

ORIGINAL ARTICLE

Online video improves clinical outcomes in adults with atopic dermatitis: A randomized controlled trial

April W. Armstrong, MD,^a Randie H. Kim, PhD,^a Nayla Z. Idriss, MD,^a Larissa N. Larsen, MD,^b
and Peter A. Lio, MD^c
Sacramento, California, and Chicago, Illinois

Background: Atopic dermatitis (AD) is a chronic inflammatory skin disorder characterized by intense pruritus that causes significant disease and psychosocial burden in patients. Patient education has the potential to improve clinical outcomes and patient knowledge of this condition.

Objectives: We sought to assess the effectiveness of online video education at improving AD knowledge and disease severity compared with a written pamphlet, and to determine the usefulness and appeal of the two educational delivery vehicles.

Methods: In a randomized controlled trial, 80 participants were randomized to receive either online video-based patient education or written pamphlet education about AD and its management. We assessed AD disease severity using the patient-oriented eczema measure (POEM) scale. AD knowledge was assessed with standardized questionnaires at baseline and after the 12-week intervention.

Results: All participants had similar baseline knowledge and AD severity at the beginning of the study. On study completion, improvements in AD knowledge assessed by questionnaire were significantly greater in the video group than the pamphlet group (3.05 vs 1.85, $P = .011$). Online video-based education resulted in greater improvement in clinical outcome, as measured by POEM, compared with pamphlet-based education (POEM score reduction of 3.30 vs 1.03, $P = .0043$). Finally, although the usefulness of both interventions was rated equally ($P = .77$), the online video was significantly more appealing than the pamphlet ($P = .0086$).

Limitations: This study is limited to AD in adults.

Conclusion: Online video for patient education is an effective and appealing tool for improving clinical outcomes in adult patients with AD. (J Am Acad Dermatol 10.1016/j.jaad.2010.01.051.)

Key words: atopic dermatitis; patient education; POEM; randomized controlled trial; video education.

From the Department of Dermatology, University of California, Davis, School of Medicine^a; Rosalind Franklin University of Medicine and Science, Chicago^b; and Department of Dermatology, Feinberg School of Medicine, Northwestern University, Chicago.^c

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Correspondence to: April W. Armstrong, MD, Department of Dermatology, University of California, Davis, 3301 C St, Suite 1300, Sacramento, CA 95816. E-mail: aprilarmstrong@post.harvard.edu.

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Atopic dermatitis (AD) is a chronic pruritic inflammatory skin disorder with a lifetime prevalence of 17% in children in the United States.¹ In adults, AD affects 1% to 3% of the population,² and it is frequently underdiagnosed in this population.³ AD has a significant impact on patients' quality of life and psychological well-being.⁴ Patient adherence to AD treatment is poor, particularly with topical medications.⁵⁻⁷ Furthermore, patients' lack of understanding of the disease process and management plan often contributes to poor clinical outcomes. Thus, patient education plays an increasingly important role in AD management.

The traditional approach to AD management centers on physician's selection of therapy, with little focus on patient education.⁸ In a study reported by Cork et al,⁹ 95% of parents of children with AD received little to no information

about the pathophysiology of AD or how to apply topical therapy properly. Thus, devising and evaluating novel patient education tools may be useful for improving clinical outcomes in AD.¹⁰

AD patient education has traditionally included workshops, programs, and practical training¹¹ that targets certain aspects of AD management, such as basic skin care and bathing practices,¹² choice of emollient,¹³ and topical corticosteroid application.^{9,14} Despite existing educational efforts, nonadherence rates of topical therapies are equivalent to or sometimes worse than oral therapies.^{5,15} For these reasons, AD education that addresses the pathophysiology of the disease, its management, and practical demonstrations has the potential to improve clinical outcomes.^{11,16} However, the interventions previously cited in the literature may be time-consuming and costly in clinical practice, thereby potentially limiting their widespread implementation. In this study, we created educational online videos and written pamphlets for patients with AD that are readily accessible and distributable. These educational modules address common clinical manifestations of AD, environmental triggers, proper washing technique, commonly used emollients, and topical treatment options. To determine the effectiveness of online video education in adults with AD, we compared the online videos with traditional pamphlets at improving knowledge and clinical outcomes in a randomized controlled trial.

METHODS

Study design and population

This randomized controlled study was approved and overseen by the Institutional Review Board of University of California, Davis in Sacramento. The clinicaltrials.gov registration number is NCT00826592. All participants were recruited from patients who were seen at the dermatology clinic and given a diagnosis of AD by board-certified dermatologists. The eligibility criteria required the participants to be 18 years or older, fulfilling the criteria of Hanifin and Rajka¹⁷ for AD, English-speaking, and

able to view videos online. All participants gave signed informed consent.

Study procedures

Eighty participants were randomized in a 1:1 simple, nonstratified randomization scheme generated by randomization software (GraphPad Software, La Jolla, CA). Randomization sequences were concealed within numbered envelopes until interventions were assigned.

Participants randomized to the online video education were instructed to watch an online video on skin care for AD. These participants were given instructions on how to access the online video and asked to demonstrate that they were able to locate and view the video during the initial visit.

The online video contained education on the clinical manifestations of AD, contributing environmental factors, bathing and hand-

washing techniques, moisturizer vehicles, and common treatment modalities. The pamphlet contained *identical* information as the online video except in a written format. The Flesch-Kincaid readability score of the pamphlet was 46.06 with a reading level closest to 13- to 15-year-olds.

All participants were instructed to view the educational material at least once during the 12-week study period and were allowed to review the educational material as often as they desired after the initial viewing.

Outcome measures

In this study, the primary outcome measure was disease severity. AD disease severity was assessed using a validated clinical outcome instrument, the patient-oriented eczema measure (POEM), at baseline and at the end of the study. The POEM questionnaire is a sensitive and validated disease severity measure for AD.^{18,19} Subjects' responses to the POEM questionnaire were used to generate a POEM score at baseline and conclusion of the study.

Improvement in the participants' knowledge was a secondary outcome measure in this study. All participants were asked to complete a prestudy questionnaire regarding their baseline knowledge of AD and skin care for AD. This knowledge

CAPSULE SUMMARY

- Patient education plays an increasingly important role in the management of atopic dermatitis (AD).
- In a randomized controlled trial comparing online video with written pamphlet education for adults with AD, online video showed significantly greater decreases in disease severity, showed greater increases in AD knowledge, and was more appealing than the written pamphlet.
- Online video appears to be an effective educational vehicle that is easily distributable, accessible, and appealing to patients with AD.

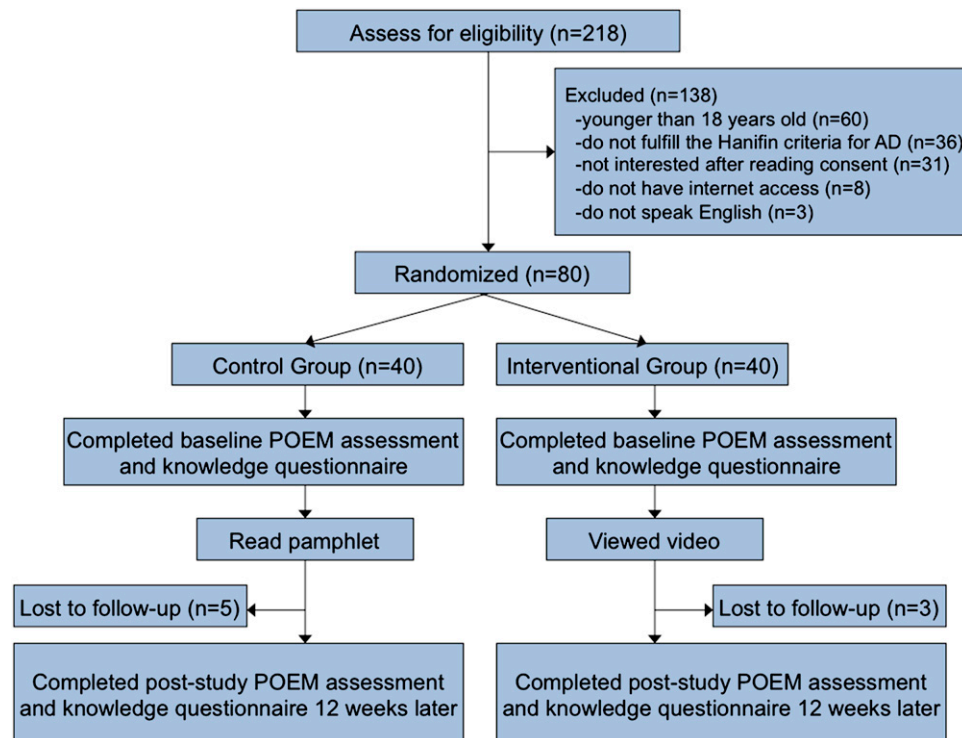


Fig 1. Randomization schema and participant flow diagram. AD, Atopic dermatitis; POEM, patient-oriented eczema measure.

questionnaire had been pretested in patients with AD within 3 months before the start of the study and consisted of 14 questions drawn from the contents of the educational materials. Participants did not receive answers to their prestudy knowledge questionnaire. At the conclusion of the study, participants were asked to complete the same questionnaire.

Overall satisfaction with the education material was also a secondary end point. At the end of the study, participants were asked to rate the usefulness and appeal of the educational method they received on a 10-point scale.

Statistical analysis

With 40 participants in each group, our study had 80% power to detect a mean difference of 1.27 in the change of POEM scores between the two intervention groups, with SD of 2 and $\alpha = 0.05$ in a two-tailed analysis. We used Student *t* test to analyze continuous variables for between-group comparisons of POEM scores and AD knowledge scores. Paired *t* tests were used to analyze continuous variables within a study group in prestudy and poststudy comparisons. The χ^2 tests were performed for categorical variables. For all statistical analyses, *P* less than .05 was considered statistically significant.

All statistical analyses were performed using software (SAS, Version 9.1, SAS Institute Inc, Cary, NC). The analyses for primary and secondary end points

were carried out using the intention-to-treat approach. Two-tailed tests were used for all statistical analyses.

RESULTS

Study population

The study recruited 80 adults with AD from the dermatology clinic. Participants were randomized to receive either online video education ($n = 40$) or pamphlet education ($n = 40$) (Fig 1). Five participants from the pamphlet group and 3 participants from the video group were lost to follow-up at the end of the study. Baseline demographic characteristics of the study populations are summarized in Table I.

AD clinical outcome

AD disease severity was assessed using the POEM scale. Participants randomized to the pamphlet group had a mean baseline POEM score of 8.63 ± 6.69 . Those in the video group had a similar baseline POEM score of 9.03 ± 5.81 ($P = .776$). Intragroup analysis revealed that, compared to the beginning of the study, participants in the pamphlet group had a reduced mean POEM score of 7.60 ± 3.83 ($P = .092$) 12 weeks later. In comparison, patients in the video group reported a significantly decreased mean POEM score of 5.73 ± 3.71 at the end of the study ($P < .001$).

Table 1. Comparison of demographic factors between pamphlet and video groups

	Pamphlet group (N = 40)	Video group (N = 40)	P value
Sex			.653*
Female	47.5% (19)	42.5% (17)	
Male	52.5% (21)	57.5% (23)	
Age, y			.306 [†]
Mean (±SD)	46 ± 17	50 ± 13	
Marital status			.245*
Married	57.5% (23)	70% (28)	
Not married	42.5% (17)	30% (12)	
Highest education level completed			.830 [‡]
Grades 1-12 or GED	2.5% (1)	5% (2)	
1-4 y of college	32.5% (13)	30% (12)	
>4 y of college	65% (26)	65% (26)	
Ethnicity			.419 [‡]
White	40% (16)	47.5% (19)	
Black	15% (6)	10% (4)	
Hispanic	7.5% (3)	0% (0)	
Asian or Pacific Islander	20% (8)	20% (8)	
Other	17.5% (7)	22.5% (9)	
Employment status			.423 [‡]
Unemployed	5% (2)	15% (6)	
Employed full time	75% (30)	67.5% (27)	
Employed part time	12.5% (5)	7.5% (3)	
Student full time	7.5% (3)	10% (4)	
Student part time	0% (0)	0% (0)	

GED, General Educational Development.

Percentages are followed by number of cases (in parentheses).

*Fisher exact.

[†]Student *t*.[‡] χ^2 tests used to determine significance.

We compared the difference in the changes in AD disease activity between the video and pamphlet group before and after the educational intervention. Intergroup analysis revealed that the reduction in the POEM score was significantly greater in the video group (3.30 ± 3.15 mean reduction in POEM score) compared to the pamphlet group (1.03 ± 3.75) with $P = .0043$.

AD skin care knowledge

Mean knowledge scores in AD skin care were similar between the pamphlet (9.80 ± 2.11 , 70%) and video (9.6 ± 1.93 , 68.5%) groups at the beginning of the study ($P = .66$). Participants in the pamphlet group showed a significant increase in the mean knowledge scores in AD skin care at the end of the study (11.65 ± 2.14 , 83%, $P < .001$). Participants in the video group also showed a statistically significant increase in knowledge score (12.75 ± 1.76 , 91%, $P < .001$).

Intergroup comparison showed that participants in the video group demonstrated significantly greater improvement in AD skin care knowledge (3.05 ± 2.16 mean increase in knowledge score) compared with the pamphlet group (1.85 ± 1.94) with $P = .011$.

Participant evaluation of educational materials

At the end of the study, all participants were asked to rate the quality and appeal of their respective educational materials on a scale from 1 to 10. There were no differences in the perceived quality of the educational materials (7.43 ± 3.06 for the pamphlets and 7.63 ± 2.92 for the online videos, $P = .77$). Participants rated the appeal of the online video (8.2 ± 2.90) higher than the appeal of the pamphlets (6.55 ± 2.56 , $P = .0086$).

DISCUSSION

At the end of the 12-week study period, participants in the video group experienced significant decreases in AD disease severity, as documented by a 37% decrease in their POEM scores. In comparison, participants in the pamphlet group saw a statistically insignificant decrease in disease severity by only 12%. Our findings corroborate results of other studies that examined educational strategies to improve AD disease outcomes. Previous studies showed that educational sessions with a specialized dermatology nurse significantly decreased the severity of disease with a vast improvement in emollient use.⁹ Similarly, other modes of educational intervention for pediatric patients also reduced AD severity by increasing adherence to topical corticosteroid therapy.¹⁶ The reduction of disease severity is a critical component of AD management because severity is correlated with quality of life.²⁰

Participants were also assessed for changes in baseline and poststudy knowledge of AD. Both interventional groups showed a significant improvement in poststudy knowledge questionnaires. Participants in the video group scored, on average, 1.2 points higher than participants in the pamphlet group ($P = .011$). These findings support previous studies that have shown that patient education contributes to improved clinical outcomes. For example, workplace education at a chemical manufacturing plant demonstrated that education alone was able to reduce the incidence of occupational dermatitis,²¹ suggesting that patient knowledge leads to behavioral changes and improved clinical outcomes.

Although participants in both pamphlet and video groups rated the usefulness of their respective interventions equally, the video was rated significantly more appealing than the pamphlet. Because the educational material was identical, these results may

reflect an inherent learning benefit conferred by audio-visual presentation. In addition, Internet use as a health care tool is on the rise,²² making online-based education highly accessible and portable. Different educational methods have previously been shown to have varying effects on AD clinical outcomes.²³ For example, adherence to topical therapy in patients with AD increased on days leading up to and immediately after office visits,⁶ suggesting that patients need follow-up, reinforcement, and encouragement to manage their disease. Thus, effective video education can reduce the time and resources necessary for both providers and patients with AD for disease management, and in this study, improve clinical outcomes.

The results of our study must be interpreted within the context of the study design. Although our study did not directly measure adherence, the randomization schema helps to ensure that characteristics of both groups were similar at baseline. The level of education of our participants is higher than that of the general population²⁴; it is possible that the effect of the educational intervention may be greater in populations with lower health literacy. The importance of health literacy for the comprehension of health materials has been well documented.^{25,26} Assessment of health literacy level of the study population will be important for future studies involving patient education. Although there are currently no known validated AD knowledge questionnaires, we tested our knowledge questionnaire in adult patients with AD before the start of our study. Lastly, although the video and pamphlet are identical in educational content, it is possible that the video itself may affect the participants' self-assessment of disease severity. Therefore, assessment by a dermatologist blinded to randomization would be helpful in future studies. We hope to refine and share this video-based educational tool with the dermatology community in the near future.

With the rising incidence of AD,²⁷ efficient and effective patient education becomes a vital component to disease management. Although patient education delivered through traditional workshops, face-to-face educational programs, and specialized nurses contributes to improving patient outcomes, these efforts can require significant time and resources for organization and implementation. This study demonstrates that online video-based education significantly decreased AD severity in adults, and was more effective in improving clinical outcomes than written pamphlets. The online videos also led to greater improvements in AD knowledge and greater ratings in appeal compared with the pamphlets. Major advantages of online video as an

educational delivery vehicle include ease of distribution, accessibility, and combined audio-visual appeal. Online video for patient education appears to be an effective tool for improving clinical outcomes in adult patients with AD.

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