ORIGINAL ARTICLE

Hybrid patient education in atopic dermatitis: feasibility analysis and clinical outcomes of an evaluator-blinded randomized controlled trial

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Summary

Background. Therapeutic patient education (TPE) is recommended in atopic dermatitis (AD), yet the comparative feasibility of different educational formats remains poorly defined. We compared knowledge level, feasibility and clinical outcomes across three take-home formats added to standardized verbal counselling. **Methods.** In this evaluator-blinded, parallel-group randomized controlled trial, patients aged 0–75 years with AD were allocated 1:1:1:1 to verbal counselling alone, counselling and a written form, an illustrated leaflet, or QR-linked videos; all arms received a standardized 20-minute counselling session. Co-primary outcomes were implementation feasibility and short-term change in disease-specific knowledge. Secondary outcomes included the Eczema Area and Severity Index (EASI), quality of life, itch and satisfaction, assessed to 18 months. **Results.** Overall, 190 participants (147 pediatric, 43 adult) were analyzed. Knowledge, clinical and quality-of-life outcomes improved in all arms, including verbal counselling alone. Short-term knowledge gain was greatest with the illustrated leaflet (Δ 16.1 ± 10.2; between-arm p = 0.021), which also achieved the highest material satisfaction, although this advantage attenuated by 18 months. The formats diverged markedly in cost, personnel dependence and scalability while producing clinically similar outcomes; adult age independently predicted lower 18-month EASI-

50 response (aOR 0.33; p = 0.039). **Conclusions.** Clinical outcomes improved across all educational formats, with no statistically significant between-group differences. Hybrid education format selection may be guided by feasibility, patient acceptability and knowledge gain.

KEY WORDS

Atopic dermatitis; therapeutic patient education; randomized controlled trial; feasibility.

IMPACT STATEMENT

Structured atopic dermatitis education improves outcomes irrespective of format; scalable take-home materials match resource-intensive counselling, supporting hybrid, feasibility-driven patient-education strategies in routine care.

Introduction

Atopic dermatitis is a chronic, relapsing inflammatory skin disease associated with pruritus, sleep disruption, impaired quality of life, psychosocial burden, and recurrent infection risk (1, 2). Contemporary guidelines recommend therapeutic patient education (TPE) as part of long-term care because disease control depends not only on prescribing treatment but also on patients' and caregivers' ability to understand the disease, use topical therapies correctly, address treatment concerns, and respond to flares (3).

The content and intensity of educational interventions vary substantially. Programmes may use individual or group teaching, written materials, illustrations, videos, mobile platforms, or combinations of these approaches. A 2024 Cochrane review found that group education probably improves clinical signs and patient-reported symptoms, whereas evidence for technology-mediated education was more heterogeneous (4). Implementation is also shaped by limited resources and specialist availability, variable funding and reimbursement environments, the absence of

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harmonized educational models, literacy, digital access, language, age, and whether the learner is the patient or a caregiver (5, 6). Direct randomized comparisons of TPE materials remain uncommon (7, 8). We conducted an evaluator-blinded randomized controlled trial (RCT) comparing four standardized TPE formats—verbal counselling alone, counselling with a written form, an illustrated leaflet, or QR-linked videos—to assess feasibility, patient satisfaction and clinical outcomes in routine practice.

Materials and Methods

Study design

This evaluator-blinded, parallel-group RCT was conducted at Kayseri City Hospital, a GA²LEN Atopic Dermatitis Centre of Reference and Excellence (ADCARE), jointly by the Departments of Dermatology and Paediatric Allergy (5). Recruitment and follow-up were carried out between June 2024 and June 2026. The trial is reported in accordance with the CONSORT 2025 statement (Figure 1A). The protocol was approved by the institutional Clinical Research Ethics Committee (IRB-121200524) and conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all adult participants and from the parents of paediatric patients.

Participants

Consecutive eligible patients aged 0–75 years with AD diagnosed by at least two physicians (a dermatologist and/or a paediatric allergist) according to the Hanifin–Rajka criteria were invited to participate. Patients who did not fully meet these criteria, or who were unable to complete the study questionnaires, were excluded.

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A broad age range was intentionally permitted to evaluate the feasibility of educational interventions across the full spectrum of routine AD care. Education was directed to caregivers for children aged 0–12 years, jointly to adolescents and a parent for ages 13–17 years, and directly to adults. Satisfaction with the educational materials was reported by caregivers for children aged 0–12 years and by patients aged ≥13 years.

Randomization and blinding

Following clinical assessment and individualized treatment planning, participants were allocated 1:1:1:1 using a computer-generated random-allocation sequence (Figure 1B). Allocation was concealed with sequentially numbered, opaque, sealed envelopes. Because the intervention is inherently educational, participants could not be blinded to the material they received; however, outcome assessors remained blinded throughout follow-up. To minimize inter-observer variability, all clinical assessments were performed by a single physician who was not involved in delivering the educational materials.

Interventions

Consistent with the ethical and pragmatic nature of the research, every participant received an individualized treatment plan and a standardized verbal counselling session of approximately 20 minutes. To maximize fidelity and reduce performance bias, each session followed an identical, predefined 10-item checklist delivered in the same sequence, covering disease pathophysiology, trigger avoidance, emollient use, dietary considerations, topical-corticosteroid safety and corticophobia, flare management, bathing practices, contact allergens, information on psychological aspects and indications for seeking care. The programme was therefore purely educational rather than a mental-health or psychotherapeutic intervention, no coping-skills training was provided. Participants were then assigned to one of four arms: verbal counselling alone

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(control); verbal counselling and a standardized four-page written form (Supplementary Figure S1); verbal counselling and a study-designed, illustrated six-page leaflet (Supplementary Figure S2); or verbal counselling and QR-linked access to two brief educational videos (Supplementary Figure S3).

Outcomes

Outcomes were assessed at baseline, short-term follow-up (7–14 days) and long-term follow-up (18 months). Two primary outcomes were prespecified before enrolment: (i) the comparative implementation feasibility of the four formats, evaluated descriptively; and (ii) the short-term change in disease-specific knowledge.

Secondary outcomes were the Eczema Area and Severity Index (EASI; 0-72), the Dermatology Life Quality Index (DLQI; age-appropriate versions: IDQOL, CDLQI or DLQI; 0-30), the mean itch Numerical Rating Scale (mean itch NRS; average itch over the past 24 hours; 0–10), the Worst Itch NRS (WI-NRS; worst itch over the past 24 hours; 0–10) and satisfaction; pruritus scales were self- or caregiver-reported as age-appropriate (9–12). Participants who had not reviewed the assigned material before follow-up were asked to do so in a designated area at the hospital before outcome assessment.

Because no standardized Turkish questionnaire addressing the targeted educational domains was available, a study-specific instrument was developed through expert consensus. The 20-item true/false questionnaire, expressed as a 0–100 score, was constructed by two dermatologists and two paediatric allergists from a targeted literature review and analysis of patient-community content; items achieving ≥75% expert agreement were retained (Supplementary Table S1). The instrument was intended to compare relative change between arms rather than to serve as an externally validated measure of disease knowledge. The questionnaire-based knowledge

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assessment was completed under physician supervision at baseline and all follow-up visits. Parents completed the questionnaire for patients aged ≤12 years, whereas patients aged >12 years completed it themselves.

Given that most participants had mild baseline disease (81.6% with EASI < 7), use of the absolute minimal clinically important difference (MCID; ≥6.6-point reduction in EASI) would have been prone to a substantial floor effect (10, 11). Clinical response was therefore predefined as the severity-independent EASI-50 endpoint (≥50% reduction in EASI) and assessed using χ^2 analysis and multivariable logistic regression (12).

Material satisfaction was assessed only in the three take-home-material groups using a study-specific questionnaire rated on a 0–5 Likert scale. Before enrolment, feasibility outcomes were prospectively defined as preparation time based on timestamped software and hardware logs; production and personnel costs derived from vendor invoices and institutional salary scales, respectively; and accessibility, portability, and technical requirements. All costs were standardized to euros.

Statistical analysis

As no comparable trial was available, the sample size for the primary short-term knowledge outcome was estimated assuming Cohen's medium effect size ($f = 0.25$). For a repeated-measures ANOVA assessing the group × time interaction across four equal-sized arms, 76 participants (19 per arm) were required to achieve 95% power (two-sided $\alpha = 0.05$; G*Power); 190 participants were ultimately enrolled. Analyses were performed using IBM SPSS Statistics v27. The primary analysis followed a modified intention-to-treat approach, including all randomized participants with at least one post-baseline assessment (n = 190). Normality was assessed using the Shapiro–Wilk test. Between-group comparisons used the Mann–Whitney U, Kruskal–Wallis, Pearson χ^2, or

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Fisher's exact tests, as appropriate, while within-group changes were analysed using the Friedman test. EASI-50 response was evaluated using χ^2 tests and exploratory multivariable logistic regression adjusted for age group and baseline EASI. Pairwise satisfaction comparisons were Bonferroni corrected (adjusted $\alpha = 0.017$). Missing long-term data were analysed using available cases without imputation. Statistical significance was defined as two-sided $p < 0.05$.

Results

Demographic data

Among 206 patients screened, 203 met the Hanifin–Rajka diagnostic criteria and were randomized. Thirteen participants were excluded before analysis—11 lost to follow-up before the first assessment and 2 who completed the knowledge questionnaire without reading the items—leaving 190 participants for the primary analysis (Figure 1A). The cohort comprised 147 paediatric (77.4%) and 43 adult (22.6%) patients; 47.9% were female and 76.8% resided in urban areas. Baseline characteristics were well balanced across study arms, including the allocated educational format ($p = 0.929$; Table I), with no clinically meaningful between-group differences. Dermatologists were the predominant source of patient education (78.9%), followed by allergists (52.1%) and internet or social-media resources (28.9%).

Baseline treatment

All patients received topical therapy. Systemic-therapy use was low and evenly distributed across arms (ciclosporin $p = 0.33$, dupilumab $p = 0.80$, JAK inhibitor $p = 0.12$) but higher in adults than children (all $p \leq 0.001$), supporting successful randomization while reflecting greater adult disease severity (Table II).

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Feasibility analysis

The final feasibility analysis compared four standalone TPE delivery formats—verbal counselling, an information form, an illustrated leaflet, and QR-linked videos—across resource requirements, accessibility, acceptability, patient autonomy, and educational effectiveness (Table III). Verbal counselling required the least one-time development (≈45 minutes per patient) but incurred the highest recurring cost through physician time and clinical space, depended on qualified personnel and afforded the lowest scalability and patient autonomy. Material-based formats required only one-time development (form ≈2 hours, video ≈6 hours, leaflet ≈16 hours), negligible per-unit cost (form €0.07, video €0.12, leaflet €0.50) and no recurring personnel, enabling repeat use and independent access. Although the leaflet required the greatest development effort, it produced the highest patient satisfaction and knowledge gains, whereas the form and video demonstrated the greatest potential for scalable dissemination (Figure 1C).

Knowledge and awareness

Between-arm short-term knowledge gain differed significantly (Kruskal–Wallis $p = 0.021$) and was greatest with the illustrated leaflet (Δ 16.1 ± 10.2) relative to the control, form and video arms (11.1 ± 8.6, 12.0 ± 7.0 and 11.2 ± 8.3, respectively) (Figure 1D). All arms also showed significant within-arm improvement over time (all Friedman $p < 0.001$). By 18 months, however, between-arm differences in knowledge were no longer significant ($p = 0.313$), indicating attenuation of the early leaflet advantage and suggesting that periodic re-exposure may be required to sustain knowledge gains.

Clinical outcomes

All 190 participants attended the first follow-up (7–14 days), whereas 125 (65.8%) completed the 18-month assessment. Attrition occurred predominantly after the short-term assessment, and

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the most frequent reasons were marked clinical improvement (35.4%), living a different city (26.2%) and complete remission (13.8%). The proportion of participants completing long-term follow-up was similar across intervention groups. Baseline severity did not differ between completers and non-completers (EASI, mean itch NRS, WI-NRS; all $p > 0.05$), and in a prespecified sensitivity analysis participants subsequently lost to follow-up had already demonstrated significant short-term improvement in knowledge and all clinical outcomes (all $p < 0.001$); these findings reduce, but do not eliminate, concern regarding attrition bias.

Baseline disease severity was comparable across study arms (EASI, $p = 0.549$). The form, leaflet, and video interventions sustained significant improvements in EASI through 18 months (all Friedman $p < 0.001$), whereas the verbal-only arm did not ($p = 0.120$). However, no significant differences were observed among the three structured take-home TPE materials (all $p > 0.05$). Quality of life improved significantly across all study arms, while sustained reductions in mean itch NRS were observed only with TPE materials; WI-NRS improved in all groups. No significant between-group differences were detected for any clinical outcome during follow-up (all $p > 0.40$; Table IV), although the study was not designed or powered to establish equivalence between interventions.

Consistent with the predominantly mild baseline disease, most participants achieved the severity-independent EASI-50 endpoint (71.0–92.3%), with no between-group differences ($p = 0.204$); notably, such high base rates limit the discriminative power of EASI-50 in a mild cohort. After multivariable adjustment, educational modality was not independently associated with 18-month EASI-50 achievement, whereas adult age remained an independent predictor of lower response (adjusted odds ratio (aOR) 0.33, 95% CI 0.11–0.95; $p = 0.039$; Supplementary Table S2).

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Satisfaction

Programme-level satisfaction was uniformly high (Table V). Material satisfaction was higher for the illustrated leaflet (4.78 ± 0.51) and video (4.70 ± 0.59) than for the written form (4.23 ± 0.88; omnibus $p < 0.001$; leaflet vs form $p = 0.002$; video vs form $p = 0.020$; leaflet vs video non-significant).

Final recorded outcomes were available for 125 of 190 participants (65.8%): 35 of 50 in the verbal arm (70.0%), 33 of 48 with the form (68.8%), 26 of 46 with the leaflet (56.5%), and 31 of 46 with video (67.4%). Completion did not differ statistically by arm (chi-square $p = 0.496$), and the global arm effect in the multivariable completion model was nonsignificant ($p = 0.592$). Female participants had lower estimated odds of completion than male participants (OR 0.49, 95% CI 0.25–0.95; $p = 0.034$), while each 10-point higher baseline knowledge score was associated with higher completion odds (OR 1.42, 95% CI 1.08–1.88; $p = 0.013$; Supplementary Table S3).

Discussion

This evaluator-blinded RCT is among the first to directly compare the feasibility of several TPE formats in both paediatric and adult patients with AD. Three main findings emerged. First, clinical and patient-reported outcomes improved in all groups, including verbal counselling alone. This suggests that the benefits were mainly related to structured education itself rather than to a specific education format. However, the format influenced knowledge gain, patient satisfaction, and implementation feasibility. Second, the illustrated leaflet produced the greatest short-term knowledge gain and the highest satisfaction, although this early advantage attenuated by 18 months. Third, and central to the study's purpose, the formats diverged sharply in cost, personnel dependence and scalability while yielding clinically similar outcomes. Collectively, these findings

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support hybrid educational strategies that pair verbal counselling with scalable take-home materials to enhance resource efficiency.

Because >80% of participants had mild baseline disease (EASI <7), absolute MCID thresholds were limited by a floor effect; therefore, EASI-50 was prespecified. This limits claims of format-specific clinical superiority and is consistent with the Cochrane review, in which educational benefits often remained below established MCIDs (4). Clinically meaningful improvement was better reflected by comparable reductions in DLQI and itch across groups.

The superior short-term knowledge gain with the illustrated leaflet may be explained by a *verbal–visual synergy* consistent with dual-coding and cognitive-load theory, whereby pairing verbal instruction with visual representation optimizes encoding and retention (13, 14). Its clear visual organization, lower text density, and ease of repeated access may have further enhanced this effect. Because the knowledge instrument, although developed by expert consensus, was not formally psychometrically validated; this signal should be interpreted cautiously and regarded as hypothesis-generating until externally validated.

The main contribution of this trial is its focus on implementation feasibility. Although verbal counselling is effective, it requires substantial staff time and is difficult to scale. Take-home materials produced comparable outcomes with fewer recurring resources while supporting patient autonomy, thereby addressing key barriers to routine TPE use.

Our findings align with a literature that has not identified one universally superior educational medium. The 2024 Cochrane review supported structured education but found heterogeneity in intervention content and delivery (4), and a contemporaneous meta-analysis likewise emphasized variation in educational intensity, outcomes, and modality (8). A multicentre nurse-led paediatric trial reduced corticophobia without demonstrating a clear disease-severity advantage over standard care at six months (7). This study suggests that resource-intensive, personnel-delivered

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interventions offer little additional clinical benefit over simpler approaches. In a small single-centre active-control trial (52 randomized; 22 completing follow-up), no statistically significant differences were detected between bilingual handouts and short videos in clinical severity, patient-reported outcomes, accessibility, or caregiver confidence (15). At the scalable end of the spectrum, a large multicentre trial of smartphone-delivered education reduced short-term relapse but showed no sustained benefit in disease severity or quality of life (16). Collectively, these studies suggest that content, reinforcement, engagement, and clinical context may matter at least as much as the medium.

Counselling content reflected contemporary guideline recommendations on dietary triggers, topical-treatment adherence, skin care and trigger avoidance (1, 3, 17, 18); consistent with age being the only independent predictor of long-term response, the greater severity and systemic-therapy use observed in adults support age-stratified management (19, 20).

This study has several limitations. The single-centre setting and seasonal variation in disease activity may limit generalisability. The modified intention-to-treat analysis excluded 13 participants without post-baseline data, leaving potential residual attrition bias despite consistent sensitivity analyses. The study-specific knowledge questionnaire was developed through expert consensus but was not psychometrically validated. No process measures like recall, comprehension, or cognitive load were collected. The predominantly mild disease profile and high EASI-50 response rate also limited outcome discrimination. Because non-response events were few, the estimated association with adult age was imprecise and should be considered exploratory. Engagement with educational materials was not objectively measured and may have varied by exposure duration, viewing conditions, and individual motivation. Finally, individualised treatment regimens reflect real-world practice but introduce confounding, precluding attribution of clinical

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improvements solely to TPE. Although subgroup and covariance analyses showed consistent effects, residual confounding likely remains.

Key strengths include the evaluator-blinded randomized design, inclusion of a socio-demographically diverse paediatric and adult population, standardized outcome assessment by a single evaluator, and a sample exceeding power requirements. The use of validated clinician- and patient-reported measures, together with feasibility and cost analyses, enabled a comprehensive assessment of both practical applicability and clinical effectiveness.

Conclusions

Structured TPE improved AD outcomes across all delivery formats; however, no format-specific clinical benefit or verified long-term advantage was established. Leaflet and video formats were better accepted than written materials. Educational format may therefore be selected according to feasibility, patient acceptability and knowledge acquisition. Larger multicentre studies are needed to confirm these implementation-focused findings.

Compliance with Ethical Standards

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Author contributions (CRediT)

FÇ: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

NÇ: Investigation, Data curation, Resources.

HÜÇ: Investigation, Data curation.

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MC: Investigation, Data curation, Writing – review & editing.

RE: Supervision, Validation, Writing – review & editing.

Conflict of interest: The authors have no competing interests to declare that are relevant to the content of this article. All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

Trial registration: Not applicable

Ethical approval: The study was conducted in accordance with the Declaration of Helsinki. All participants provided written informed consent. Ethical approval was obtained from the Health Sciences University, Kayseri Faculty of Medicine, Kayseri City Hospital Clinical Research Ethics Committee (File Date: 20/05/2024-121).

Informed consent: Written informed consent was obtained from all adult participants and from the parents of paediatric patients.

Declaration of Generative AI and AI-assisted Technologies in the writing process: AI-based language support was used only to improve grammar and punctuation during manuscript preparation. The authors take full responsibility for the content, interpretation, and conclusions of the work.

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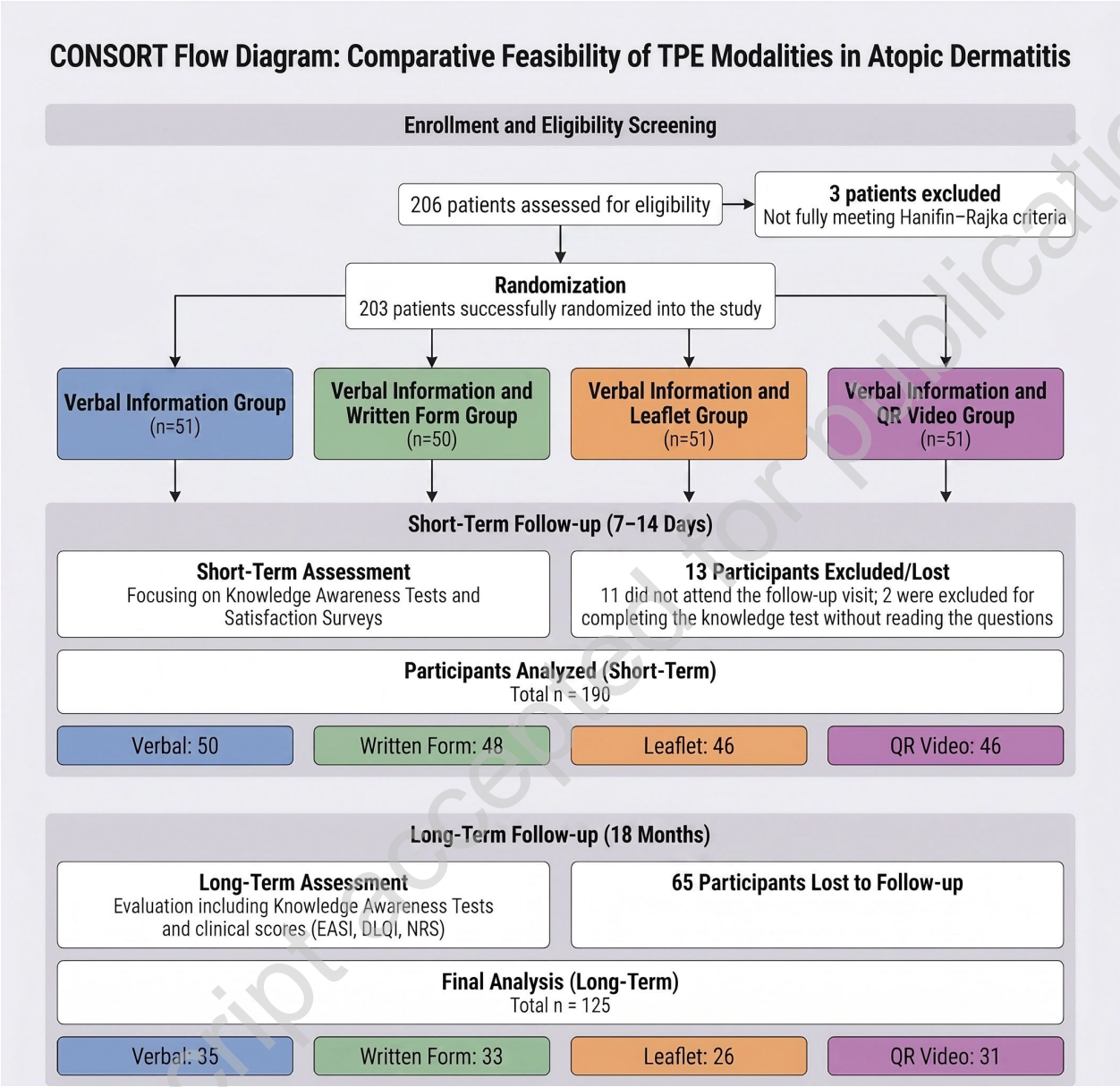
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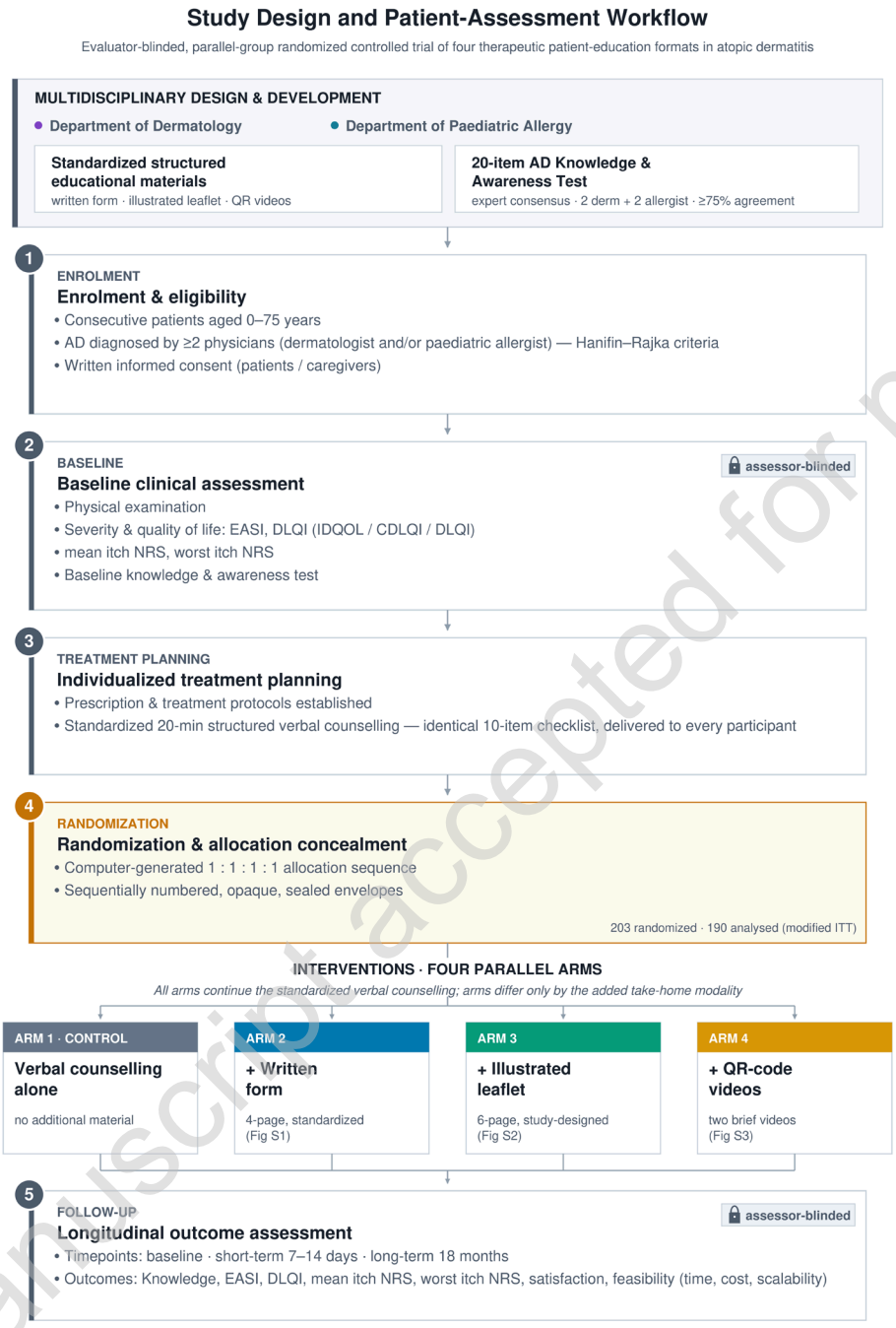
Figure 1A. CONSORT flow diagram of the study population.



Enrolment, computer-generated 1:1:1:1 randomization, follow-up and final analysis across the four educational-intervention arms.

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Figure 1B. Study design and patient-assessment workflow.



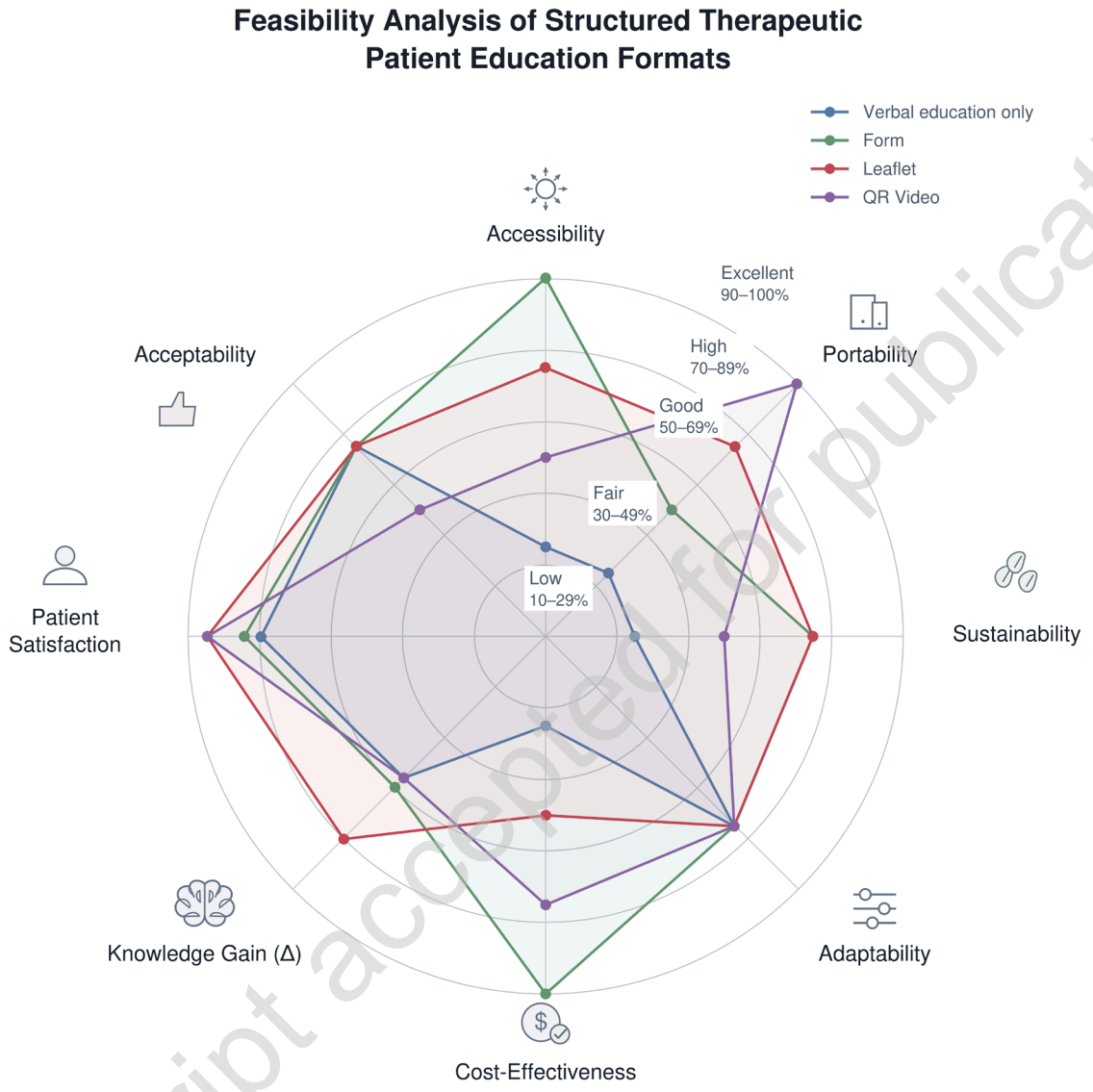
Evaluator-blinded, parallel-group randomised controlled trial for atopic dermatitis. All participants received standardised 20-minute verbal counselling and individualised treatment

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planning. AD, atopic dermatitis; EASI, Eczema Area and Severity Index; EASI-50, at least 50% reduction in EASI; DLQI, Dermatology Life Quality Index; CDLQI, Children's Dermatology Life Quality Index; IDQOL, Infants' Dermatitis Quality of Life Index; NRS, numerical rating scale; QR, quick response.

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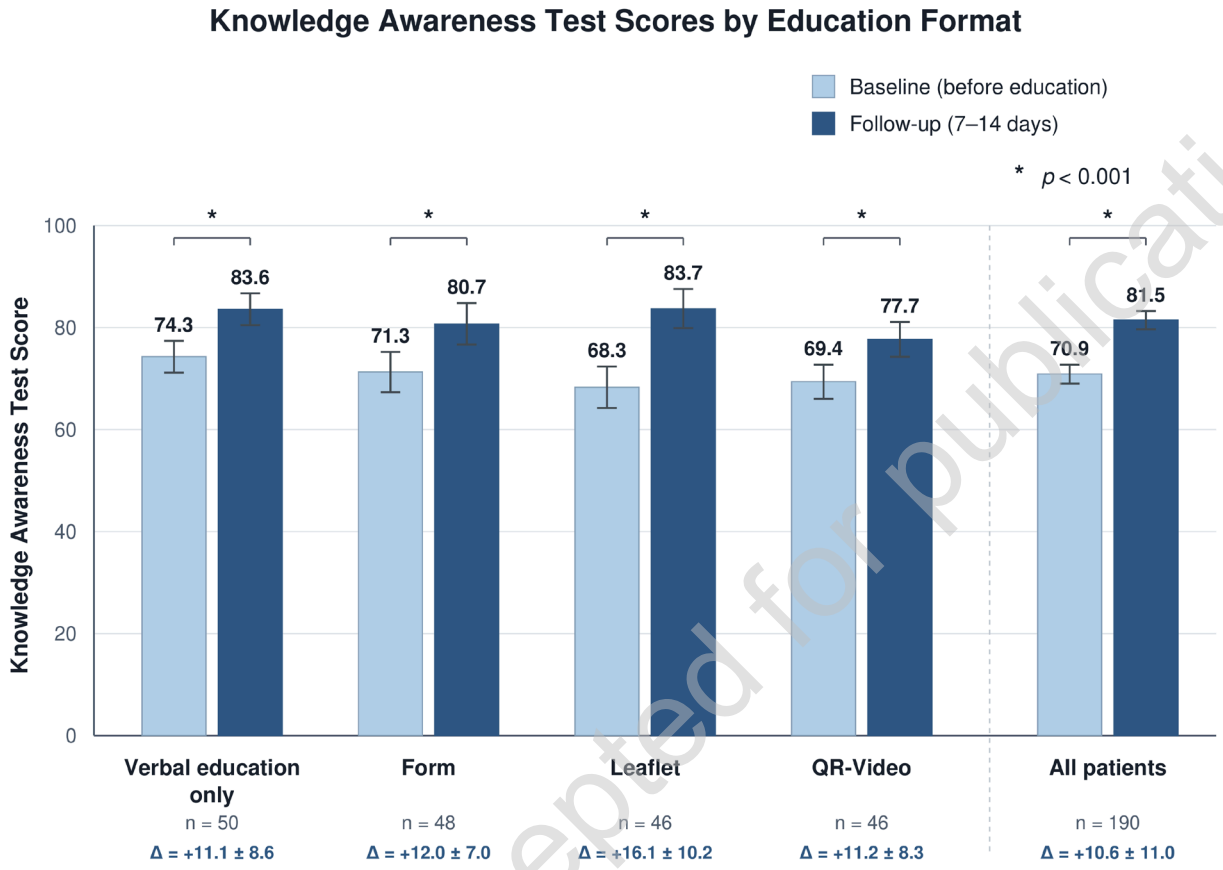
Figure 1C. Feasibility analysis of structured therapeutic patient education formats.



Radar plot comparing verbal education only, written form, illustrated leaflet, and QR video across accessibility, portability, sustainability, adaptability, cost-effectiveness, knowledge gain, patient satisfaction, and acceptability. Distance from the center represents the rating for each domain, with greater distance indicating a higher rating. Δ denotes knowledge gain; QR, quick response.

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Figure 1D. Knowledge awareness test scores by education format.



Bars show mean scores at baseline (before education) and follow-up (7–14 days); error bars represent 95% confidence intervals. Groups received verbal education only (n = 50), a written form (n = 48), an illustrated leaflet (n = 46), or QR videos (n = 46); all patients denotes the overall analysed cohort (n = 190). The same asterisk marks each within-group baseline–follow-up comparison, including the overall cohort: *$p < 0.001$ (Wilcoxon signed-rank test). The between-format comparison of knowledge gain was reported as $p = 0.021$ (Kruskal–Wallis test). Δ denotes the reported mean within-patient change (follow-up minus baseline), presented with the standard deviation. QR, quick response.

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Table I. Demographic characteristics of the study population.

Characteristic	Paediatric n (%)	Adult n (%)	Total n (%)	*p*
Gender				0.061[a]
Female	65 (44.2)	26 (60.5)	91 (47.9)	
Male	82 (55.8)	17 (39.5)	99 (52.1)	
Place of residence				0.791[b]
Rural	5 (3.4)	2 (4.7)	7 (3.7)	
District centre	30 (20.4)	7 (16.3)	37 (19.5)	
Urban centre	112 (76.2)	34 (79.1)	146 (76.8)	
Monthly income				**0.041[b]**
<€500	29 (19.9)	16 (37.2)	45 (23.8)	
€500–1,000	57 (39.0)	18 (41.9)	75 (39.7)	
€1,000–1,500	40 (27.4)	7 (16.3)	47 (24.9)	
>€1,500	20 (13.7)	2 (4.7)	22 (11.6)	
Educational level				0.060[b]
Primary school	20 (13.6)	12 (27.9)	32 (16.8)	
Secondary school	51 (34.7)	17 (39.5)	68 (35.8)	
University	74 (50.3)	13 (30.2)	87 (45.8)	
Master's degree	2 (1.4)	1 (2.3)	3 (1.6)	
Type of birth				**<0.001[b]**
Vaginal	49 (38.0)	30 (88.2)	79 (48.5)	
Caesarean section	80 (62.0)	4 (11.8)	84 (51.5)	

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Breastfeeding				**<0.001[b]**
Yes	129 (100.0)	31 (91.2)	160 (98.2)	
No	0 (0.0)	3 (8.8)	3 (1.8)	
Patient education format				0.929[a]
Verbal education only	37 (25.2)	13 (30.2)	50 (26.3)	
Form	38 (25.9)	10 (23.3)	48 (25.3)	
Leaflet	36 (24.5)	10 (23.3)	46 (24.2)	
Video	36 (24.5)	10 (23.3)	46 (24.2)	
Self-awareness of the disease				0.932[a]
Yes	105 (71.4)	31 (72.1)	136 (71.6)	
No	42 (28.6)	12 (27.9)	54 (28.4)	

Data are n (%); percentages are column percentages. Baseline characteristics were balanced across the four educational-format arms (p = 0.929).

[a] Pearson's chi-square test.

[b] Fisher's exact test.

Totals for type of birth and breastfeeding are below the full sample because some participants were uncertain of their history and left these items blank.

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Table II. Systemic treatment use by patient education format and age group.

Group	Ciclosporin n (%)	Dupilumab n (%)	Oral JAKi n (%)
Patient education format			
Verbal education only (n = 50)	1 (2.0)	1 (2.0)	4 (8.0)
Form (n = 48)	3 (6.3)	1 (2.1)	2 (4.2)
Leaflet (n = 46)	2 (4.3)	0 (0.0)	0 (0.0)
Video (n = 46)	0 (0.0)	1 (2.2)	5 (10.9)
Total (n = 190)	6 (3.2)	3 (1.6)	11 (5.8)
p	0.33	0.80	0.12
Age group			
Paediatric (n = 147)	1 (0.7)	1 (0.7)	2 (1.4)
Adult (n = 43)	5 (11.6)	2 (4.7)	9 (20.9)
Total (n = 190)	6 (3.2)	3 (1.6)	11 (5.8)
p	**<0.001**	**0.001**	**<0.001**

Data are n (%). JAKi, Janus kinase inhibitor.

p-values are from Pearson's chi-square and Fisher's exact tests; bold denotes $p < 0.05$. Systemic-therapy use was evenly distributed across arms but higher in adults than children.

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Table III. Comparative feasibility analysis of the four structured therapeutic patient education formats.

Evaluation parameter	Verbal education only	Form	Leaflet	Video
Method characteristics	Physician-led, 20-min face-to-face individual session	21 × 30 cm, 4-page, monochrome, double-sided printed material	12 × 20 cm, 6-page, colour, double-sided, foldable printed material	8 × 8 cm card with a QR code linking to an online video
Development time (one-off)*	Low (≈45 min)	Moderate (≈2 h)	Very high (≈16 h)	High (≈6 h)
Cost**	Very high (personnel + facility)	Low (€0.07)	High (€0.50)	Moderate (€0.12)
Accessibility	Limited (requires appointment)	Very high (printed + online)	High (printed)	Moderate (internet + device)
Portability	Low	Moderate	High	Very high
Sustainability	Low	High	High	Moderate
Dissemination potential	Moderate	High	Moderate	Moderate
Acceptability	High	High	High	Moderate
Adaptability	High	High	High	High

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Attractiveness / visual interest	Low	Moderate	Very high	High
Technical requirement	Absent	Absent	Absent	Present (internet + device)
Spatial requirement	Present (clinic room)	Absent	Absent	Absent
Personnel requirement	Present (physician)	Absent	Absent	Absent
Patient autonomy	Low	High	High	High
Educational efficacy (qualitative)	Moderate	High	Very high	Moderate
Knowledge gain, Δ (mean ± SD)†	11.1 ± 8.6	12.0 ± 7.0	16.1 ± 10.2	11.2 ± 8.3

This analysis compares the independent implementation scenarios of each education format. Preparation time was derived from timestamped activity logs, production costs from vendor invoices and personnel costs from institutional salary scales; all costs were standardized to euros.

* One-off development, preparation and implementation time of the educational material.

** Production and printing cost per unit; qualified-personnel and facility costs for verbal counselling are excluded.

† Δ, mean change in the knowledge–awareness test score (short-term follow-up minus baseline); the between-group difference in Δ was significant (Kruskal–Wallis $p = 0.021$).

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Table IV. Knowledge level, clinician and patient-reported outcomes across TPE formats at baseline and final follow-up.

Outcome / time point	TPE format (mean ± SD)					
	Verbal education only (n = 35)	Form (n = 33)	Leaflet (n = 26)	Video (n = 31)	*H*	*p*
EASI (0-72)						
Baseline	3.30 ± 3.27	3.18 ± 3.63	4.40 ± 4.59	4.01 ± 5.62	2.114	0.549
Final follow-up	1.66 ± 2.07	0.94 ± 1.54	1.25 ± 1.93	0.93 ± 1.90	2.912	0.405
Δ baseline→final	2.91 ± 2.86	2.61 ± 3.08	3.83 ± 4.35	3.56 ± 4.98	2.230	0.526
Within-group change (Friedman)	$\chi^2 = 4.24$ $p = 0.120$	$\chi^2 = 31.20$ ***p* <0.001**	$\chi^2 = 20.34$ ***p* <0.001**	$\chi^2 = 17.93$ ***p* <0.001**		
Mean itch (0-10)						
Baseline	4.86 ± 3.32	4.88 ± 3.04	5.23 ± 2.93	4.35 ± 3.14	1.053	0.788
Final follow-up	2.60 ± 3.27	2.45 ± 3.27	1.59 ± 2.60	1.13 ± 1.55	1.534	0.674
Δ baseline→final	4.60 ± 3.19	3.64 ± 2.79	4.19 ± 3.24	3.81 ± 3.12	1.570	0.666
Within-group change (Friedman)	$\chi^2 = 5.28$ $p = 0.071$	$\chi^2 = 18.90$ ***p* <0.001**	$\chi^2 = 16.79$ ***p* <0.001**	$\chi^2 = 11.26$ ***p* = 0.004**		
Worst itch (0-10)						
Baseline	4.94 ± 3.62	5.18 ± 3.42	5.19 ± 3.12	4.32 ± 3.41	1.241	0.743
Final follow-up	2.76 ± 3.49	2.79 ± 3.63	1.24 ± 2.22	1.20 ± 1.78	1.799	0.615
Δ baseline→final	4.29 ± 3.62	4.09 ± 3.39	4.38 ± 2.98	3.94 ± 3.32	0.366	0.947

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Within-group change (Friedman)	$\chi^2 = 9.45$ ***p* = 0.009**	$\chi^2 = 13.02$ ***p* <0.001**	$\chi^2 = 18.98$ ***p* <0.001**	$\chi^2 = 9.33$ ***p* = 0.009**		
DLQI (0-30)						
Baseline	7.74 ± 5.28	8.48 ± 6.12	8.04 ± 6.26	6.23 ± 5.66	3.127	0.372
Final follow-up	3.68 ± 3.72	4.95 ± 4.31	3.71 ± 5.37	1.80 ± 2.24	5.066	0.167
Δ baseline→final	5.69 ± 4.83	5.97 ± 4.83	6.15 ± 5.75	5.48 ± 5.46	0.444	0.931
Within-group change (Friedman)	$\chi^2 = 21.15$ ***p* <0.001**	$\chi^2 = 22.44$ ***p* <0.001**	$\chi^2 = 13.54$ ***p* <0.001**	$\chi^2 = 10.13$ ***p* <0.001**		
Knowledge&awareness test score (0-100)						
Baseline	76.00 ± 10.35	72.12 ± 14.47	70.19 ± 15.46	70.81 ± 11.11	3.704	0.295
Final follow-up	81.71 ± 11.56	77.73 ± 15.87	78.85 ± 15.77	76.45 ± 10.50	3.304	0.347
Δ baseline→final	8.57 ± 6.13	10.45 ± 8.42	12.50 ± 11.51	7.90 ± 8.24	3.557	0.313
Within-group change (Friedman)	$\chi^2 = 20.40$ ***p* <0.001**	$\chi^2 = 13.44$ ***p* <0.001**	$\chi^2 = 28.98$ ***p* <0.001**	$\chi^2 = 16.09$ ***p* <0.001**		

Data are mean ± SD. Sample sizes reflect participants with complete long-term follow-up.

H and *p* — between-group Kruskal–Wallis test statistic and *p*-value comparing the four modalities at each time point. Δ, mean within-patient change from baseline to final assessment.

Shaded rows report the within-group longitudinal comparison (Friedman test: χ^2 and *p*); bold *p*-values are significant ($p < 0.05$).

DLQI, Dermatology Life Quality Index; EASI, Eczema Area and Severity Index; Mean itch, mean itch intensity over the past 24 hours; Worst itch, most severe itch intensity over the past 24 hours; TPE, therapeutic patient education.

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Table V. Patient-reported experience and satisfaction with the education programme across TPE formats (full cohort, n = 190).

Evaluation criterion	Verbal education only (n = 50)	Form (n = 48)	Leaflet (n = 46)	Video (n = 46)	*p*
1) Found the education programme useful — yes	49 (98.0)	45 (93.8)	46 (100)	46 (100)	0.113
2) Learned new information through the programme — yes	43 (86.0)	46 (95.8)	45 (97.8)	44 (95.7)	0.088
3) Would recommend the programme to other patients — yes	50 (100)	48 (100)	46 (100)	46 (100)	>0.999
4) Satisfied with follow-up at an ADCARE centre — yes	50 (100)	48 (100)	46 (100)	46 (100)	>0.999
5) Believed that follow-up at an ADCARE centre improves disease outcome — yes	44 (88.0)	42 (87.5)	42 (91.3)	43 (93.5)	0.795
Satisfaction with the educational material (Likert 0–5) [a]					
Score 5	—	25 (52.1)	38 (82.6)	35 (76.1)	
Score 4	—	9 (18.8)	6 (13.0)	8 (17.4)	
Score 3	—	14 (29.2)	2 (4.3)	3 (6.5)	
Score 0–2	—	0 (0)	0 (0)	0 (0)	
Mean satisfaction score ± SD	—	4.23 ± 0.88	4.78 ± 0.51	4.70 ± 0.59	**<0.001** [b]

Data are n (%) unless otherwise indicated. Categorical comparisons used Fisher's exact test; the Likert satisfaction score was compared using the Kruskal–Wallis test with Bonferroni-corrected Mann–Whitney U tests for pairwise comparisons. Bold denotes $p < 0.05$.

[a] The Likert item did not apply to the verbal-only group, which received no printed or audiovisual material ("—"). Median [IQR] was 5 [3–5], 5 [5–5] and 5 [5–5] for the form, leaflet and video groups, respectively.

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[b] Omnibus Kruskal–Wallis H(2) = 14.02, $p < 0.001$. Post-hoc Bonferroni-corrected Mann–Whitney U comparisons (adjusted $\alpha = 0.017$): leaflet vs form, $p = 0.002$ (rank-biserial r = 0.34); video vs form, $p = 0.020$ (r = 0.28); leaflet vs video, $p = 1.000$ (non-significant).

ADCARE, Atopic Dermatitis Centres of Reference and Excellence; SD, standard deviation; TPE, therapeutic patient education.

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Supplementary Figure S1. Written information form provided to the written-form arm.

TURKISH DERMATOLOGY ASSOCIATION
DERMATOALLERGY WORKING GROUP
ATOPIC ECZEMA PATIENT INFORMATION FORM

Atopic eczema (dermatitis) is a chronic, recurrent skin disorder characterized by dry skin, rash, and itching. It follows a relapsing–remitting course, with periodic flares and improvement. Although it is more common in infants and young children, it can affect individuals of any age. It typically begins in early childhood, and symptoms may worsen after discontinuation of breastfeeding.

The exact cause is unknown. It represents an exaggerated immune response of the skin to environmental and emotional triggers and is not contagious. Most individuals with atopic eczema have a personal or family history of allergic conditions such as asthma or hay fever. In general, skin lesions tend to improve as the individual gets older.

Symptoms

• Dry skin and intense itching are the most prominent symptoms. Severe itching may disrupt sleep and lead to concentration difficulties at school or work.

• Recurrent skin eruptions that may appear as dry, red, scaly, or oozing lesions. The distribution and characteristics vary according to age.
– In infants and young children, lesions commonly involve the face, elbows, and knees but may also appear on other parts of the body.
– In older children and adults, lesions typically affect the hands, neck, inner elbows, behind the knees, and ankles.

• Dry, easily irritated skin that is prone to infections.

In addition, the following conditions may occur in association with atopic eczema:

• Asthma and hay fever.
• Skin infections: recurrent infections caused by herpes simplex virus or certain bacteria.
• Eye problems: such as conjunctivitis and cataracts.
• Recurrent hand eczema.

Diagnosis of Atopic Eczema

The diagnosis of atopic eczema is based on clinical signs and symptoms. In addition to physical examination findings, it is important to determine whether you experience itching and whether you or your relatives have a history of allergic diseases such as asthma or hay fever.

No laboratory tests are required to establish the diagnosis of atopic eczema.

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Factors That May Trigger Flares

The following factors may worsen your condition:

- Increased skin dryness (e.g., prolonged or hot bathing)
- Scratching
- Bacterial and viral infections
- Stress
- Sweating
- Changes in temperature and climate
- Cleansers, soaps, and detergents
- Wool clothing and blankets
- Dust and plant pollens
- Cigarette smoke
- In infants and children: egg, milk, peanuts, soybeans, fish, and wheat
- Animal dander

Treatment of Atopic Eczema

You should follow your physician's recommendations regarding the most appropriate treatment type and duration for your condition. Treatment can generally be divided into five categories:

1. Intensive skin moisturization
2. Avoidance of triggering factors
3. Reduction of itching
4. Treatment of active eczematous lesions
5. Treatment of infections affecting eczematous skin

Medications Used in Atopic Eczema

Moisturizers
Moisturizers should be used daily to prevent skin dryness. Fragrance-free and dye-free products are preferred. Your physician can help you select an appropriate product.

Topical Corticosteroids
Corticosteroid creams and ointments control redness and itching during active phases of eczema. They are available in different potencies, and your physician will determine which type to use, where to apply it, and for how long. To protect the skin barrier, topical corticosteroids should be used in combination with moisturizers.

When used correctly, topical corticosteroids are safe. You should receive detailed instructions from your physician regarding their proper use.

Topical Immunosuppressants
Some patients benefit from newer, non-steroidal topical agents containing tacrolimus or

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pimecrolimus. These medications suppress redness and inflammation and are effective in atopic eczema. They do not cause skin thinning and are not associated with the side effects seen with topical corticosteroids.

The most common side effect is a burning or stinging sensation. They may increase the risk of skin infections. Long-term application to sun-exposed areas should be avoided, and they should not be used concurrently with ultraviolet light therapy.

Antihistamines (Anti-itch Medications)
Sedating antihistamines may help control itching and improve sleep. Their effectiveness may decrease with prolonged use.

Ultraviolet Light Therapy
Some patients with widespread eczema may benefit from ultraviolet (UV) light therapy. This treatment should be administered by dermatologists in a hospital setting. There are three types of UV therapy: narrowband UVB, UVA, and PUVA.

Systemic (Stronger) Treatments
Patients with severe and widespread eczema may require stronger systemic treatments under close medical supervision. Short-term systemic corticosteroids may be used in very severe cases. They are effective but are not suitable for long-term use due to potential side effects.

In more severe cases, immunosuppressive agents such as azathioprine or cyclosporine may be initiated. These treatments also have potential side effects and require regular blood tests and clinical monitoring.

Herbal remedies are considered alternative treatment options and may appear beneficial; however, their contents and side effects are not fully known. Therefore, their use is not recommended. They may cause liver problems.

Recommendations

• Prefer loose-fitting, cotton, dye-free clothing. Since sweating may trigger flares, avoid tight or excessively thick garments. Do not use wool or rough-textured clothing, blankets, pillows, quilts, or toys. Wash new clothing before wearing and remove labels.

• Use hypoallergenic detergents for laundry. Use small amounts of detergent or soap powder, ensure thorough rinsing (preferably double rinse), and avoid fabric softeners.

• Keep fingernails short and smooth. Scratching with nails may damage the skin and lead to infection. Cotton gloves are recommended at night for infants and young children.

• Bathe with lukewarm water and use non-soap cleansers that do not dry the skin. Keep bathing time as short as possible and avoid abrasive materials such as loofahs. Within three minutes after bathing, apply oily moisturizers or emollient creams and gently pat the skin dry with a soft towel without rubbing.

• Apply moisturizer at least twice daily. Choose fragrance-free and dye-free products.

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• Chemical substances such as perfumes, cosmetic products, alcohol-containing skin products, and dyes (e.g., finger paints or modeling dough dyes) may worsen symptoms.

• Excessive sweating may increase itching and trigger flares. Avoid factors that increase sweating (excessive sun exposure, heavy clothing, very hot environments, and strenuous exercise).

• If known triggers (such as dust, tree and flower pollens, animal dander, or specific foods) are identified, avoid contact with these factors.

• Infants should be encouraged to receive breast milk whenever possible.

• Ensure that your environment is neither excessively dry nor excessively humid.

• If you are allergic to dust or house dust mites, use protective covers for pillows and duvets and wash bedding frequently in hot water. Cleaning with high-suction vacuum cleaners is recommended to reduce house dust mites.

• If possible, avoid keeping pets and indoor plants at home.

• Cook foods thoroughly; undercooked foods may trigger allergic symptoms.

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Supplementary Figure S2. Study-designed illustrated leaflet provided to the leaflet arm.

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TÜRKİYE CUMHURİYETİ SAĞLIK BAKANLIĞI
KAYSERİ ŞEHİR EĞİTİM VE ARAŞTIRMA HASTANESİ

ADCARE
Atopic Dermatitis Centers of Reference and Excellence
A GA²LEN NETWORK

Patient
Information
Brochure

Atopic dermatitis

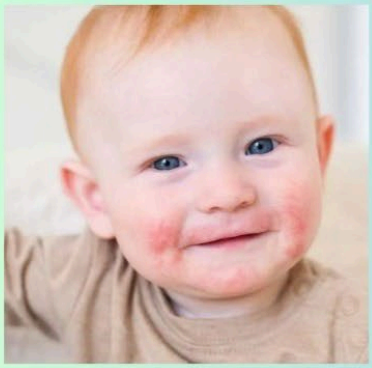


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Purpose of the Brochure

This brochure has been designed to help you gain a better understanding of atopic dermatitis. It explains what atopic dermatitis is, its causes, what can be done, and provides practical advice for managing this condition.

Dr.Furkan Çalıcıoğlu



What Is Atopic Dermatitis?

Eczema is a general term used to describe inflamed skin that is red, swollen, scaly, and itchy. The most common form of eczema is atopic dermatitis, also known as atopic eczema.
The best way to determine whether you or your child has atopic dermatitis (rather than another type of eczema) is to consult a physician. Dermatologists, pediatricians, allergists, and some general practitioners specialize in the management of atopic dermatitis.
In most cases, blood tests or allergy testing are not required to diagnose atopic dermatitis.

How Common Is Atopic Dermatitis?

Atopic dermatitis is a common condition. In Europe, approximately 15–20% of children and 5–10% of adults are affected by atopic dermatitis, although prevalence rates may vary.
It is known to occur more frequently in large urban areas and in industrialized countries compared with rural regions. The exact reasons for this difference remain unclear; however, environmental and lifestyle factors are thought to play an important role.

What Causes Atopic Dermatitis?

The exact cause of atopic dermatitis is not fully understood. It is likely that there is no single cause.
A combination of congenital/genetic and acquired (developed after birth) factors interact to contribute to the disease. Dysfunction of both the immune system and the skin barrier—particularly the outer protective layer of the skin—plays a central role in the development of atopic dermatitis.

How Does Atopic Dermatitis Develop?

Atopic dermatitis is a chronic form of eczema that typically begins in childhood, often improves with age, but may persist into adulthood. In some individuals, atopic dermatitis may also present for the first time during adulthood.
Factors associated with a more persistent or chronic course include early onset of the disease and the presence of other allergic conditions, such as asthma and allergic rhinitis (hay fever).

Is Atopic Dermatitis an Allergy?

Atopic dermatitis is a complex disease, and a significant component of its underlying cause involves allergic immune dysfunction.
Allergy refers to a harmful or exaggerated response of the body's immune system to substances that are normally harmless, such as pollens, foods, house dust mites, and other allergens (substances that can trigger allergic reactions).

In some individuals with atopic dermatitis, these allergens may trigger disease flare-ups. However, the majority of patients with atopic dermatitis do not need to follow a specific diet. Because unnecessary dietary restrictions may be harmful—particularly in children—any dietary modifications should be discussed with your physician before implementation.

What Are the Signs and Symptoms of Atopic Dermatitis?

In both adults and children affected by atopic dermatitis, the condition typically presents with symmetrical red patches of inflamed, dry, and itchy skin. These patches may appear on the cheeks (particularly in toddlers), arms, legs, wrists, and frequently in the skin around joints.
The distribution of atopic dermatitis lesions varies between individuals and may involve any area of the body. When the condition persists over a prolonged period, the skin may become thickened (lichenified). During flare-ups (periods of worsening), the skin may ooze clear fluid, weep, or bleed due to intense scratching. Atopic dermatitis is almost always associated with itching and may sometimes also cause pain or a burning sensation.

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What Is a Flare-Up?

A flare-up is a period of worsenin symptoms characterized by intense itching and severely inflamed, painful skin. Some individuals experience acute flare-ups alternating with "quiet" phases marked by mild itching and minimal skin inflammation. Even between flare-ups, the skin often remains highly sensitive to temperature changes, stress, or irritating skin care products.
However, if the skin is persistently itchy and inflamed, it may be difficult to clearly distinguish individual flare-ups.

What Causes Flare-Ups in Patients With Atopic Dermatitis?

Triggering factors for flare-ups vary from person to person. Common triggers include weather changes, hot showers, bubble baths, harsh soaps, heat, wool, perfumes, certain skin care products, sweating, emotional stress, and specific foods.
Flare-ups are more frequent during months when temperature and humidity levels are low. In addition, bacterial and viral infections may worsen atopic dermatitis.

What Are the Consequences of More Severe Atopic Dermatitis?

Severe atopic dermatitis is more likely to result in sleep loss, fatigue, chronic stress, and even depression.Atopic dermatitis can significantly affect the quality of life of patients of all ages, as well as their families. If you feel that your atopic dermatitis is causing emotional distress or interfering with your social or personal life, it is very important to discuss this with your physician.If your child has atopic dermatitis associated with sleep disturbances, this may lead to learning difficulties at school and may also affect family and occupational functioning.

Three Important Things You Should Know About the Treatment of Atopic Dermatitis

1. Atopic dermatitis is a chronic condition. It is a disease that typically lasts for several years. However, because many children improve as they grow older, this does not necessarily mean that you or your child will have atopic dermatitis for a lifetime. Even when atopic dermatitis persists into adulthood, it often follows a course characterized by long, stable, and relatively quiet periods.
2. Atopic dermatitis is not caused by a single allergen. No single allergen causes atopic dermatitis. However, certain allergies may coexist with the condition. For example, food allergies can be present in some individuals with atopic dermatitis and may occasionally trigger flare-ups.
3. Although atopic dermatitis cannot be cured with a short course of treatment (such as antibiotics for an infection), it can be effectively controlled. Long-term management makes it possible for patients to live as normal a life as possible. Appropriate and consistent treatment can make a significant difference in disease control and overall quality of life.

How Are the Dry, Red Patches (Inflammation) of Atopic Dermatitis Treated in Daily Life?

• Topical corticosteroids are the most commonly used medications for treating dry, red, scaly rashes.
In most cases, topical corticosteroids (TCS) are applied once daily, preferably in the evening. They are available in different potencies (low, medium, and high strength) and in various formulations, including creams, ointments, lotions, and foams.
Your physician will prescribe the most appropriate potency and formulation based on your age and the location of the affected skin.
• Another commonly used group of medications is topical calcineurin inhibitors (TCIs). There are only two different TCIs available:
Tacrolimus ointment and pimecrolimus cream.
• Treating red patches with TCS or TCI is important because this is the most effective way to reduce itching and scratching, which drive the disease process.
• Antihistamines rarely help relieve itching unless they have sedative properties.
• Treating red patches also contributes to strengthening your skin barrier.
• How long should TCS or TCI be applied regularly?
They should be continued until itching and red patches have resolved and the skin has become smooth again. It is very important not to discontinue TCS or TCI too early, even if improvement occurs quickly. A gradual reduction in application frequency may be the best approach. As maintenance therapy, these medications may be applied two to three times per week to help prevent flare-ups.
Another important point to remember is to begin using TCS or TCI as soon as red patches appear —when the skin becomes pink and slightly rough. Do not wait for a severe flare-up before starting treatment.
If treatment is delayed for too long, the eczema may become more extensive and severe, making the flare-up more difficult to control.
• In some cases, your clinician may prescribe wet wrap therapy over topical steroid applications to enhance treatment effectiveness (see wet wrap therapy instructions).

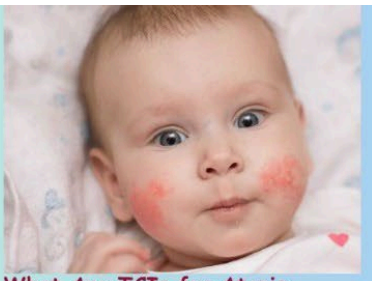
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Are Topical Steroids Dangerous?

Topical corticosteroids are generally very effective and safe; however, many individuals with atopic dermatitis have concerns about using them. Topical steroids should be clearly distinguished from oral steroids (taken in tablet or syrup form). Because topical steroids are applied directly to inflamed skin and act locally, they are much safer than oral steroids, which affect the entire body.

When topical steroids are used as recommended by your clinician for acute atopic dermatitis, side effects are very rare. They are also beneficial as maintenance therapy to help prevent flare-ups.
However, if you are an adult or an adolescent with atopic dermatitis, two specific precautions should be considered to minimize the risk of side effects:
Strong topical steroids should not be used on the face for prolonged periods. Applying high-potency corticosteroids daily to the facial area for more than one month may cause skin sensitivity and persistent redness. Intermittent use—for example, every other day or twice weekly—can reduce the risk of adverse effects.
Prolonged application of topical steroids to the inner thighs and, in women, to the breasts may lead to stretch marks (striae), particularly during adolescence. Similarly, pregnant women with atopic dermatitis should use topical steroids carefully and avoid applying them to areas prone to stretch marks, such as the abdomen.



What Are TCIs for Atopic Dermatitis and Are They Safe?

Your physician may have prescribed tacrolimus or pimecrolimus. These are non-steroidal topical treatments.
They are not more effective than topical corticosteroids; however, they may be particularly useful if you have chronic atopic dermatitis affecting the face or eyelids. They can also be beneficial on other body areas during the maintenance phase to help prevent flare-ups.
Both tacrolimus and pimecrolimus are considered safe for use in children and adults. There is no evidence that topical calcineurin inhibitors cause cancer. These medications do not cause stretch marks, although they may produce a burning or stinging sensation, especially at the beginning of treatment.

Can a Skin Infection Occur?

If you have atopic dermatitis, you may have experienced one or more skin infections.
• In atopic dermatitis, the skin barrier is weakened.
Even in areas of skin that do not appear inflamed, certain microorganisms—such as Staphylococcus aureus—are commonly present in higher numbers on the skin surface of individuals with atopic dermatitis.
• Staphylococcus aureus can cause painful yellow crusts on the skin and may further worsen eczema. In some cases, this type of infection requires treatment with antibiotics prescribed by a physician; however, it often improves with appropriate use of topical steroid creams.



Diluted bleach baths or other antiseptic treatments may be helpful in this situation. Please consult your physician for detailed instructions and guidance before using these methods.
• You may also experience episodes of skin infection caused by the herpes simplex virus. For this reason, family members or friends with a known or suspected history of herpes infection (e.g., cold sores) should avoid close contact with individuals who have atopic dermatitis.

When and How Should Atopic Dermatitis Be Treated With Systemic Medications?

Most patients with atopic dermatitis can be effectively managed with a combination of moisturizers and topical anti-inflammatory creams.
In cases of severe atopic dermatitis, systemic medications may be required to achieve adequate disease control. These medications may be administered orally in tablet form or by subcutaneous injection.
Oral corticosteroids are highly effective in suppressing acute flares and may be used under medical supervision for short periods; however, they should not be used long-term or without proper monitoring.

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Cyclosporine is a licensed, fast-acting immunosuppressive medication. Methotrexate, azathioprine, and mycophenolate mofetil are slower-acting immunosuppressive agents that may be used in selected cases by experienced specialists. Dupilumab is an approved biologic medication. It selectively targets a specific part of the immune system that is overactive in patients with atopic dermatitis.

Janus kinase (JAK) inhibitors are a group of medications that act through intracellular signaling pathways and are effective in the treatment of atopic dermatitis.

Systemic treatment of atopic dermatitis should be prescribed and monitored only by experienced specialists.

Practical Recommendations for Skin Care in Atopic Dermatitis

When showering, use fragrance-free, mild cleansers (such as synthetic detergents, moisturizing shower gels, or products formulated for dry skin) instead of drying bar soaps.

• Avoid prolonged hot baths. Take short, lukewarm baths or showers (5–10 minutes).

• There is no strict recommendation regarding bathing frequency. Daily or every-other-day showers appear to be beneficial for many patients.

• After bathing or showering, gently pat the skin dry and apply a moisturizer immediately. The moisturizer may be applied while the skin is still slightly damp. Regular use of moisturizers is the best way to strengthen the skin barrier.

Moisturizers may be applied in the morning or evening, particularly in combination with an anti-inflammatory cream (TCS or TCI) • When combined with anti-inflammatory treatment, the moisturizer should be applied after the anti-inflammatory cream.

• The moisturizer should contain as few allergenic substances as possible.

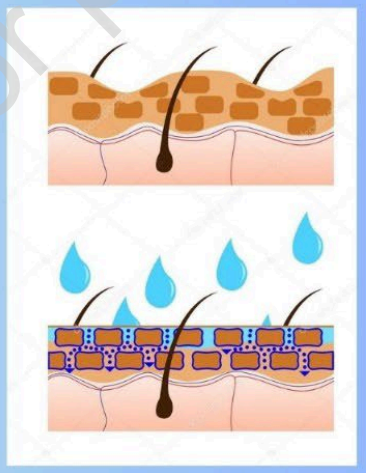
Depending on you or your child's preference—and the degree of burning sensation—you may choose an ointment (more oily) or a cream (lighter). The preferred formulation may vary depending on the severity of dryness and the season.

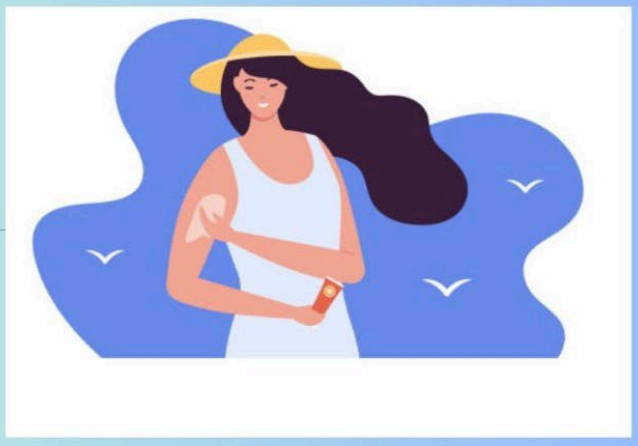
In some cases, excessive use of moisturizers may cause a burning sensation on inflamed skin. This may be related to sensitivity to one of the ingredients. During acute flare-ups, your physician may recommend temporarily discontinuing that specific moisturizer for a few days.

• If certain foods worsen symptoms such as dryness or itching (e.g., milk, eggs, hazelnuts, peanuts, fish, spices, processed foods, carbonated beverages), their intake should be reduced. If a true food allergy is confirmed, those foods should be eliminated from the diet.

• Air pollution, smoke, unpleasant odors, cigarette smoke, and strong perfumes or deodorants may exacerbate atopic dermatitis and, if present, asthma symptoms. These triggers should be avoided whenever possible. Homes should be well ventilated, and smoking should not occur near affected individuals.

• Wool clothing and fabrics may worsen symptoms. Cotton, comfortable, loose-fitting garments should be preferred. Avoid wool scarves covering the head and neck and thick wool blankets.





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- Consult your physician when selecting cosmetic and personal care products. Some products may dry the skin, and certain ingredients may further damage the skin barrier.
- · House dust mites and pets (e.g., cats, dogs, birds) may trigger flare-ups. If a pet worsens symptoms, removal from the home may be necessary. Reducing dust-collecting items and carpets, maintaining clean floors, and ensuring good room ventilation are recommended.
- · If allergy testing confirms sensitivity to dust, pollen, animals, metals, or certain foods, patients, family members, and caregivers should be informed and educated accordingly.
- · Adhering to the recommended treatments and attending regular follow-up visits will positively influence the course of your disease and help prevent more severe and difficult-to-treat flare-ups.
-

· Atopic dermatitis is a chronic condition that can be treated with various medications (creams, tablets, injections). Not every treatment is suitable for every patient, and even an ideal treatment may not be effective if adherence is poor or triggering factors persist.

· Remember: regular and high-quality moisturization, avoidance of triggers, and consistent, well-informed treatment result in significant improvement in the vast majority of patients.



Abbreviations:

TCS: Topical corticosteroids

TCI: Topical calcineurin inhibitors



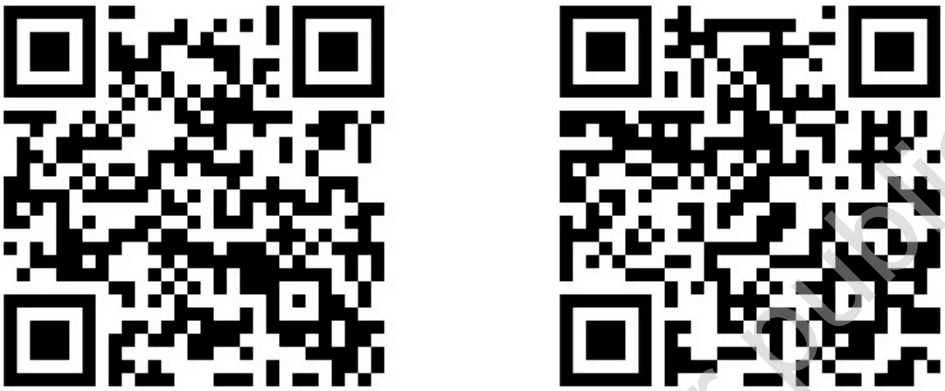




Although every effort has been made to ensure the accuracy of the information provided in this brochure, not every treatment will be suitable or effective for every individual. Your own physician can provide more detailed and personalized advice.

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Supplementary Figure S3. QR codes linking to the two short educational videos provided to the video arm.



Video 1 (left) and Video 2 (right).

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Supplementary Table S1. Atopic Dermatitis Knowledge and Awareness Test.

Statement	True	False
1. The cause of atopic dermatitis is unknown.		
2. Atopic dermatitis is an inflammatory disease.		
3. Atopic dermatitis is not a contagious disease.		
4. Atopic dermatitis may be hereditary.		
5. Atopic dermatitis can also occur in adults.		
6. Atopic dermatitis can appear anywhere on the skin.		
7. The main symptoms of atopic dermatitis are itching and/or skin rash.		
8. Atopic dermatitis may be associated with asthma or hay fever.		
9. Asthma does not always develop in children with atopic dermatitis.		
10. Children with atopic dermatitis can be vaccinated according to the current vaccination schedule.		
11. Woollen clothing is not suitable for children with atopic dermatitis.		
12. Certain types of food may trigger the onset of atopic dermatitis.		
13. Steroid creams are harmful for patients with atopic dermatitis.		
14. In patients with atopic dermatitis, the use of steroid creams for treatment causes weight gain.		
15. In children, the use of steroid creams for acute treatment causes growth retardation.		
16. For the treatment of atopic dermatitis, non-steroidal herbal creams or traditional Chinese medicine should be used instead of steroid creams.		
17. In patients with atopic dermatitis, oral steroids should be used frequently because they suppress symptoms very well.		
18. Skin moisturization should be applied whenever the skin becomes dry in patients with atopic dermatitis.		

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19. In patients with atopic dermatitis, bath times should be kept as long as possible because the skin constantly loses water.

20. Patients with atopic dermatitis should use moisturizers only if itching increases after bathing.

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21. Do you consider yourself well-informed about atopic dermatitis? □ Yes □ No

22. Where do you obtain information about atopic dermatitis? (Select all that apply.) (1) Dermatologist; (2) Allergist; (3) Family physician; (4) Media (television, radio, newspapers); (5) Internet/social media; (6) Neighbours, friends, relatives; (7) Other (please specify): _____

23. Educational level: (1) Primary education; (2) High school; (3) University; (4) Master's degree.

24. Monthly income: (1) <€500; (2) €500–1,000; (3) €1,000–1,500; (4) >€1,500.

25. Place of residence: (1) Village; (2) District/town; (3) City centre.

Items 1–20 constitute the 20-item true/false knowledge score (expressed as a 0–100 scale). Items 21–25 captured self-perceived awareness, information sources and socio-demographic data. The instrument was developed by expert consensus for within-study comparison and was not externally validated.

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Supplementary Table S2. Adjusted Predictors of EASI-50 Response at 18 Months: Multivariable Logistic Regression Analysis.

Covariate	18-month aOR (95% CI)	*p*
Educational modality		
Form vs verbal education only	0.64 (0.18–2.33)	0.503
Leaflet vs verbal education only	2.77 (0.48–15.96)	0.253
Video vs verbal education only	0.51 (0.14–1.82)	0.298
Age group: adult vs paediatric	0.24 (0.07–0.81)	**0.021**
Baseline EASI (per point)	1.10 (0.96–1.27)	0.171

EASI-50, ≥50% reduction in EASI; aOR, adjusted odds ratio (reference categories: control, paediatric, female); CI, confidence interval. Bold denotes p < 0.05. Multicollinearity was excluded (all VIF < 1.6).

In the long-term model (N = 123; 98 events) the limited number of non-responders (3.1 events per variable) renders the fully adjusted estimates exploratory; a pre-specified parsimonious model (modality, age, baseline EASI; 5.0 events per variable) confirmed calibration ($p = 0.73$) and the principal finding that adults were less likely to achieve 18-month EASI-50 (aOR 0.33, 95% CI 0.11–0.95; $p = 0.039$).

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Supplementary Table S3. Adjusted Predictors of Completion of the Final Follow-up Assessment: Multivariable Logistic Regression Analysis.

Predictor	*OR*	95% CI	*p*
Form vs verbal education only	1.17	0.45–3.02	0.751
Leaflet vs verbal education only	0.70	0.29–1.67	0.421
Video vs verbal education only	1.28	0.51–3.18	0.600
Adult vs paediatric	1.86	0.80–4.36	0.151
Female vs male	0.49	0.25–0.95	**0.034**
Baseline knowledge, per 10 points	1.42	1.08–1.88	**0.013**
Baseline EASI, per point	1.01	0.89–1.14	0.919
Short-term knowledge gain, per 10 points	1.13	0.81–1.58	0.477
Short-term EASI improvement, per point	1.08	0.88–1.32	0.455

OR, odds ratio; CI, confidence interval. Odds ratios >1 indicate higher odds of completing the final follow-up assessment (i.e., having a final recorded outcome). The overall effect of educational format was not statistically significant (global $p = 0.592$). Statistically significant associations ($p < 0.05$) are shown in bold.

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