

Does an Eczema Action Plan Improve Atopic Dermatitis? A Single-Site Randomized Controlled Trial

Clinical Pediatrics

1–6

© The Author(s) 2018

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0009922818795906

journals.sagepub.com/home/cpi

Julia Brown, MD¹, Nicole W. Weitz, MD², Amy Liang, MD³,
Melissa S. Stockwell, MD, MPH⁴, and Suzanne Friedman, MD³

Abstract

The multitude of treatment options for atopic dermatitis (AD) makes management frustrating for providers and patients. Eczema action plans (EAPs) have been proposed to improve parental and provider management. We developed a single-site randomized controlled trial to evaluate the impact of an EAP on quality of life (QOL), provider knowledge, and comfort with AD management. Providers were randomized into an EAP-use group and a traditional care group. All patients completed validated AD QOL surveys, and those with AD were verbally administered the survey 1 month later. Providers' perceptions on managing AD were compared in the EAP and usual use groups. Parents in the EAP group demonstrated a significantly increased understanding of AD treatment, and providers in the EAP group had a significantly increased understanding and management of AD. The EAP is a feasible tool that can be integrated into a busy clinic practice with a positive impact on physicians and patients.

Keywords

eczema, atopic dermatitis, eczema action plan

Introduction

Atopic dermatitis (also termed AD or eczema) is a chronic inflammatory pediatric condition that affects an estimated 10% of US children.¹ Genetic, immune, and environmental factors contribute to the manifestation of dry, itchy skin with acute flare-ups of pruritic lesions in patients with AD. AD has a dynamic disease course that is chronic and relapsing in nature and therefore requires care tailored to both acute exacerbations and long-term maintenance, which poses a major challenge to AD management.² The American Academy of Dermatology recommends skin-directed management, involving skin care and topical anti-inflammatory medications, combined with itch control and management of infectious and allergic triggers.³ This amounts to a multitude of treatment options, and the lack of treatment standardization can make the management of AD frustrating for providers, patients, and families alike.^{4,5}

Prior research has proposed that the addition of an eczema action plan (EAP), similar to an asthma action plan, could be beneficial in standardizing and simplifying the management of eczema for both providers and patients.^{6–10} Not only does a visual aid help augment and reinforce verbal instructions, an EAP also details daily

management, avoidance of triggers, and guidance on handling exacerbations. The first randomized controlled study on the utility of an EAP as an instruction tool showed both a decrease in parental anxiety around eczema management and a significant increase in comfort around self-management in patients and parents who received the EAP as compared with those who only received verbal instructions from their provider.⁹ This finding is in concordance with a previous quality improvement study on the clinical utility of EAPs in which parents overwhelmingly reported that the EAP helped clarify which medications to use during a flare and improved their overall comfort with their child's skin care.⁸ In addition to patient and caregiver use of an EAP, implementation requires physician acceptance of

¹Mount Sinai Health System, New York, NY, USA

²UCSF Benioff Children's Hospital, San Francisco, CA, USA

³Columbia University Medical Center, New York, NY, USA

⁴Columbia University, New York, NY, USA

Corresponding Author:

Suzanne Friedman, Columbia University Medical Center, 630 West 168th Street, Vanderbilt Clinic 4th Floor, New York, NY 10032, USA.

Email: suzannefriedman@gmail.com

its use. Using a prototype EAP based on existing asthma protocols, a survey analysis of pediatricians in primary care practices showed that these pediatricians were receptive to the notion of using an EAP in their clinical practices to improve adherence and outcomes in patients with AD.⁷

The need for a standardized tool such as the EAP goes beyond simply combating the frustration that management of AD can cause providers and patients. AD has a negative effect on the quality of life (QOL) of caregivers and parents.¹¹ The complicated treatment regimens for AD, associated financial burden, and increased work of caring for a child with eczema can contribute to exhaustion, lack of sleep, and feelings of hopelessness, guilt, anger, and depression and stress.^{12,13} One observational cohort study showed that mothers of young children under 6 years of age with eczema reported significantly higher stress scores than mothers of children with other chronic disorders, such as insulin-dependent diabetes and profound deafness; moreover, these stress scores were similar to the scores of parents of children with severe disabilities requiring home enteral feeding.¹⁴⁻¹⁶ One report showed that parents of children with AD spend up to 3 hours on their child's skin care a day.³ Another study demonstrated that depression rates in mothers of children with eczema are twice as high as in mothers of children with asthma.¹⁷

These data highlight the need for effective and consistent child and parent education to help aid in AD management. Additionally, the complexities of medical management of AD not only create challenges for the patients and their caregivers but also may lead to confusion for medical providers. Early studies using the EAP have shown success in improving parents' comfort in AD management, but to our knowledge, no study has evaluated the effect of EAPs on the QOL of patients and families, or its effect on providers' comfort and confidence of management of AD. The aims of this study were to investigate (1) the impact of an EAP on parents and patients' QOL, (2) its impact on provider comfort with AD management, and (3) the impact of an educational session on provider knowledge of AD and its management.

Methods

Study Subjects

This study was a single-site randomized controlled clinical trial conducted at the Washington Heights Family Health Center, an Ambulatory Care Network Practice of New York Presbyterian Hospital. The sample

comprised pediatric patients who presented for urgent or well-care visits between August and September 2015. All English- and Spanish-speaking patients who reported having a diagnosis of AD on the initial study survey, discussed below, were eligible for participation in this study. Physicians included both resident and attending physicians at the Washington Heights Family Health Center.

Provider Education

Physicians were first educated on the pathophysiology and management of AD by completing the Stanford School of Medicine online module, Atopic Dermatitis 101. The main points of this module were reviewed with providers, and the idea of a standardized approach to treatment with an EAP was introduced through a PowerPoint presentation. The presentation was created in collaboration with the Department of Dermatology at Columbia University, and was given by the authors of this article as a presentation to all physicians in the clinic as part of the daily resident continuity clinic lecture series, during the first week of the study.

EAP

An EAP was created, incorporating information from the 2014 Pediatric Clinical Report on AD³ and designed similar in outlay to asthma action plans (Figure 1).¹⁸ Physicians were randomized into EAP-Use and Usual Care groups. EAP-Use groups were encouraged to use the EAP with all patients with AD throughout the study. Usual Care groups were instructed to provide their routine care without the use of the EAP.

Data Collection

Validated QOL surveys, the Infants Dermatitis Quality of Life Index and Children's Dermatology Life Quality Index,¹⁹ were distributed to all patients who registered at the Washington Heights Family Health Center for a well or walk-in visit between August and September 2015 for baseline measurements. Only patients who self-identified as having a diagnosis of AD on the survey were included in the study. These 10-question surveys ask patients or their parents to rate AD symptoms and QOL features over the past week on a 5-point Likert-type scale. Patients were called 1 month after the study's completion and were verbally administered the same QOL surveys as well as a retrospective pretest surveying their understanding of their child's eczema management, their doctors' explanations, and their comfort managing their child's eczema. Questions included "I would rate

ECZEMA ACTION PLAN	Patient Sticker: Date EAP Provided
GREEN ZONE: Skin is normal, mildly red, a little dry, not itching much at all	
Daily Skin Care Routine: - Keep baths to 5-10 minutes with warm water and no more than once daily - Use a small amount of sensitive, fragrance-free soap (Dove sensitive, Aveeno, Cetaphil, CeraVe) - After bath, pat dry and leave damp to touch and apply moisturizer immediately - Use <u>unscented</u> laundry detergent (Tide Free) - Polysporin or bacitracin ointment to open areas of skin to prevent infection. - Dilute Bleach bathes - Moisturizer: At least twice daily or as often as necessary with cream and/or ointment. (Vaseline, Aquaphor, Aveeno, Eucerin, CeraVe) *Creams may sting if skin is broken.	
YELLOW ZONE: Skin is starting to get red and itchy: mild to moderate redness, itching and rough, raised areas forming.	
Continue Daily Skin Care Routine but moisturize a little extra AND: Apply topical steroid: _____ twice daily to affected areas on FACE/GROIN/SKIN FOLDS for up to _____ days. Apply topical steroid: _____ twice daily to affected areas on BODY for up to _____ days/ weeks *Apply medication BEFORE you apply moisturizer. *If using Yellow zone medications regularly (for more than 1-2 weeks at time), you should see your doctor every few months.	
RED ZONE: Skin is very itchy, rough, and raised.	
Continue Daily Skin Care Routine but moisturize a little extra AND: Apply topical steroid: _____ twice daily to affected areas on FACE/GROIN/SKIN FOLDS for _____ days. Apply topical steroid: _____ twice daily to affected areas on BODY for _____ days/weeks *Apply medication BEFORE you apply moisturizer. *Call the doctor on-call if there is no improvement in 3-5 days OR if there is fever, pus, drainage, honey crusting or pain. Your child may have an infection that requires antibiotics.	

Figure 1. Eczema action plan.

my understanding of my child's eczema and creams for eczema" and "I would rate my comfort level with caring for my child's eczema," scored on a 1- to 5-point Likert-type scale. Patients who received the EAP were verbally administered a third survey during this phone call on the effect of the EAP on the care of their child's AD. Institutional review board approval was obtained prior to beginning the study, and all patients or parents provided verbal consent to participate.

Provider Surveys

All providers completed a survey on their knowledge and management of AD both before and after the educational session. At the conclusion of the study all participants were asked to complete a retrospective pretest regarding their comfort managing AD. Those in the EAP-use group answered additional questions regarding their opinions on the use of the EAP.

Statistical Analyses

The demographic data (age, gender, and insurance type) were compared via χ^2 tests between the Usual Care and EAP-Use groups as well as the groups reached for follow-up and not reached for follow-up. QOL scores were compared via t tests. The survey results between EAP-Use and Usual Care groups were compared via t tests based on a 5-point Likert-type scale. Microsoft Excel 2016 software was used for analysis. $P < .05$ was used for statistical significance.

Results

Study Participants and Demographics

Of the 243 patients who completed the QOL surveys, 114 (46%) of those patients reported having AD. A third of these patients ($n = 37$; 32%) were reached via phone for follow-up questionnaires. Of those with AD, one

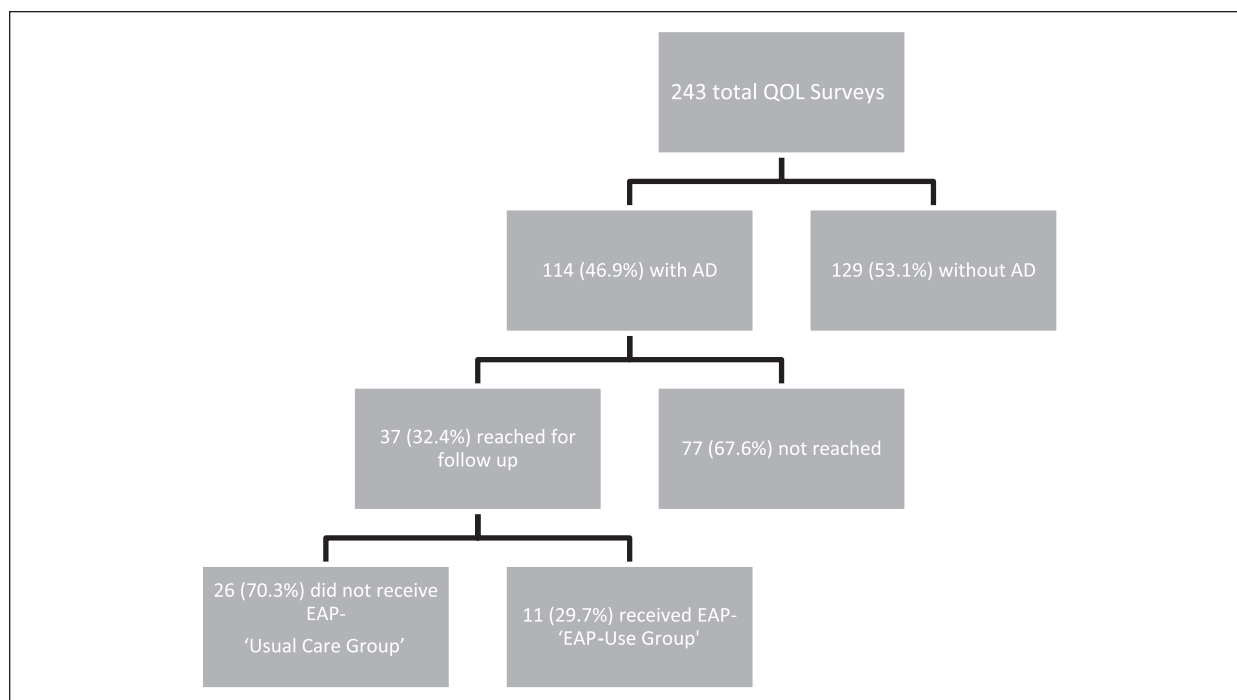


Figure 2. Breakdown of the quality of life (QOL) surveys and patients reached for follow-up.

Table 1. Patient Demographics.

	Reached for Follow-up— EAP (n = 11)	Reached for Follow-up— Usual Care (n = 26)	Not Reached for Follow-up (n = 77)	P
Sex, % male	54.5%	26.9%	45.4%	.17
Age, average in years (SD)	6.4 (4.7)	3.6 (3.2)	8.3 (6.7)	.03
Insurance, % Medicaid	80.7%	81.8%	84.4%	.9

Abbreviations: EAP, eczema action plan.

third (n = 11; 30%) reported receiving the EAP. Almost half, 49 patients (43%), completed the English questionnaires and 65 patients (57%) completed the Spanish questionnaires (Figure 2). The demographic characteristics between the groups reached for follow-up and not reached and the group reporting receiving the EAP versus not receiving did not differ significantly with one exception: the group unable to be reached for follow-up were on average older (Table 1).

Patient Results

The QOL scores decreased, signifying improved QOL among those who received an EAP as well as those who did not (5.5 to 2.8 for EAP, 3.7 to 1.4 for Usual Care; Table 2). There was also no significant difference between the postscores between the groups either overall or after adjusting for their prescores.

Parents in the EAP-Use group did demonstrate a significantly increased understanding of AD treatment (Table 2). Of the patients who received the EAP, 90% found it easy to understand, 100% felt it helped them care for their/their child's AD, and 100% would like to continue receiving it from their physician.

Provider Results

Average scores on the AD knowledge assessment taken by providers improved from 75% correct answers prestudy to 79% poststudy. Providers' comfort with multiple aspects of AD improved significantly after the study in the EAP group compared with the usual care group (Table 3). Of the providers in the EAP group, 85% stated it improved their comfort, understanding, and management abilities and 100% said they would like to continue to use the EAP in their practice.

Table 2. Patient QOL, Understanding, and Comfort in EAP-Use and Usual Care Groups.

	Pre-EAP-Use Group	Post-EAP-Use Group	Pre-Usual Care Group	Post-Usual Care Group	P
QOL	5.5	2.8	3.7	1.4	.38
Patient understanding ^a	2.8	4.8	2.5	3.2	.01
Patient comfort ^a	3.5	4.2	3.1	3.7	.30

Abbreviations: QOL, quality of life; EAP, eczema action plan.

^aMean scores based on Likert-type response scale where 5 represents "very comfortable" and 1 represents "very uncomfortable."

Table 3. Provider Comfort and Understanding in EAP-Use and Usual Care Groups^a.

	Pre-EAP-Use Group	Post-EAP-Use Group	Pre-Usual Care Group	Post-Usual Care Group	P
Managing AD	3.1	3.9	2.7	3.3	.05
Understanding medications	2.8	3.9	2.4	3.0	.02
Providing anticipatory guidance	3.3	4.1	2.9	3.3	.002
Understanding the stages of AD	2.8	3.7	2.4	3.1	.02

Abbreviations: EAP, eczema action plan; AD, atopic dermatitis.

^aMean scores based on Likert-type response scale where 5 represents "very comfortable" and 1 represents "very uncomfortable."

Discussion

While AD is one of the most common skin conditions affecting children, the prevalence reported by parents is even higher than often thought and further underscores the importance of addressing its management. QOL scores improved in both the Usual Care and EAP-Use treatment groups without a statistically significant difference. However, the EAP-Use group did report a statistically significant improvement in their understanding in the management of AD as compared with the Usual Care group. The EAP-Use group also reported that they found the EAP itself understandable, helpful, and that they would be in favor of its continued use. Providers similarly reported that the EAP enabled them to feel more comfortable with managing AD, improved their ability to provide anticipatory guidance, helped them better understand the stages of AD and medications to use, and that they would also like to continue its use. While there was concern that the EAP would add time to already rushed visits, 100% of providers found the EAP useful enough that they wished to continue using it in their practice.

Although this study did not show a direct impact of the EAP on QOL scores, there subjectively was an overwhelmingly positive response from providers and patients on the use of the EAP. Given the known mental and social impact a diagnosis of AD can have on a patient and families⁴ and the challenges its complicated and burdensome treatment plans can pose to providers and families alike, it is a disease process that could greatly benefit from a means of facilitating care. Additionally, since many affected patients do not have access to pediatric

subspecialists, such as pediatric dermatologists or allergists, the burden of AD care will continue to fall on primary care providers.⁷ Prior research has demonstrated that the EAP has the potential to standardize and simplify AD management and that patients and providers are interested in its implementation.⁷ Thus, despite its lack of statistical significance here, the EAP has the potential to be the much-needed tool that could help improve patient and family comfort and understanding of AD management, as well as provider comfort level by providing providers and families with a tangible treatment plan.

That said, there are a few notable limitations inherent in this study. First is its relatively small sample size, largely from the final number of patients lost to follow-up within the treatment group as seen in Figure 2. Also of note is its single patient population given it was based on a single hospital practice site comprising patients primarily from the Washington Heights area of New York, making generalizability to other populations limited. Additionally, the data relied on patient, caregiver, and provider self-reporting, which has its own inherent bias, including the recall bias of surveys administered the month after the visit. Most important, patients self-identified on surveys as having a diagnosis of AD; thus, placement in the AD treatment group relied on appropriate self-identification of having AD. However, it can be confirmed that those patients who eventually received the EAP did have a diagnosis of AD, as providers only gave out EAPs to patients they diagnosed with AD. Nonetheless, this limitation may have played a significant role in the small sample of patients that were ultimately included in the treatment group, as many patients

may not have correctly self-identified. Finally, another limitation is that the provider surveys and retrospective tests were designed by the authors of this study, thus not previously used validated surveys. On the other hand, the QOL surveys used in this study, while validated and adapted to meet the perceived literacy of the target population, may have surpassed the overall health literacy of some of the patient population studied.

Despite these limitations, this study suggests that there is a promising role for the EAP in the management of pediatric AD. The use of the EAP in primary care has been gaining popularity, and there is increasing data in the literature to support this. Our study investigates the implementation of an EAP in a busy clinic practice, and its positive impact on physicians and patients. Future studies are needed to clarify what role the EAP should play in clinical practice; in particular, additional studies are needed to investigate the use of the EAP in distinct patient populations, among different types of primary care practices. Further work is needed to elucidate the impact of EAP use on objective measures of AD management, including disease severity scores such as the Eczema Area and Severity Index Score, possible reduction in visits to the doctor for exacerbations, and frequency of cutaneous infections. Overall, we see this study as a launching ground for further research on a tool that has the potential to simplify management and improve the comfort of both providers and patients in the management of AD, a prevalent disease that carries a large burden.

Author Contributions

JB conceptualized the study, created study material, analyzed data and authored the manuscript. NWW created study material, analyzed data and authored the manuscript. AL administered study material, analyzed data and authored the manuscript. MSS conceptualized the study, provided statistical support and edited the manuscript. SF conceptualized the study, analyzed data and authored the manuscript.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

- Shaw TE, Currie GP, Koudelka CW, Simpson EL. Eczema prevalence in the United States: data from the 2003 National Survey of Children's Health. *J Invest Dermatol*. 2011;131:67-73.
- Eichenfield L, Boguniewicz M, Simpson EL, et al. Translating atopic dermatitis management guidelines into practice for primary care providers. *Pediatrics*. 2015;136:554-565.
- Tollefson MM, Bruckner AL; Section on Dermatology. Atopic dermatitis: skin-directed management. *Pediatrics*. 2014;134:e1735-e1744.
- Lio PA, Lee M, LeBovidge J, Timmons KG, Schneider L. Clinical management of atopic dermatitis: practical highlights and updates from the atopic dermatitis practice parameter 2012. *J Allergy Clin Immunol Pract*. 2014;2:361-369.
- Carrol CL, Balkrishnan R, Feldman SR, Fleischer AB, Manuel JC. The burden of atopic dermatitis: impact on the patient, family, and society. *Pediatr Dermatol*. 2005;22:192-199.
- Chisolm SS, Taylor SL, Balkrishnan R, Feldman SR. Written action plans: potential for improving outcomes in children with atopic dermatitis. *J Am Acad Dermatol*. 2008;59:677-683.
- Ntuen E, Taylor SL, Kinney M, O'Neill JL, Krowchuk DP, Feldman SR. Physicians' perceptions of an eczema action plan for atopic dermatitis. *J Dermatolog Treat*. 2010;21:28-33.
- Rork JF, Sheehan WJ, Gaffin JM, et al. Parental response to written eczema action plans in children with eczema. *Arch Dermatol*. 2012;148:391-392.
- Shi VY, Nanda S, Lee K, Armstrong AW, Lio PA. Improving patient education with an eczema action plan: a randomized controlled trial. *JAMA Dermatol*. 2013;149:481-483.
- Sauder M, McEvoy A, Sampson M, et al. The effectiveness of written action plans in atopic dermatitis. *Pediatr Dermatol*. 2016;33:e151-e153.
- Warschburger P, Buchholz HT, Petermann F. Psychological adjustment in parents of young children with atopic dermatitis: which factors predict parental quality of life? *Br J Dermatol*. 2004;150:304-311.
- Lewis-Jones S. Quality of life and childhood atopic dermatitis: the misery of living with childhood eczema. *Int J Clin Pract*. 2006;60:984-992.
- Slatery MJ, Essex MJ, Paletz EM, et al. Depression, anxiety, and dermatologic quality of life in adolescents with atopic dermatitis. *J Allergy Clin Immunol*. 2011;128:668-671.
- Faught J, Bierl C, Barton B, Kemp A. Stress in mothers of young children with eczema. *Arch Dis Child*. 2007;92:683-686.
- Gieler U, Schoof S, Gieler T, Scheewe S, Schut C, Kupfer J. Atopic eczema and stress among single parents and families: an empirical study of 96 mothers. *Acta Derm Venereol*. 2017;97:42-46.
- Daud LR, Garralda ME, David TJ. Psychosocial adjustment in preschool children with atopic eczema. *Arch Dis Child*. 1993;69:670-676.
- Moore K, David TJ, Murray CS, Child F, Arkwright PD. Effect of childhood eczema and asthma on parental sleep and well-being: a prospective comparative study. *Br J Dermatol*. 2006;154:514-518.
- Rank M, Volcheck G, Li J, Patel AM, Lim KG. Formulating an effective and efficient written asthma action plan. *Mayo Clin Proc*. 2008;83:1263-1270.
- Finlay AY, Khan GK. Dermatology Life Quality Index (DLQI)—a simple practical measure for routine clinical use. *Clin Exp Dermatol*. 1994;19:210-216.