the age of 5 years. 6 As a result, pediatricians diagnose and manage most children.7,8 However, more than half of the pediatricians in the United States refer even mild cases of AD to dermatologists. 7,8 These high referral rates significantly impact the workload of dermatologists, which further increases waiting time and deepens an already increasing shortage. Therefore, proper evaluation, treatment, and management of AD by pediatricians are essential to further improve patient care and work efficiency.8,9

Currently, however, AD treatment by pediatricians needs improvement. International guidelines recommend the use of topical corticosteroids (TCS) during a flare until the skin is smooth and inflammation has settled.10 However, studies comparing skin diseases treated by general pediatricians and pediatric dermatologists found inconsistencies in guidelines adherence, with the general pediatricians being more conservative than pediatric dermatologists, in their use of TCS, in terms of potency and treatment duration.11-12 In addition, as TCS phobia prevalence is increasing worldwide13-14 and may result in persistent AD disease and early escalation to systemic agents, pediatricians play an essential role in educating and reassuring parents about proper disease management.

In Israel, dermatology rotation during pediatric residency is optional, and many pediatricians may end their residency without official training in diagnosing and treating pediatric skin problems, including AD. Therefore, we sought to evaluate the confidence level of pediatric residents and specialists in managing AD in children.

One accepted and commonly used method for the assessment of medical personnel confidence is self-efficacy surveys, also used in different fields in pediatrics.15-16 Self-efficacy could be described as an individual’s belief in their ability to complete a particular task.17-18 Previous studies reported correlations between self-efficacy and clinical performance and the success of students and physicians.19 Mastery of activity and experiencing success within an activity are related to higher self-efficacy beliefs. High self-efficacy can motivate people to perform a task more frequently. Therefore, successful experiences lead to positive self-efficacy beliefs, which in turn can reinforce future behavior.20

To the best of our knowledge, no study has yet evaluated pediatricians’ self-confidence in treating AD and only several studies estimate the need to update pediatric residency programs. The aim of our study was to evaluate the comfort level of pediatricians in diagnosing and treating AD in pediatric patients, based on a self-efficacy survey. We further aimed the evaluate which parameters characterize pediatricians with high self-efficacy at different career stages and to recognize which training methods improved one's self-efficacy and suggest integrating them into the residency program.

**METHODS**

This is a questionnaire cross-sectional study among Israeli pediatricians, that was conducted between April 2022 and June 2022. The study was reviewed by the local Institutional Review Board of Soroka University Medical Center and granted an exemption because the responses were anonymous, and did not include patients' information.

*Participants*

The study included pediatric residents in academic hospitals or pediatric specialists who work either in community clinics or hospitals in Israel. We excluded residents of other specialties than pediatrics or physicians without pediatric specialization treating children, including general practitioners, as well as pediatric dermatologists. All participants expressed consent when entering and completing the questionnaire via a link sent by mail or message. Participation and completion of the questionnaire were voluntary. Participants' confidentiality was maintained throughout the study, and all the information collected by the questionnaire was anonymous.

*Questionnaires*

The questionnaire (Appendix A) was made to identify characteristics of pediatric residents and specialists with high vs. low self-efficacy regarding their ability to diagnose and treat AD.

Our questionnaire was divided into three sections. The first section consisted of demographic-related questions such as age, gender, religion, marital status, location of medical school (Israeli/non-Israeli medical school), medical status (resident/pediatrician/Fellowship/pediatrician with sub-specialty), stage and years of residency, current place of work (hospital/ community based or privet clinics), and job seniority. The second section was based on questions evaluating the self-efficacy of each participant regarding their ability to diagnose and manage AD. Finally, the third section was centered around questions regarding the teaching methods participants were exposed to during their training and their ability to improve their knowledge in the management of AD. We offered eight teaching/training methods in the questionnaire (Lectures, Continuing medical education, Online program, Dermatology rotation, Frontal convention / Conference, Online convention / Conference / Webinar, Dermatology research, Experts case discussions) and the option to add additional methods stated as "other"). In addition, participants were asked to choose which of the above methods they would recommend adding to the pediatric residency program to positively affect dermatology skills. Data was collected by a Google-based questionnaire sent to the participants by e-mail or massage. All data was collected and saved anonymously.

*Statistical Analysis*

Nominal variables were compared using Pearson's chi-square test, and continuous variables meeting the assumptions of the normal distribution were compared using Student's t-test or One-Way analysis of variance. Ordinal and continuous variables that did not meet parametric criteria were compared using Kruskal-Wallis or Mann-Whitney tests. Continuous variables are presented as mean ± standard deviation (SD) and categorical data - as percentages. Statistical significance was defined as a p-value ≤ 0.05. Analyses were performed using the IBM SPSS software version 22.

**RESULTS**

171 participants completed the questionnaire of the 350 questionnaires that were sent (48.86% responses). The average age of the study population was 41.05±10.55 years, with a female majority (59.4%). Regarding medical status, 39.1% of the participants were residents, while 60.9% were board-certified specialists, which included pediatric specialists (29.6%), fellows (training in sub-specialty) (9.5%), and pediatric specialists who completed subspecialty (21.9%). 78.4% of respondents went to medical school in Israel, and 70.2% of participants worked in a hospital setting. Details about the demographic characteristics of our population are presented in Table 1.

Next, we evaluated the self-efficacy of each participant regarding their ability to diagnose and manage AD. The questions had participants rated on a scale from 1 to 5, one being the lowest score, five the highest score, and three the average. Two third of respondents had below or average self-efficacy scores in diagnosing and treating children with AD, without consulting a dermatologist, while 35.6% reported above average (Table 2).

We further divided the study population according to their self-efficacy level, into two groups: average and below (≤ 3) and above average (4,5), in order to find which parameters were related to higher self-efficacy scoring. The higher self-efficacy group was significantly older (44.39 vs. 39.14 years, P=0.003), had more years of experience in evaluating children with AD (p=0.004), and was trained in dermatology during their medical school or residency (p=0.02). Gender, place of medical school, location of residency, stage in the residency, and the current working place did not differ between the groups (Table 3).

When we asked detailed questions on information sources, self-education, management of AD with/without consulting a dermatologist, and at which stage of treatment you would refer to a dermatologist, a significantly higher percentage of the low-efficacy group stated that they would not treat a child with AD without consulting a dermatologist (90.7 vs 9.3, P<0.001). The rest of the questions did not differ significantly between the groups (Table 4).

When we asked the participant to estimate their ability to teach colleagues how to manage AD in children, non-surprisingly, a larger proportion of the participants with average/ low ability to teach their colleagues, were belonged to the low self-efficacy group (86.8% vs 13.2%, P<0.001), and vice versa (Table 5).

When we asked about dermatology training methods or dermatology rotation length during residency, the majority of participants with average/low self-efficacy were trained by less than three training methods (70.8% vs 29.2%, p=0.009) and had only a short dermatology rotation (up to 1 week) during the residency (67.3 vs 32.7, p=0.01), Table 6. When asked about any dermatology training during residency, most participants mentioned dermatology lectures (N=118), and up to one-month dermatology rotation (N=87).

Multivariable logistic regressions on the statistically and clinically significant parameters showed that age above 40 and training in dermatology at the residency were significantly higher in the high self-efficacy group (OR=5.63, P=0.04, and OR=3.36, P=0.054, respectively).

**DISCUSSION**

In this cross-sectional questionnaire study, we evaluated the self-efficacy level of pediatric residents and specialists in the diagnosis and management of children with AD. One hundred seventy-one physicians, in different pediatric training stages, participated in our study. Two-thirds of the participants reported below or average confidence in diagnosing and treating AD in children. The higher self-efficacy group was significantly older, had more years of experience in monitoring children with AD, was trained in dermatology during their residency, with a longer training period, and had more than three training methods. Most participants with average or low ability to teach their colleagues belonged to the low self-efficacy group. Multivariable logistic regressions showed that older age and dermatology training during residency had higher chances of being in the high-efficacy group.

Our study population is diverse and representative of the physician's population in our country. The study population was mainly females, with an average age of 41 years, most of them were board-certified specialists, working at hospitals. Still, two-thirds of our study population reported average scores and below in feeling confident in diagnosing and managing children with AD without a dermatologist consulting.

While AD is a wildly encountered skin disease during pediatric residency and afterward, many pediatricians do not perceive themselves as competent enough to diagnose and manage the disease without consulting a dermatologist. Experience is a crucial element in pediatric residents' and specialists' self-efficacy in managing AD. The correlation between residents’ experience and their self-efficacy has been previously studied,21 and it is not surprising that older age and greater experience were correlated with higher self-efficacy. By focusing on training young and inexperienced residents through efficient teaching methods, residency programs will be able to improve residents’ confidence and ability in diagnosing and treating children with AD.

A survey among graduate physicians who trained in pediatrics reported that 38% desired additional dermatology training.22 Furthermore, many pediatricians and general practitioners feel their specific knowledge in the management of AD was “inadequate” or “enough to get by”.23 These challenges are even greater when it comes to the management of AD in young children (<2 years), and may include difficulty distinguishing moderate and severe AD in this age group, fear of TCS, and lack of education and compliance among caregivers.24

The large number of patients presenting to pediatricians with skin-related problems, specifically AD, and the limited access to pediatric dermatology subspecialty care prompt the need for a change. Accurate diagnosis and appropriate management of dermatological conditions, especially AD, should be an essential aspect of the pediatric residency curriculum. Enriching residents' training with dermatologic education will improve patient outcomes and prevent patients’ frustration. Our study also implies a need for meaningful training in a significant length and variety of teaching methods to implement the critical elements. Most participants would like to include in the residency curriculum: dermatology rotation, expert case discussions, and lectures. Similar findings were published in a survey study among pediatric residency directors regarding dermatology training in pediatric residency.25 Although an online program was not frequently chosen in our study as a method to pursue, there is an advantage to online AD modules. Pediatric residents demonstrated a significant improvement in their knowledge of AD after an online dermatology education,26 while a different study did not demonstrate these results after an online learning tool.27 As viewed by our findings, our study recommends a dermatology rotation of significant length (more than a week) as a part of the pediatric program, which should be considered as a mandatory requirement rather than an elective one since residents do not choose to use this resource in their limited elective time. Online modules and lectures were also thought to be useful.

The strength of our study is the relatively large and diverse population, composed of residents, specialists, fellows, and specialists with sub-specialty. Our study population's demographic analysis demonstrated that gender diversity among our responders is similar to the one seen in pediatric departments. 28 This diversity is a representative cohort of pediatricians and enabled further sub-analysis between the groups. We also had a relatively high respondent rate (almost 50%). Another important strength is the clinical relevance and application of the results. Based on the results, we plan to incorporate a dermatology training program during pediatric residency as a pilot program.

The study's main limitation arises from its design, a cross-sectional questionnaire-based study. Therefore, it might be predisposed to selection bias (those who answer the questionnaire might not represent the total population). Like in all questionnaire studies, our sample depended on participants' compliance rate, an obstacle we tried to overcome by using simplified multiple-choice questions. Nevertheless, the lack of complicated answers may have prevented participants from providing their deep thoughts and reflections.

Another limitation of the current study lies in the lack of validation of the questionnaire we used. However, it is a pilot, and we hope that our study would encourage the use of our questionnaire as a prototype for future studies.

**CONCLUSIONS**

In this self-efficacy survey among pediatric residents and specialists, most participants were not comfortable treating children with AD. Those with high self-efficacy were older, exposed to more patients, and were trained in dermatology during their residency in different methods for a longer time period. We, therefore, encourage the implementation of a mandatory training program in dermatology that will include dermatology rotation, expert case discussions, and lectures during the pediatric residency.