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Educational and psychological interventions for managing atopic dermatitis (eczema) (Review)

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[Intervention Review]

Educational and psychological interventions for managing atopic dermatitis (eczema)

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ABSTRACT

Background

Atopic dermatitis (eczema), can have a significant impact on well-being and quality of life for affected people and their families. Standard treatment is avoidance of triggers or irritants and regular application of emollients and topical steroids or calcineurin inhibitors. Thorough physical and psychological assessment is central to good-quality treatment. Overcoming barriers to provision of holistic treatment in dermatological practice is dependent on evaluation of the efficacy and economics of both psychological and educational interventions in this participant group. This review is based on a previous Cochrane review published in 2014, and now includes adults as well as children.

Objectives

To assess the clinical outcomes of educational and psychological interventions in children and adults with atopic dermatitis (eczema) and to summarise the availability and principal findings of relevant economic evaluations.

Search methods

We searched the Cochrane Skin Specialised Register, CENTRAL, MEDLINE, Embase, APA PsycINFO and two trials registers up to March 2023. We checked the reference lists of included studies and related systematic reviews for further references to relevant randomised controlled trials (RCTs) and contacted experts in the field to identify additional studies. We searched NHS Economic Evaluation Database, MEDLINE and Embase for economic evaluations on 8 June 2022.

Selection criteria

Randomised, cluster-randomised and cross-over RCTs that assess educational and psychological interventions for treating eczema in children and adults.

Data collection and analysis

We used standard Cochrane methods, with GRADE to assess the certainty of the evidence for each outcome. Primary outcomes were reduction in disease severity, as measured by clinical signs, patient-reported symptoms and improvement in health-related quality-of-life (HRQoL) measures. Secondary outcomes were improvement in long-term control of symptoms, improvement in psychological well-being, improvement in standard treatment concordance and adverse events. We assessed short- (up to 16 weeks after treatment) and long-term time points (more than 16 weeks).

Main results

We included 37 trials (6170 participants). Most trials were conducted in high-income countries (34/37), in outpatient settings (25/37). We judged three trials to be low risk of bias across all domains. Fifteen trials had a high risk of bias in at least one domain, mostly due to bias in measurement of the outcome. Trials assessed interventions compared to standard care.

Individual educational interventions may reduce short-term clinical signs (measured by SCORing Atopic Dermatitis (SCORAD); mean difference (MD) −5.70, 95% confidence interval (CI) −9.39 to −2.01; 1 trial, 30 participants; low-certainty evidence) but patient-reported symptoms, HRQoL, long-term eczema control and psychological well-being were not reported.

Group education interventions probably reduce clinical signs (SCORAD) both in the short term (MD −9.66, 95% CI −19.04 to −0.29; 3 studies, 731 participants; moderate-certainty evidence) and the long term (MD −7.22, 95% CI −11.01 to −3.43; 3 studies, 1424 participants; moderate-certainty evidence) and probably reduce long-term patient-reported symptoms (SMD −0.47 95% CI −0.60 to −0.33; 2 studies, 908 participants; moderate-certainty evidence). They may slightly improve short-term HRQoL (SMD −0.19, 95% CI −0.36 to −0.01; 4 studies, 746 participants; low-certainty evidence), but may make little or no difference to short-term psychological well-being (Perceived Stress Scale (PSS); MD −2.47, 95% CI −5.16 to 0.22; 1 study, 80 participants; low-certainty evidence). Long-term eczema control was not reported.

We don't know whether technology-mediated educational interventions could improve short-term clinical signs (SCORAD; 1 study; 29 participants; very low-certainty evidence). They may have little or no effect on short-term patient-reported symptoms (Patient Oriented Eczema Measure (POEM); MD −0.76, 95% CI −1.84 to 0.33; 2 studies; 195 participants; low-certainty evidence) and probably have little or no effect on short-term HRQoL (MD 0, 95% CI −0.03 to 0.03; 2 studies, 430 participants; moderate-certainty evidence). Technology-mediated education interventions probably slightly improve long-term eczema control (Recap of atopic eczema (RECAP); MD −1.5, 95% CI −3.13 to 0.13; 1 study, 232 participants; moderate-certainty evidence), and may improve short-term psychological well-being (MD −1.78, 95% CI −2.13 to −1.43; 1 study, 24 participants; low-certainty evidence).

Habit reversal treatment may reduce short-term clinical signs (SCORAD; MD −6.57, 95% CI −13.04 to −0.1; 1 study, 33 participants; low-certainty evidence) but we are uncertain about any effects on short-term HRQoL (Children's Dermatology Life Quality Index (CDLQI); 1 study, 30 participants; very low-certainty evidence). Patient-reported symptoms, long-term eczema control and psychological well-being were not reported.

We are uncertain whether arousal reduction therapy interventions could improve short-term clinical signs (Eczema Area and Severity Index (EASI); 1 study, 24 participants; very low-certainty evidence) or patient-reported symptoms (visual analogue scale (VAS); 1 study, 18 participants; very low-certainty evidence). Arousal reduction therapy may improve short-term HRQoL (Dermatitis Family Impact (DFI); MD −2.1, 95% CI −4.41 to 0.21; 1 study, 91 participants; low-certainty evidence) and psychological well-being (PSS; MD −1.2, 95% CI −3.38 to 0.98; 1 study, 91 participants; low-certainty evidence). Long-term eczema control was not reported.

No studies reported standard care compared with self-help psychological interventions, psychological therapies or printed education; or adverse events.

We identified two health economic studies. One found that a 12-week, technology-mediated, educational-support programme may be cost neutral. The other found that a nurse practitioner group-education intervention may have lower costs than standard care provided by a dermatologist, with comparable effectiveness.

Authors' conclusions

In-person, individual education, as an adjunct to conventional topical therapy, may reduce short-term eczema signs compared to standard care, but there is no information on eczema symptoms, quality of life or long-term outcomes. Group education probably reduces eczema signs and symptoms in the long term and may also improve quality of life in the short term. Favourable effects were also reported for technology-mediated education, habit reversal treatment and arousal reduction therapy. All favourable effects are of uncertain clinical significance, since they may not exceed the minimal clinically important difference (MCID) for the outcome measures used (MCID 8.7 points for SCORAD, 3.4 points for POEM). We found no trials of self-help psychological interventions, psychological therapies or printed education. Future trials should include more diverse populations, address shared priorities, evaluate long-term outcomes and ensure patients are involved in trial design.

PLAIN LANGUAGE SUMMARY

Are education and psychological therapies effective for managing eczema?

Key messages

• Face-to-face education for individuals and groups may reduce eczema severity. Using technology to deliver education, such as the internet, may have little or no effect on disease severity.

• Using nurse practitioners instead of dermatologists to deliver group education may have lower costs and be similarly effective.

• People's circumstances vary and this will affect delivery of, and and how they receive information. Educational and psychological interventions for people with eczema should be developed based on patient and carer preferences, so that they will be used. Study participants should be followed over the (very) long term, remembering that 'long term' could be a lifetime for someone with eczema, not just the length of a research study.

What is eczema?

Eczema (also known as atopic dermatitis) is an uncomfortable, itchy, visible skin condition. Many different things can make eczema worse, such as foods, pollen, dust mites, stress, seasonal changes and pollution. Scratching the itch can make the skin itchier, reduce the chances of treatment being successful, and damage the skin.

How is eczema treated?

It is a complicated business living with eczema. It is usually treated by avoiding 'triggers' and irritants, and applying moisturising (emollients) or medicated (topical corticosteroids or clacineurin inhibitors) creams and lotions. Education and psychological techniques can give people information to manage the impact of eczema.

Education can be provided in different ways, such as one-on-one or group sessions, led by either doctors or patients themselves. These sessions can be in-person or online. They can vary in length and often include follow-ups. Follow-ups are important because benefitting from educational and psychological material usually takes some time and requires some support. Methods to help change behaviour are also often used during educational sessions.

Stress and coping behaviours can make eczema worse. Therapy that focuses on changing habits or distracting from scratching can help, and we have grouped these as 'psychological interventions'. Counselling may be a cost-effective option. Techniques like mindfulness and relaxation can also help reduce itching. Some methods, like guided imagery and virtual reality, can divert attention away from itching. Virtual reality, although not widely studied for eczema, has been used for anxiety and pain, which are related to itching. However, not all places offer these therapies consistently.

What did we want to find out?

We investigated the usefulness of educational and psychological techniques to help anybody with eczema. That might be to reduce eczema symptoms or the costs of treating eczema.

What did we do?

We searched for studies that investigated educational or psychological approaches to improve eczema. Improvement could be measured by reduction in symptoms, as reported by people with eczema or their carers, or improvement in quality of life, for example. We also looked for other improvements: long-term control of eczema symptoms, psychological well-being, and using medication appropriately. We wondered if there were unwanted effects from the information given.

What did we find?

We found 37 studies that included 6170 adults and children. Most studies took place in hospitals in high-income countries. The majority of participants were children and adolescents. People in the studies had a mix of eczema severity. We found little information about cost-effectiveness and no useful information about self-help, psychological therapy, or printed educational materials.

The results below are for educational or psychological methods compared with standard eczema care.

• Individual education may reduce short-term disease severity (1 study, 30 participants).

• Group education probably reduces eczema severity (9 studies, 2426 participants).

• We are unable to comment on whether education delivered using technology (for example online education) reduces disease severity as measured by clinical signs. It may have little or no effect on eczema severity as reported by patients but probably slightly improves long-term control of eczema symptoms (5 studies, 654 participants).

• Treatment to change habits may reduce disease severity but probably has little or no effect on improvement of quality of life (1 study, 33 participants).

• Therapies to reduce stress or anxiety such as mindfulness, meditation and relaxation techniques (arousal reduction therapies) may make little or no difference in improvement in quality of life (3 studies, 33 participants).

No studies provided useful information about improvement in long-term control of eczema symptoms, improvement in following standard treatment, or unwanted effects.

What are the limitations of the evidence?

Where we found evidence, our confidence in it is only moderate because of concerns that the included studies used different ways of delivering educational or psychological treatments. The studies were very small and most did not the best design to give conclusive results.

Most studies were in high-income countries, so our review does not report on whether some of these educational and psychological methods might work better in some cultures or for people in low- or middle-income countries.

How up to date is this evidence?

The evidence is current up to March 2023.

SUMMARY OF FINDINGS

Summary of findings 1. Summary of findings table - Individual educational interventions compared to standard care for people with eczema

Individual educational interventions compared to standard care for people with eczema

Patient or population: people with eczema
Setting: Secondary care
Intervention: Individual educational interventions
Comparison: standard care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with standard care	Risk with Individual educational interventions				
Reduction in disease severity, as measured by clinical signs (SCORAD)[a]	The mean reduction in disease severity, as measured by clinical signs (SCORAD) was **19.8**[b]	MD **5.7 lower** (9.39 lower to 2.01 lower)	-	30 (1 RCT)	⊕⊕⊖⊖ Low[c]	Minimum follow-up period of 6-week for children (ages: 3 to 12 years)
Reduction in disease severity, as measured by patient-reported symptoms	0 per 100	**0 per 100** (0 to 0)	Not estimable	(0 RCTs)	-	No study was found to measure this outcome quantitatively
Improvement in quality-of-life measures	0 per 100	**0 per 100** (0 to 0)	Not estimable	(0 RCTs)	-	No study was found to measure this outcome quantitatively
Improvement in long-term control of eczema symptoms	0 per 100	**0 per 100** (0 to 0)	Not estimable	(0 RCTs)	-	No study was found to measure this outcome quantitatively
Improvement in psychological well-being measures	0 per 100	**0 per 100** (0 to 0)	Not estimable	(0 RCTs)	-	No study was found to measure this outcome quantitatively

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval; **MD:** mean difference

GRADE Working Group grades of evidence
High certainty: we are very confident that the true effect lies close to that of the estimate of the effect.

Moderate certainty: we are moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low certainty: our confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect.
Very low certainty: we have very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect.

See interactive version of this table: https://gdt.gradepro.org/presentations/#/isof/isof_question_revman_web_441343113935671190.

[a] using SCORAD (SCORing Atopic Dermatitis). The SCORAD score range is between 0 and 103 points, where 0 indicates clear or no eczema, and 103 indicates very severe disease. Lower score is better.
[b] Assumed risk is taken from Kardroff 2003
[c] Downgraded by two levels due to a bias arising from the randomization process, and the inclusion of only one small study.

Summary of findings 2. Summary of findings table - Group educational interventions compared to standard care for people with eczema

Group educational interventions compared to standard care for people with eczema

Patient or population: people with eczema
Setting: Secondary care, and primary care setting
Intervention: group educational interventions
Comparison: standard care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with standard care	Risk with group educational interventions				
Reduction in disease severity, as measured by clinical signs[a]	The mean reduction in disease severity, as measured by clinical signs ranged from **17.93 to 35.2**[b]	MD **7.22 lower** (11.01 lower to 3.43 lower)	-	1424 (3 RCTs)	⊕⊕⊕⊖ Moderate[c]	Long-term reduction (at least 6-month follow-up period) for ages between 3 months to 18 years. Random-effects estimate is used due to expected heterogeneity. Results showed considerable heterogeneity, however, different age groups among studies may warrant this variability. As eczema is a chronic condition, long-term outcomes are likely to be more important to patients, and hence we report this the long-term reduction first in this table.
Reduction in disease severity, as measured by clinical signs[a]	The mean reduction in disease severity, as measured by clinical	MD **9.66 lower** (19.04 lower to 0.29 lower)	-	731 (3 RCTs)	⊕⊕⊕⊖ Moderate[c]	Short-term reduction for unspecified ages. Random-effects estimate used due to expected heterogeneity. Results showed considerable heterogeneity, however, different age groups among studies may

	signs was **22.94 to 36.44**[d]					warrant this variability and explain why we have not downgraded the quality evidence for inconsistency.
Reduction in disease severity, as measured by patient-reported symptoms[e]	-	SMD **0.47 SD lower** (0.6 lower to 0.33 lower)[f]	-	908 (2 RCTs)	⊕⊕⊕⊖ Moderate[g]	Long-term reduction (at least 6-month follow-up period) for unspecified ages.
Improvement in quality-of-life measures[h]	-	SMD **0.19 SD lower** (0.36 lower to 0.01 lower)[f]	-	746 (4 RCTs)	⊕⊕⊖⊖ Low[i]	At least 6-week follow-up period for ages up to 14 years old. Different scales were used to measure the quality of life such as infants, children, and family Dermatology Life Quality Index.
Improvement in long-term control of eczema symptoms	0 per 100	**0 per 100** (0 to 0)	Not estimable	(0 RCTs)	-	No study was found to measure this outcome quantitatively
Improvement in psychological well-being measures [j]	The mean improvement in psychological well-being measures was **19.44**[k]	MD **2.47 lower** (5.16 lower to 0.22 higher)	-	80 (1 RCT)	⊕⊕⊖⊖ Low[l]	Two-month follow-up period for unspecified ages. We present Perceived Stress Scale in this table as we expected it to be changed as a result of intervention more than state anxiety.

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval; **MD:** mean difference; **SMD:** standardised mean difference

GRADE Working Group grades of evidence
High certainty: we are very confident that the true effect lies close to that of the estimate of the effect.
Moderate certainty: we are moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low certainty: our confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect.
Very low certainty: we have very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect.

See interactive version of this table: https://gdt.gradepro.org/presentations/#/isof/isof_question_revman_web_441343755721595490.

[a] Using SCORAD (SCORing Atopic Dermatitis). The SCORAD score range is between 0 and 103 points, where 0 indicates clear or no eczema, and 103 indicates very severe disease. Lower score is better.
[b] Range of assumed risks is taken from Liag 2017 and Staab 2006
[c] Downgraded by one level due to a bias in measurement of the outcome in Liang 2017 study
[d] Range of assumed risks is taken from Grillo 2006 and Liang 2017

[e] Staab 2006 study used skin detective for subjective severity. Morawska 2016 used POEM (Patient Oriented Eczema Measure). The POEM score range is between 0 to 28, where 0 indicates or no eczema, and 28 indicates a very severe eczema. Lower score is better. The skin detective score range is between 0 and 103 points, where 0 indicates clear or no eczema, and 103 indicates very severe disease. Lower score is better.

[f] SD: is the standard deviation

[g] Downgraded by one level due to bias in selection of the reported results, and some concerns about a bias in measurement of the outcome

[h] Using Dermatology Life Quality Index (DLQI). The DLQI score range is between 0 and 30 points, where 0 indicates no effect at all on patient's life, and 30 indicates extremely large effect on patient's life. Higher score is better.

[i] Downgraded by two levels due to bias in measurement of the outcome in Liang 2017, and bias in selection of the reported result in Ryu 2015.

[j] Using Perceived Stress Scale (PSS). The PSS score from 0 to 40 is presented, with higher scores representing higher levels of stress.

[k] Assumed risk is taken from Pustisek 2016

[l] Downgraded by two levels due to different concerns regarding the risk of bias arising from the randomisation process, deviations from intended interventions, and measurement of the outcome. Also due to a serious imprecision (the confidence interval crosses the clinical decision threshold).

Summary of findings 3. Summary of findings table - Technology mediated educational interventions compared to standard care for people with eczema

Technology mediated educational interventions compared to standard care for people with eczema

Patient or population: people with eczema
Setting: Secondary care, and primary care setting
Intervention: technology mediated educational interventions
Comparison: standard care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with standard care	Risk with technology mediated educational interventions				
Reduction in disease severity, as measured by clinical signs[a]	The mean reduction in disease severity, as measured by clinical signs was **32.33**[b]	MD **4.58 higher** (11.51 lower to 20.67 higher)	-	29 (1 RCT)	⊕⊖⊖⊖ Very low[c]	A follow-up period of 3 to 4 months for children (unspecified ages).
Reduction in disease severity, as measured by patient-reported symptoms[d]	The mean reduction in disease severity, as measured by patient-reported symptoms ranged from **3.4 to 7.1**[e]	MD **0.76 lower** (1.84 lower to 0.33 higher)	-	195 (2 RCTs)	⊕⊕⊖⊖ Low[f]	At least 12-week follow up period for unspecified ages. We choose to report the results for unspecified ages over the results for ages 0-12 or for ages 13-25 as these results were pooled from more than 1 RCT.

Improvement in quality-of-life measures[g]	The mean improvement in quality-of-life measures ranged from **0.8 to 4.4**[h]	MD **0** (0.03 lower to 0.03 higher)	-	430 (2 RCTs)	⊕⊕⊕⊖ Moderate[i]	At least one month follow-up period for unspecified ages
Improvement in long-term control of eczema symptoms[j]	The mean improvement in long-term control of eczema symptoms was **10.7**[k]	MD **1.5 lower** (3.13 lower to 0.13 higher)	-	232 (1 RCT)	⊕⊕⊕⊖ Moderate[l]	52-week follow-up period for 13-25 years. The study measured long-term eczema control at 24 and 52 weeks. In our methods, and for 'long-term', we took the measurement closest to 12 months if multiple time points were used and this is why we have reported the results for 52 weeks here.
Improvement in psychological well-being measures[m]	The mean improvement in psychological well-being measures was **3.24**[n]	MD **1.78 lower** (2.13 lower to 1.43 lower)	-	24 (1 RCT)	⊕⊕⊖⊖ Low[o]	Measurements are taken immediately after intervention for ages between 13 and 15 years.

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval; **MD:** mean difference

GRADE Working Group grades of evidence
High certainty: we are very confident that the true effect lies close to that of the estimate of the effect.
Moderate certainty: we are moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low certainty: our confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect.
Very low certainty: we have very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect.

See interactive version of this table: https://gdt.gradepro.org/presentations/#/isof/isof_question_revman_web_440070079215902978.

[a] using SCORAD (SCORing Atopic Dermatitis). The SCORAD score range is between 0 and 103 points, where 0 indicates clear or no eczema, and 103 indicates very severe disease. Lower score is better.
[b] Assumed risk is taken from Niebel 1999
[c] Downgraded by three levels due to bias in measurement of the outcome and bias in selection of the reported result, and a very serious imprecision (confidence interval crosses the clinical decision threshold).
[d] using POEM (Patient Oriented Eczema Measure). The POEM score range is between 0 to 28, where 0 indicates or no eczema, and 28 indicates a very severe eczema. Lower score is better.
[e] Assumed risk is taken from Santer 2014 and Hedman-Lagerlof 2021
[f] Downgraded by two levels due to bias in selection of the reported result in Santer 2014 study, and a serious imprecision (confidence interval crosses the clinical decision threshold).
[g] using health-related quality of life (HRQoL) indicator. HRQoL scores range from 0 to 100, with higher scores indicating better quality of life.
[h] Assumed risk is taken from Santer 2022 and Santer 2004
[i] Downgraded by one level due to serious imprecision (confidence interval crosses the clinical decision threshold).

[j] using Recap of atopic eczema (RECAP). The total score of RECAP is from 0 to 28, with higher scores indicating poorer eczema control.
[k] Assumed risk is taken from Santer 2022
[l] Downgraded by one level due to serious imprecision (confidence interval crosses the clinical decision threshold).
[m] Using one-item overall stress-rating scale, subjects were asked to rate their overall levels of stress on a scale between 0 (no stress) and 10 (extremely stressed). Lower score is better
[n] Assumed risk is taken from Kimata 2004
[o] Downgraded by two levels due to a randomization process bias, and small sample size.

Summary of findings 4. Summary of findings table - Habit reversal compared to standard care for people with eczema

Habit reversal compared to standard care for people with eczema

Patient or population: people with eczema
Setting: Secondary care
Intervention: habit reversal
Comparison: standard care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with standard care	Risk with habit reversal				
Reduction in disease severity, as measured by clinical signs[a]	The mean reduction in disease severity, as measured by clinical signs was **15.9**[b]	MD **6.57 lower** (13.04 lower to 0.1 lower)	-	33 (1 RCT)	⊕⊕⊖⊖ Low[c]	11-week follow up period for children (unspecified ages).
Reduction in disease severity, as measured by patient-reported symptoms	0 per 100	**0 per 100** (0 to 0)	Not estimable	(0 RCTs)	-	No study was found to measure this outcome quantitatively
Improvement in quality-of-life measures[d]	The mean improvement in quality-of-life measures was **2.33**[b]	MD **0.41 lower** (2.15 lower to 1.33 higher)	-	30 (1 RCT)	⊕⊖⊖⊖ Very low[e]	11-week follow up period for children (unspecified ages).
Improvement in long-term control of eczema symptoms	0 per 100	**0 per 100** (0 to 0)	Not estimable	(0 RCTs)	-	No study was found to measure this outcome quantitatively
Improvement in psychological well-being measures	0 per 100	**0 per 100** (0 to 0)	Not estimable	(0 RCTs)	-	No study was found to measure this outcome quantitatively

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval; **MD:** mean difference

GRADE Working Group grades of evidence
High certainty: we are very confident that the true effect lies close to that of the estimate of the effect.
Moderate certainty: we are moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low certainty: our confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect.
Very low certainty: we have very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect.

See interactive version of this table: https://gdt.gradepro.org/presentations/#/isof/isof_question_revman_web_440071817856103192.

[a] using SCORAD (SCORing Atopic Dermatitis). The SCORAD score range is between 0 and 103 points, where 0 indicates clear or no eczema, and 103 indicates very severe disease. Lower score is better.
[b] Assumed risk is taken from Noren 2018
[c] Downgraded by two levels due to the inclusion of only one small size study; Noren 2018.
[d] using Children's Dermatology Life Quality Index (CDLQI). The CDLQI range is between 0 and 30 points, where 0 indicates no effect at all on on child's life, and 30 indicates extremely large effect on child's life. Higher score is better.
[e] Downgraded by three levels due to the inclusion of only one small size study, and a very serious imprecision (confidence interval crosses the clinical decision threshold) in Noren 2018.

Summary of findings 5. Summary of findings table - Arousal reduction therapies compared to standard care for people with eczema

Arousal reduction therapies compared to standard care for people with eczema

Patient or population: people with eczema
Setting: Secondary care
Intervention: arousal reduction therapies
Comparison: standard care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with standard care	Risk with arousal reduction therapies				
Reduction in disease severity, as measured by clinical signs[a]	The mean reduction in disease severity, as measured by clinical signs was **7**[b]	MD **0.2 higher** (3.7 lower to 4.1 higher)	-	24 (1 RCT)	⊕⊖⊖⊖ Very low[c]	One-month follow-up period for adults.
Reduction in disease severity, as mea-	The mean reduction in disease severity, as mea-	MD **11.1 lower**	-	18 (1 RCT)	⊕⊖⊖⊖ Very low[f]	Adult patients report results immediately after the intervention.

sured by patient reported symptoms[d]	sured by patient reported symptoms was **29.2**[e]	(27.47 lower to 5.27 higher)				
Improvement in quality-of-life measures[g]	The mean improvement in quality-of-life measures was **12.6**[h]	MD **2.1 lower** (4.41 lower to 0.21 higher)	-	91 (1 RCT)	⊕⊕⊖⊖ Low[i]	12-week follow up period for children (unspecified ages)
Improvement in long-term control of eczema symptoms	0 per 100	**0 per 100** (0 to 0)	Not estimable	(0 studies)	-	No study was found to measure this outcome quantitatively
Improvement in psychological well-being measures[j]	The mean improvement in psychological well-being measures was **20.5**[h]	MD **1.2 lower** (3.38 lower to 0.98 higher)	-	91 (1 RCT)	⊕⊕⊖⊖ Low[i]	12-week follow up period for children (unspecified ages). Carers-Perceived Stress (PSS) Intervention was chosen to be presented in the Sof rather than Carer-Depression (PHQ-9) Intervention & Anxiety (GAD7) Intervention as the results for these three interventions were similar, and only PSS was reported in another table.

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the __relative effect__ of the intervention (and its 95% CI).

CI: confidence interval; **MD:** mean difference

GRADE Working Group grades of evidence
High certainty: we are very confident that the true effect lies close to that of the estimate of the effect.
Moderate certainty: we are moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low certainty: our confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect.
Very low certainty: we have very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect.

See interactive version of this table: https://gdt.gradepro.org/presentations/#/isof/isof_question_revman_web_440071471881858908.

[a] using Eczema Area and Severity Index (EASI) scores. The EASI score range is between 0 and 72 points, where 0 indicates clear or no eczema, and 72 indicates very severe disease. Lower score is better.
[b] Assumed risk is taken from Bae 2012
[c] Downgraded by three levels due to deviations from intended interventions, inclusion of only one small size study, and a very serious imprecision (confidence interval crosses the clinical decision threshold) in Bae 2012
[d] using Visual Analogue Scales (VAS) for pruritis and loss of sleep. The VAS score range is between 0 and 100 points, where 0 indicates no pain, and 100 indicates worst pain imaginable. Lower score is better
[e] Assumed risk is taken from de L Horne 1999

[f] Downgraded by three levels due to missing outcome data, the inclusion of only one small size study, and serious imprecision (confidence interval crosses the clinical decision threshold) in de Home 1999

[g] using Dermatitis Family Impact (DFI). The DFI score range is between 0 and 30 points, where 0 indicates no impact on life of family, and 30 indicates maximum effect on life of family. Higher score is better

[h] Assumed risk is taken from Fung 2020

[i] Downgraded by two levels due to a serious imprecision (confidence interval crosses the clinical decision threshold), and the inclusion of only one study; Fung 2020 study

[j] using Perceived Stress Scale (PSS). The PSS score from 0 to 40 is presented, with higher scores representing higher levels of stress.

BACKGROUND

This review is based on a previous Cochrane review (Ersser 2014), extending the population to include adults with atopic dermatitis (eczema), in addition to children, and now with the inclusion of a health economic analysis. A glossary of terms is provided in the additional tables (Table 1)

Description of the condition

Atopic dermatitis is a long-term inflammatory skin condition. This Cochrane review relates to atopic dermatitis throughout; we use the term 'eczema' to refer to atopic dermatitis hereafter. Eczema is a debilitating disease with a multifaceted aetiology and high levels of disease burden for patients (Blakeway 2020; Jabbar-Lopez 2020). The main clinical features are itching, dryness, erythema, weeping, vesicles; and more chronically, skin thickening, hyper/hypo-pigmentation and excoriation. Eczema is usually diagnosed clinically based on the signs and symptoms described above. Diagnostic criteria sets, such as those of Hanifin and Rajka can be utilised (Hanifin 1980), but these are often not specifically used in clinical practice. Serum immunoglobulin E (IgE) levels can sometimes be of diagnostic benefit. Taking a biopsy for histology is rarely needed but can be of use if there is diagnostic uncertainty, particularly in adults. Further investigations in the form of patch testing or 'skin prick' testing (involving putting a drop of liquid onto the forearm that contains a substance the patient may be allergic to) may be indicated if there is a suspicion of co-morbid allergy.

Eczema is the most prevalent longer-term inflammatory skin disorder, affecting up to 20% of children and 10% of adults in high-income countries (Tsakok 2019). A systematic review indicated an increasing prevalence of eczema in Africa, East Asia, Western Europe, and parts of Northern Europe (Deckers 2012). Research has predominantly focused on incidence in childhood, as just under three-quarters of cases begin in children younger than five years of age (Hanifin 2007). Whilst there are fewer adults with eczema, their condition is frequently more severe (Abuabara 2019; Herd 1996). It is unclear whether trends of increasing levels of eczema in adults are due to increasing persistence of disease or new-onset disease later in life.

Eczema is a systemic inflammatory disease with several co-morbidities (Brunner 2017). With its very high incidence in childhood, chronicity, wide-ranging impact on quality of life for patients and their families, socioeconomic burden, and limited therapeutic possibilities, eczema is challenging for all involved (Eyerich 2019). Its management is complex (Hashimoto 2017), and often requires a well-planned, multidisciplinary approach for optimal care.

Causes

The rising global incidence of eczema has led researchers to question whether environmental factors may be contributing to this public health problem. trials indicate that the way genes interact with the environment plays a role in eczema (Blakeway 2020). Genetic mutations have been associated with eczema (Hongping 2020), with the most consistently reported genetic variant being loss-of-function mutations (resulting in reduced or lost function of the resulting protein) in the gene coding filaggrin (FLG) (Blakeway 2020; Eyerich 2019; Handa 2019; Lau 2019). FLG plays a vital role in aggregating keratin filaments, ordering lamellar lipid bilayers, conserving hydration, and the pH balance of the epidermis. Current understanding focuses on disturbance of the skin barrier, leading to increased permeability of the epidermis, pathological inflammation, dryness, and percutaneous heightened sensitivity to allergens (Flohr 2010; Tam 2016; Tsakok 2019).

There is growing evidence that micro-organisms on the skin are also indicated in eczema, particularly *Staphylococcus epidermidis* (Tsakok 2019). Disease exacerbations (also called flares) are known to be linked to significant decreases in skin microbiota diversity and an increase in abundance of both *S aureus* and *S epidermidis*.

Environmental factors, including skin cleansing, may also contribute to friction damage, and therefore guidance about the optimal frequency of bathing is variable (Tsakok 2019). There is also a positive association between living in a 'hard water' area (water that has high mineral content) and having eczema (Jabbar-Lopez 2020). Animal research evidences that environmental allergens, including but not limited to house dust mites and food protein, can interact with the immune system via antigen-presenting cells (cells that process antigens and allergens, and then expose them to the immune system), leading to hypersensitivity (Ersser 2014). This can exacerbate eczema and might also be a precursor for respiratory and food allergies (Fallon 2009). Eczema is associated with IgE sensitisation to both food allergens and aeroallergens, particularly in school-age children (Johansson 2017).

Impact

Eczema can have a significant impact on quality of life for people with eczema and their families, particularly due to sleep disturbance (von Kobyletzki 2017), and itching. Prescription costs can also impact on quality of life for people with eczema. Impact evaluation on quality of life and mental health is required to provide a rich understanding and inform optimal management of eczema, and psychosocial factors may also play a role in the itch-scratch cycle (Ersser 2014). The fact that eczema is frequently comorbid with other conditions, for example asthma, can also contribute to reduced quality of life for the affected individual and their families. Several trials have evidenced that eczema has a greater consequence on quality of life than other dermatological diseases, including acne and psoriasis (Lewis-Jones 2001; Schuster 2019); hence, it is important to measure the impact of interventions on quality of life and wider psychological functioning. This review also aims to capture the experiences of parents and caregivers, including their well-being, where relevant.

There is a high prevalence of depression in people with skin conditions, including eczema (Clarke 2020). Some patients might also fear the stigma associated with the condition (Duncan 2019). Teasdale 2020 cited a lack of recognition by both health professionals and wider society of the wide-ranging impacts on people with eczema and their families. This can include the person with eczema experiencing low mood and self-esteem (Ghio 2021), due to feeling stigmatised and self-conscious about their appearance, and this can affect their relationships. Surveys of people with moderate-to-severe eczema have revealed a possible impact on academic success. Working-life trials have shown that eczema can impact choice of work, though these effects do not continue to have implications upon lifetime productivity (von Kobyletzki 2017). The impact on everyday life can involve people changing their behaviours and modifying everyday routines in response to eczema symptoms, in an attempt to avoid irritants

and concord with treatment guidance. Hence, reduction in disease severity and improvement in long-term control are outcomes in this review.

Non-concordance to long-term treatments for eczema is considered to be a barrier to effective eczema management; furthermore, people with eczema and their carers can become exasperated with the advice they receive (Santer 2016). People with eczema might also worry about side effects of medication, such as potential skin thinning by topical corticosteroids, and risks of skin cancer with topical calcineurin inhibitors (a group of topical medicines that reduce inflammation in the skin by acting on the immune system, often used as an alternative to topical steroids). They may also feel that they receive inconsistent advice from medical professionals about the risks of topical treatments and regimens (Teasdale 2020). There may be frustration with the transient benefit of anti-inflammatory topical treatments, especially in people with a relatively new diagnosis of eczema, which may correspond to a lack of understanding or acceptance of eczema as a chronic condition (Teasdale 2020). This may represent an area where psychological and educational interventions will be helpful to enhance concordance.

There are numerous practical burdens involved in treating eczema, not only for the individual (and their families; Ablett 2016) but for wider society (Tsakok 2019). Concordance can be complicated, sometimes involving specific types of clothing and bedlinen, applying greasy emollients, and the avoidance of certain activities, for example swimming (Van Onselen 2021). Treatments may also sting, feel cold and give an oily appearance to the skin that sufferers may find embarrassing. Findings from a systematic review concluded that low treatment concordance is a multidimensional phenomenon and should not be considered as the patient's fault alone (Eicher 2019). Factors impacting the burden to patients include: beliefs, efficacy and duration of treatment; route of administration; the chronicity of the disease; and the disease itself (Capozza 2020; Eicher 2019). As treatment concordance has been highlighted in the literature, it is important to explore it further as one of the secondary outcomes of this Cochrane review.

Cost of illness

Eczema places a substantial economic burden on patients in terms of out-of-pocket expenditures, healthcare services in terms of providing treatment, and society in terms of reduced productivity amongst people with eczema and the need to provide informal care for children with eczema.

Several trials demonstrate the substantial burden of illness. For example, a retrospective analysis of insurance claims for adults in the USA predicted annual additional costs of US Dollars (USD) 3302 (2013 values) per person affected by eczema compared to the general population, with even higher costs for those with more severe disease (Drucker 2018). Another trial from the USA estimated median annual out-of-pocket costs associated with eczema to be USD 600 (2019 values), demonstrating the substantial economic burden on people with eczema (Begolka 2021).

A trial of 1014 people with moderate-to-severe eczema across five countries (France, Germany, Italy, Spain, and the UK) estimated direct costs (including contacts with healthcare providers, hospitalisation and emergency room attendance) to range from Euro (EUR) 2242 to 6924 per person per year. Indirect costs accounting for work impairment leading to productivity losses due to absenteeism ranged from EUR 7277 to EUR 14,236 per person per year. Disease severity was the main driver of both direct and indirect costs (Girolomoni 2021). A cross-sectional trial of children in Singapore found that the average societal cost of illness per child (measured in 2017) was USD 7943, ranging from USD 6651 for mild disease to USD 14,335 for severe disease (Olsson 2020). These trials clearly demonstrate the need for a brief economic commentary, which will be undertaken as part of this review.

Description of the intervention

Although there is currently no cure, various interventions exist to control symptoms of eczema. These interventions tend to target rehydration of the skin, reduction in inflammation, control of itch, and prevention and treatment of infection (Ersser 2014). Standard treatment is avoidance of triggers and irritants, and regular application of emollients and topical steroids or calcineurin inhibitors (Wollenberg 2020). Severe cases may also be treated with phototherapy, immunosuppressive treatments or, more recently, dupilumab (a monoclonal antibody or biologic drug that works against chemical messengers called cytokines, specifically interleukin-4 and interleukin-13), and Janus kinase inhibitors (novel therapies that work on the Janus kinase/signal transducers and activators of transcription (JAK-STAT) intracellular signalling pathway of the immune response and can be used both in a topical and oral systemic form; Mendes 2020). Thorough assessment of the person with eczema's physical and psychological well-being is also key to treatment (Duncan 2019). However, there are barriers to providing such support in dermatological practice, including time pressures, resources, and perhaps clinicians' levels of training, hence the need for evaluating the efficacy and economics of both psychological and educational interventions in this participant group.

There are some main eczema treatments that are commonly used but have been shown to be ineffective. These include antihistamines, leukotriene antagonists, probiotics, antibiotics, water softeners, silk clothing, and bath oils (Foisy 2011). In these cases, educational interventions might help in providing information to patients such that they might avoid unnecessary expenditure and potential harm. In addition, alternative or complementary therapies have been used in an attempt to treat eczema, and a wide range of approaches might be classified under this heading, ranging from food supplements to the use of practices such as aromatherapy, yoga, and massage. However, we have excluded alternative therapies from this review, as the focus here is on the use of educational and psychological interventions that are based on the findings from educational or psychological research and theory, and this is in keeping with inclusion criteria adopted by other reviews conducted in this area (Hashimoto 2017). Further, a range of psychological and educational interventions have been specifically developed and tested alongside the use of conventional medical treatments for eczema (i.e. as an adjunctive to emollient and topical steroids or calcineurin inhibitor use). Consequently, it is important that reviews of the literature focus specifically on evaluating the merits of using educational and psychological interventions in the management of eczema.

Educational interventions

Educational interventions are often used in supporting people with long-term conditions to optimise care (Ingo 2019). For the

treatment of eczema, approaches range from one-to-one sessions to group sessions, and from clinician-led to patient-led. They are also presented in a variety of formats which increasingly cater for distanced learning, including online programmes and virtual education sessions. The length of educational intervention is variable and often includes follow-up sessions. The latter are necessary because motivation and intention to change do not always translate into change itself (Thompson 2017). Some behavioural change techniques are also used as part of educational interventions (Ersser 2014).

Psychological interventions

The itch-scratch cycle is a key consideration when treating a person with eczema. Stress and psychological variables associated with this play an important role in the maintenance of chronic itch (Wollenberg 2020). Behavioural therapy should also be considered, whereby the scratch reflex is modified via habit reversal, or substitution with alternative behaviours, or both (Misery 2021; Rosenbaum 1981). This can be particularly effective where patients with eczema demonstrate unconscious scratching behaviours. As such, successful psychology-based programmes may include strategies for disrupting the itch-scratch cycle, relaxation, and other stress-management techniques (Wollenberg 2020). Mindfulness meditation and relaxation techniques also appear to show promise for reducing itch (Daunton 2016; Heratizadeh 2017).

Guided imagery has been used, to a fairly limited extent. Typically, it takes the form of audio scripts used to divert the imagination away from any stress and the itching sensation (Derrick 1994). Virtual reality is a more immersive approach towards re-focusing attention and consequently reducing stress. Two pilot trials have been conducted to evaluate the potential of virtual reality as an adjunct to usual eczema symptom management (Singleton 2022; Singleton 2023), these prelimiinary findings indicated that virtual reality is an acceptable, easy to use, calming and enjoyable intervention when used to distract from scratching and discomfort caused by eczema. Whilst there are no clinical trials (to our knowledge) that have evaluated virtual reality to specifically treat eczema, it has been used to treat anxiety, burns, and pain (Scapin 2018; Singleton 2024). Since itch and pain can be triggered from the same receptive fields in the skin (Behrang 2020), it is expected that virtual reality could be used as a more potent version of guided imagery.

Talking therapies have also been reported to be cost-effective in supporting reductions in disease-related distress (Pickett 2015). Self-management information delivered via the internet or via other related technologies (eHealth) has also been investigated, mostly with cognitive behavioural interventions, and has recently been shown to be comparable to face-to-face therapy (Craddock 2018). It is worth noting, however, that whilst a range of psychological therapies exist, they are not consistently available in all geographical areas (APPG 2020).

How the intervention might work

Educational interventions

Educational interventions generally focus on the process of acquiring knowledge or skills through teaching and learning activities (Ersser 2014). Informed patients are better able to understand the need for any healthcare intervention and how their disease can be managed. Being fully informed can also give patients a sense of empowerment in relation to their condition (Duncan 2019). More recently, it has been demonstrated that the patient must be actively involved in the education process; hence, self-efficacy-based interventions have been promoted (Hashimoto 2017; Thompson 2017), to enable people to self-manage their condition (Ersser 2011).

There is a body of evidence indicating that educational interventions are effective for treating eczema because they support effective self- and parental management. For example, a recent randomised controlled trial (RCT) evaluated a parental eczema education programme (Cheng 2020); the main conclusion was that nurse-led parental education programmes, which provided evidence-based information and encouraged peer support, could improve health outcomes in patients with eczema. In addition to nurse-led education clinics, there are numerous online programmes and apps available for eczema. However, the quality of such apps is variable, and it is reported that clinicians need guidance that would enable them to make personalised recommendations for people with eczema and caregivers (Van Galen 2019).

Psychological interventions

Brain imaging research has shown atypical brain activation patterns in people with eczema after itch stimulation, suggesting central sensitisation (Misery 2021). Techniques such as habit reversal work on the notion that scratching can become unconscious and widespread beyond the itch itself (Staughton 2020). Such techniques teach patients how to use different, less harmful behaviours where the itch perseveres. Other psychological approaches, such as relaxation, might also work by lowering arousal and anxiety or stress, which may intensify the awareness of itch.

Currently, the evidence base for mindfulness and relaxation as treatments for eczema is limited. However, it is useful to extrapolate from other similar evidence bases where mindfulness-based interventions have been used successfully. For example, in a small RCT with 60 participants, Vagnoli 2019 found that relaxation-guided imagery reduced perioperative anxiety and pain in children. A range of different types of well-being podcasts, apps and other media are being developed at speed, and we predict that evaluation of efficacy will follow.

Why it is important to do this review

Due to eczema being a prevalent disease that has a significant impact on people with eczema and their families, educational and psychological interventions are essential. However, there has been little previous research that has evaluated the measurable effects of these interventions. The original version of this review found only limited evidence to support such interventions (Ersser 2007). The updated version of the review (Ersser 2014), also found limited research evidence about the effect of educational and psychological approaches when used alongside medicines for the treatment of childhood eczema; meta-analysis of trials was not possible due to a lack of high-quality evidence and heterogeneity of outcome measurements. In this review we are widening the scope to include adults as well as children and young people. It will be interesting to assess whether there have been more evaluative trials conducted since 2014, and if any evaluation of adults with eczema can help provide insight into the treatment of children and young people who have eczema.

trials to evaluate the efficacy of educational interventions have been sparse or of poor quality, or both (Pustisek 2016). Ridd 2017 found that there is still ambiguity about whether educational interventions are effective in improving quality of life for children and adults with eczema; most trials have been small and of poor quality, and it is not known which particular components are clinically effective and cost-effective in different clinical settings. Psychological treatments have only been evaluated to a limited extent, despite the fact that the nature of eczema suggests that psychological factors may play a pivotal role in maintenance of the condition (Hedman-Lagerlöf 2019). Trials tend to have small sample sizes, which has made it difficult to estimate the effects of treatments (Hashimoto 2017). Hence, there is a need for this proposed review of the educational and psychological interventions that have been used to help treat adults and children with eczema to date.

From an economic perspective, the rising prevalence of eczema suggests that the economic burden of treating this disease on healthcare services, people with eczema and society, can be expected to grow in the future. However, a common factor amongst all cost-of-illness trials identified is that the economic burden of eczema is driven by the severity of disease. This suggests that the emergence of new treatment approaches may have substantial potential for cost-effectiveness if they can lead to better disease control for patients, prevention of disease progression to more severe disease stages, and improvement of quality of life of people with eczema.

It is important to conduct this review to assess the cost-effectiveness of eczema interventions. Globally, healthcare systems have insufficient resources (e.g. money or staff) to provide treatment for all who have this common health problem and there is a paucity of economic evidence for treatments in comparison to clinical outcomes (Sach 2019). Some interventions now have sufficient evidence to suggest little or no benefit for people with eczema, such as the application of topical corticosteroids twice daily rather than once daily; topical corticosteroids containing antibiotics when used for the management of non-infected eczema; the use of ion exchange water softeners; and dietary supplements,such as probiotics, borage oil and evening primrose oil (Nankervis 2017). This provides options for disinvestment, ensuring that available funds are channelled to the most effective and efficient treatments. Non-concordance to eczema treatment is widely reported, though the reasons remain poorly understood. Poor treatment concordance results in a complex and sizeable problem for global healthcare, as it has a vast impact on clinical outcomes, health economics, and patient safety (Eicher 2019). Eczema places a substantial economic burden on healthcare providers, patients, and society. Given the need to ensure efficient allocation of scarce healthcare funding resources, it is important to include a summary of the cost-effectiveness evidence base that evaluates the use of educational and psychological interventions for the treatment of eczema.

This Cochrane review was prioritised by Cochrane Skin in their 2020 prioritisation exercise, which aimed to identify the most important systematic review titles within the group's scope (Cochrane Skin 2020).

OBJECTIVES

To assess the clinical outcomes of educational and psychological interventions in children and adults with atopic dermatitis (eczema) and to summarise the availability and principal findings of relevant economic evaluations.

METHODS

Criteria for considering studies for this review

Types of studies

We included individually randomised, cluster-randomised and cross-over randomised controlled trials (RCTs) that assessed educational and psychological interventions for treating eczema in children and adults. We did not exclude trials based on language or publication status.

Types of participants

We included participants of any age, with a diagnosis of eczema of any severity (identified using established diagnostic criteria, or diagnosed by a suitable healthcare professional). Participants either fulfilled diagnostic criteria such as the Hanifin and Rajka definition (Hanifin 1980), or the UK modification (Williams 1994); or had been diagnosed clinically by a healthcare professional, using the terms 'atopic eczema' or 'atopic dermatitis', for example.

For trials in which only a subset of participants was eligible (e.g. only some of the participants were diagnosed clinically with 'atopic' eczema), we deployed two mechanisms, as follows.

- If the trial reported separate data for the eligible participants, we included the data for the eligible participants only.
- If the trial did not report separate data for the eligible participants, then in order to avoid loss of data (i.e. when trials are excluded), we included trials in which more than 80% of the participants conformed to the eligibility criteria.

If no detailed information was available, we attempted to contact the authors of such trials to provide the information required. If we did not receive a reply, or the percentage of relevant participants was less than 80%, we excluded the trial.

We avoided making post-hoc inclusion decisions as much as possible. However, if a post hoc decision was made, all the review authors justified, documented, checked and agreed it. We conducted sensitivity analysis if we included any trial with a subset of eligible participants in the meta-analysis by a post-hoc inclusion decision, to assess the impact of these decisions on the review's findings.

Following consideration, we excluded trials regarding participants with 'hand eczema' as we felt this was outside the scope of this review, which is specifically for atopic dermatitis, noting that hand eczema can have varying aetiology including irritant and allergic contact dermatitis.

Types of interventions

We evaluated all educational interventions for eczema, delivered to groups or individuals. Eligible interventions included the following.

- Face-to-face individual and face-to-face group educational interventions, including consultations and workshops
- Technology-mediated interventions (such as online educational packages, videos, animations, social media, and virtual and telephone interactions)
- Printed educational publications (such as leaflets, infographics, and comics)

We evaluated all psychological interventions for eczema, delivered to groups or individuals. Eligible interventions included the following.

- Psychological therapies, including counselling and cognitive behavioural therapy
- Behavioural interventions (such as habit reversal)
- Self-help interventions
- Arousal reduction therapies (such as mindfulness, meditation, relaxation techniques and guided imagery)

We included all settings relating to these types of psychological and educational interventions, regardless of whether the intervention was carried out in the community, or within a primary-, secondary-, or tertiary-care setting. All trials were eligible for inclusion, regardless of mode of delivery, intensity, frequency, or duration of interventions. Interventions varied in both the mode of delivery (possibly using more than one delivery element) and the pattern of delivery (with varying duration and frequency). Interventions also varied in their theoretical underpinning.

Some interventions were simple, single interventions; others were complex interventions that utilised a combination of approaches. We included trials that gave the same co-intervention in each arm (e.g. conventional treatment such as topical corticosteroids and emollients). The comparators were likely to be standard care (in the trial setting), but we also included trials with active comparators such as different forms of psychological or educational intervention.

Types of outcome measures

Outcome measures for eczema interventions have been addressed by the Harmonising Outcome Measures for Eczema initiative (HOME 2021). The initiative includes four core outcome domains as follows:

- a clinical signs tool (Eczema Area and Severity Index (EASI);
- patient-reported symptoms tools, for example Patient-Oriented Eczema Measure (POEM);
- quality-of-life tools; and
- tools to evaluate long-term control.

We excluded trials if the outcomes did not fall into the categories listed below.

Primary outcomes

1. Reduction in disease severity, as measured by clinical signs. This included, but was not restricted to, EASI (Hanifin 2001; Schmitt 2014), and SCORing Atopic Dermatitis (SCORAD) (with or without subjective component) (Kunz 1997).
2. Reduction in disease severity, as measured by patient-reported symptoms. This included, but was not restricted to, POEM (Charman 2004; Spuls 2017), and NRS-11 (Numeric Rating Scale for intensity of itch; Yosipovitch 2019).
3. Improvement in quality-of-life measures (including, where specified, for family and caregivers), including but not restricted to, Dermatology Life Quality Index (adults; Finlay 1994), (children; Lewis-Jones 1995), (infants; Finlay 2001)

Where two scores were used for a single outcome, we prioritised them based on the outcome measures recommended by HOME 2021.

Secondary outcomes

1. Improvement in long-term control of eczema symptoms. This includes, but is not restricted to, Recap of Atopic Eczema (Howells 2020), or Atopic Dermatitis Control Test (Pariser 2020)
2. Improvement in psychological well-being measures (including, where specified, for family and caregivers), including but not restricted to, Patient Health Questionnaire (Kroenke 2001), and Generalised Anxiety Disorder Questionnaire (Spitzer 2006)
3. Improvement in concordance with standard treatment
4. Adverse events (i.e. withdrawals due to adverse events)

Timing of outcome assessment

We grouped time points into intervals representing ‘short term’ (up to 16 weeks after completion of the intervention), and ‘long term’ (longer than 16 weeks after completion of the intervention).

For 'short term', we used the measurement closest to 12 weeks if multiple time points were used. For 'long term', we took the measurement closest to 12 months if multiple time points were used.

Search methods for identification of studies

We aimed to identify all relevant RCTs, regardless of language or publication status (published, unpublished, in press, or in progress).

Electronic searches

Electronic searches for randomised controlled trials

The Cochrane Skin Information Specialist (Liz Doney, with update searches done by Helen Scott) searched the following databases using strategies based on the draft strategy for MEDLINE in our published protocol (Singleton 2021).

- The Cochrane Skin Specialised Register 2021 via the Cochrane Register of Studies (CRS-Web) using the search strategy in Appendix 1 (searched 6 March 2023)
- The Cochrane Central Register of Controlled Trials (CENTRAL; 2023, Issue 2) in the Cochrane Library, using the strategy in Appendix 2 (searched 6 March 2023)
- MEDLINE, via Ovid using the strategy in Appendix 3 (1946 to 6 March 2023)
- Embase, via Ovid using the strategy in Appendix 4 (1974 to 6 March 2023)
- APA PsycInfo, via Ovid using the strategy in Appendix 5 (1806 to 6 March 2023)

Liz Doney searched the trials registers listed below on 18 November 2021, updated by Helen Scott, 14 October 2022 and 6 March 2023.

- ClinicalTrials.gov (www.clinicaltrials.gov); see search strategy in Appendix 6 (searched 6 March 2023)
- The World Health Organization International Clinical Trials Registry Platform (ICTRP; trialsearch.who.int/); see search strategy in Appendix 7 (searched 6 March 2023)

Electronic searches for economic evaluations

We followed the current guidance on searching for a brief economic commentary in the *Cochrane Handbook for Systematic Reviews of Interventions* (Aluko 2022). The Cochrane Skin Information Specialist searched the NHS Economic Evaluation Database (NHS EED), available on the UK Centre for Reviews & Dissemination (CRD) website (covering from the earliest record in NHS EED, dating from 1968, up to and including 31 December 2014, when updating of the database ended) on 8 June 2022.

As NHS EED is no longer updated, the Information Specialist also searched the following databases on 8 June 2022 to identify eligible trials added from 1 January 2015 onwards.

- MEDLINE, via Ovid
- Embase, via Ovid

For the search strategies used for the economic evaluation searches, see Appendix 8.

Errata and retractions

The Cochrane Skin Information Specialist ran a specific search in MEDLINE and Embase, via Ovid, to identify errata or retractions related to our included trials on 19 October 2022, but no relevant retraction statements and errata were retrieved.

Searching other resources

Additional searches for randomised controlled trials

Searching reference lists

We checked the bibliographies of included trials and any relevant systematic reviews identified for further references to relevant RCTs.

Correspondence with trial authors, experts, and organisations

We contacted the original trial authors for clarification and further data if trial reports were unclear. We contacted experts and organisations in the field to obtain further information on unpublished, relevant trials.

Adverse effects

We did not perform a separate search for adverse effects of psychological and educational interventions used for managing eczema. We considered adverse effects described in the included trials only.

Additional searches for economic evaluations

We checked the bibliographies of the included trials and any relevant systematic reviews identified for references to relevant economic evaluations.

Data collection and analysis

We used Covidence systematic review software to screen and manage the references. The software automatically created a PRISMA trial flow diagram for us to include in the review (Moher 2009).

Selection of studies

We used Cochrane's Screen4Me workflow to help assess the results of the search for RCTs. Screen4Me comprises three components, of which we used two: known assessments (a service that matches records in the search results to records that have already been screened in Cochrane Crowd and been labelled as 'RCT' or 'not an RCT'); and the RCT classifier (a machine-learning model that distinguishes RCTs from non-RCTs). For more information about Screen4Me and the evaluations that have been done, please go to the Screen4Me webpage on the Cochrane Information Specialist's portal. In addition, more detailed information regarding evaluations of the Screen4Me components can be found in Marshall 2018 and Noel-Storr 2021.

Two review authors (HS, AH) independently screened the titles and abstracts of each record identified in the searches. If a trial met our inclusion criteria, we analysed the full text to confirm its inclusion. Any disagreement was resolved by a third review author (VH). We recorded reasons for exclusions in the Characteristics of excluded studies. We presented the process of trial selection in a PRISMA flow diagram (Moher 2009).

Data extraction and management

Four review authors (HS, AH, JVO and SO'M) undertook data extraction independently. The data fields we extracted include the following.

- Trial information including: trial design, trial author, year of publication, trial duration, trial setting, sample size
- Participant details (age; severity of condition; ethnicity; patient, carer, or both; etc.)
- Details of interventions (e.g. behavioural/educational components; co-interventions; length of sessions)
- Details of comparators (e.g. no treatment or standard care)
- Details about outcomes (e.g. primary and secondary outcomes; measurement instruments; time points)
- Outcome data
- Conflicts of interest
- Funding sources

Using these characteristics, we completed Characteristics of included studies tables. We entered extracted outcome data into meta-analysis or described them narratively. We compared data extractions and resolved any discrepancies through discussion.

Assessment of risk of bias in included studies

Three review authors (HS, AH, JVO) independently assessed the risk of bias of included trials using Cochrane's risk of bias tool, RoB 2 (Sterne 2019). We assessed the following domains: bias arising from the randomisation process; bias due to deviations from intended interventions; bias due to missing outcome data; bias in measurement of the outcome; and bias in the selection of the reported result. We assessed the effect of assignment to the intervention. Using the RoB 2 Excel tool to manage the process, we assessed the risk of bias for each outcome shown in the Summary of findings tables. We used RoB 2 assessments for both short- and long-term outcomes.

We used the RoB 2 variant specifically designed for cluster-randomised trials where relevant, taking into account the possible resulting identification or recruitment bias in our judgement (Higgins 2022). We also used the RoB 2-specific variant for any cross-over trials (Higgins 2022).

We made judgements in relation to the risk of bias arising from each domain, based on answering a series of signalling questions. An algorithm proposes a bias judgement for each domain based on the answers to signalling questions. Another algorithm proposes an overall risk of bias assessment for each outcome, based on the judgements for each domain. Domain-level and overall judgements can be 'low' or 'high' risk of bias, or can express 'some concerns'. We resolved any discrepancies in assessments through discussion.

Our primary analysis included all eligible trials regardless of whether they were at low risk of bias, high risk of bias, or caused 'some concerns'. We performed a sensitivity analysis, where feasible, to explore the impact of bias (see: Sensitivity analysis). The overall risk of bias judgement informed one of the GRADE considerations (trial limitations); see below.

Measures of treatment effect

As most of our outcomes were continuous, we calculated mean differences (MDs) with 95% confidence intervals (CIs). Some of these outcomes have established minimal clinically important differences (MCIDs), including Eczema Area and Severity Index (EASI), SCORing Atopic Dermatitis (SCORAD), pruritis numerical rating scale (NRS), Dermatology Life Quality Index (DLQI) and Patient Oriented Eczema Measure (POEM) (CADTH 2018). When trials measured the same outcome using different instruments or scales, we calculated the standardised mean difference (SMD). Where possible, to enable interpretation, we transformed the effect back to the units used in a specific trial. Where dichotomous data were expressed (e.g. number of participants with adverse events), we calculated risk ratios (RRs) with 95% CIs.

Unit of analysis issues

The unit of analysis for parallel-group trials and cross-over trials was individuals in the treatment arm compared to those in the control arm. Only the first phase of cross-over trials was included in the meta-analysis because the design was not appropriate for assessing educational and psychological interventions, as there are likely to be 'carry-over' effects. In trials with more than two relevant treatment arms, we analysed pairs of comparisons.

We addressed cluster-randomised trials in accordance with methods specified in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2022). The unit of analysis was the cluster and the sample size for the analysis was the number of clusters.

Many of the trials had multicomponent interventions from which it was not possible to estimate the effectiveness of single interventions unless data were presented for comparator groups. We compared the effectiveness of single- and multicomponent interventions between trials, and aimed to assess whether the effects of combining interventions were additive or multiplicative.

Dealing with missing data

We attempted to obtain any missing data from the primary trial authors. Where it was reasonable, we calculated missing data from other numerical data given (e.g. CIs, P values).

Assessment of heterogeneity

In terms of heterogeneity, particularly with respect to trials' participants (i.e. adults versus children), we applied a random-effects model for the meta-analysis. We used the following thresholds for interpreting the I^2 statistic value (Higgins 2003), as outlined in the *Cochrane Handbook for Systematic Reviews of Interventions* (Deeks 2021).

- 0% to 40%: might not be important
- 30% to 60%: may represent moderate heterogeneity*
- 50% to 90%: may represent substantial heterogeneity*
- 75% to 100%: considerable heterogeneity*

*The importance of the observed value of the I^2 statistic depends on 1) the magnitude and direction of effects, and 2) the strength of evidence for heterogeneity (e.g. P value from the Chi^2 test, or a CI for I^2 statistic: uncertainty in the value of I^2 statistic is substantial when the number of trials is small).

Additionally, we checked Cochran's Q test of heterogeneity to confirm the results of the I^2 statistic, as well as visual inspection of the forest plots. To assess whether between-trial heterogeneity was caused by one or more trials with extreme effect sizes; we identified any trial with a CI that did not overlap with the CI of the pooled effect as an outlier and influential trial using the Baujat plot approach (Borenstein 2009).

Assessment of reporting biases

Where data allowed, we generated funnel plots and used the Egger test to detect publication bias for meta-analyses that included a minimum of 10 trials (Egger 1997).

Data synthesis

We undertook a meta-analysis only if we judged the participants, interventions, comparisons and outcomes to be sufficiently similar to ensure an answer that was clinically meaningful. Where data allowed, we performed meta-analysis, using random-effects models, for each comparison using Review Manager software (RevMan 2024). Where it was not feasible to perform meta-analysis due to heterogeneity, we synthesised the results using the 'Synthesis without meta-analysis (SWiM) in systematic reviews: reporting guideline' (Campbell 2020).

We analysed educational and psychological interventions separately. We also analysed interventions that involved both components (e.g. psycho-educational). We pooled trials for analysis if they were suitably comparable in relation to their participants, interventions, comparisons, and outcomes.

Where we estimated results for individual trials with low numbers of events (fewer than 10 in total), or where the total sample size was fewer than 30 participants and a risk ratio was used, we reported the proportion of events in each group together with a P value from a Fisher's Exact test (Fisher 1934).

Subgroup analysis and investigation of heterogeneity

If sufficient trial information was available, we undertook a subgroup analysis to identify whether the intervention effects in the meta-analysis significantly differed by age, ethnicity, severity of disease, carer versus patient, or group versus individual interventions.

We used the formal Chi^2 test for subgroup differences to test for subgroup interactions. We also compared subgroups using the analysis option of the 'test for subgroup differences' in RevMan 2024, using the P value from the test for subgroup differences in RevMan to formally compare subgroups.

Sensitivity analysis

We undertook sensitivity analyses by applying the 'trim-and-fill' method (Borenstein 2009; Higgins 2021), and removed from the quantitative synthesis trials deemed to be at overall high risk of bias. We removed trials with a different trial design (e.g. cross-over or cluster-RCTs), or where data had been inputted and calculated differently (e.g. extracted from a figure).

Incorporating economic evidence

Following the search outlined in Search methods for identification of studies, we developed a brief economic commentary to summarise the availability and principal findings of single-trial (e.g. trial-based) and model-based full economic evaluations (cost-effectiveness analyses, cost-utility analyses, cost-benefit analyses and cost-minimisation analyses) that compared educational or psychological interventions, or both, with standard treatment for eczema amongst children or adults (Aluko 2022). This commentary focused on the extent to which principal findings of eligible economic evaluations indicated that an intervention might be judged favourably (or unfavourably) from an economic perspective, when implemented in different settings.

A health economist (DB) screened the results of the search against the same population, intervention and comparator criteria that we had developed for the main review of effectiveness. Evaluations that provided a synthesis of costs and outcomes, or comparative analysis of costs, within a full economic evaluation framework were included. Evaluations conducted alongside single trials (typically within trial evaluations or before-and-after trial designs) and decision-analysis models were both deemed eligible for inclusion. We extracted the following data from eligible trials.

- Brief trial characteristics:
  - analysis framework: cost-effectiveness analysis (CEA), cost-utility analysis (CUA), or cost-benefit analysis (CBA);
  - type of evaluation (trial- or model-based);
  - analysis perspective (e.g. health system, payer, societal);
  - time horizon (for costs and effects);
  - types of costs included in the evaluation (e.g. health/other/patient and family/productivity);
  - costing details (e.g. country, costing year, costing currency, setting (primary/secondary care)).
- Principal findings:
  - base case incremental cost-effectiveness ratio (and range of sensitivity analyses, if reported);
  - verbatim text on conclusions drawn by the trial authors for the main base case analysis;
  - verbatim text used by trial authors to summarise the uncertainty of the results (e.g. any sensitivity analyses conducted, deterministic or probabilistic).

The findings of the brief economic commentary were incorporated into the Discussion section of the review as a narrative summary of the principal findings of the included economic evaluation trials.

Summary of findings and assessment of the certainty of the evidence

We prepared summary of findings tables, using GRADEPro GDT software. We created the following summary of findings tables (all interventions were in addition to standard care, i.e. emollients and topical corticosteroids).

- Individual educational interventions versus standard care only
- Group educational interventions versus standard care only
- Technology-mediated educational interventions versus standard care only
- Habit reversal versus standard care only
- Arousal reduction therapies versus standard care only

We did not create summary of findings tables for psycholgical therapies versus standard care, self-help psychological interventions versus standard care, or printed educational publications versus standard care because we found no trials that reported quantitative results for these outcomes.

We used the GRADE approach to assess the certainty of evidence for the following primary and secondary outcomes (Schünemann 2022).

- Primary outcomes:
  - reduction in disease severity, as measured by clinical signs;
  - reduction in disease severity, as measured by patient-reported symptoms;
  - improvement in quality-of-life measures (including, where specified, for family and caregivers).
- Secondary outcomes:
  - improvement in long-term control of eczema symptoms;
  - improvement in psychological well-being measures (including, where specified, for family and caregivers) (measured using Kroenke 2001 or Spitzer 2006 assessments).

As eczema is a chronic condition, long-term outcomes are likely to be more important to patients, therefore we prioritised them for the 'Summary of findings' tables. For reduction in disease severity as measured by clinical signs (primary outcome 1), we used EASI alone rather than combining with SCORAD, as the latter also contains a subjective component and is therefore not a comparable outcome.

We used the five GRADE considerations — trial limitations (using the RoB 2 assessments), consistency of effect, imprecision, indirectness, and publication bias — to assess the certainty of the body of evidence for these prespecified outcomes. We resolved any discrepancies in the GRADE process through discussion between OA and RB, with adjudication by a third review author (HS) if necessary.

RESULTS

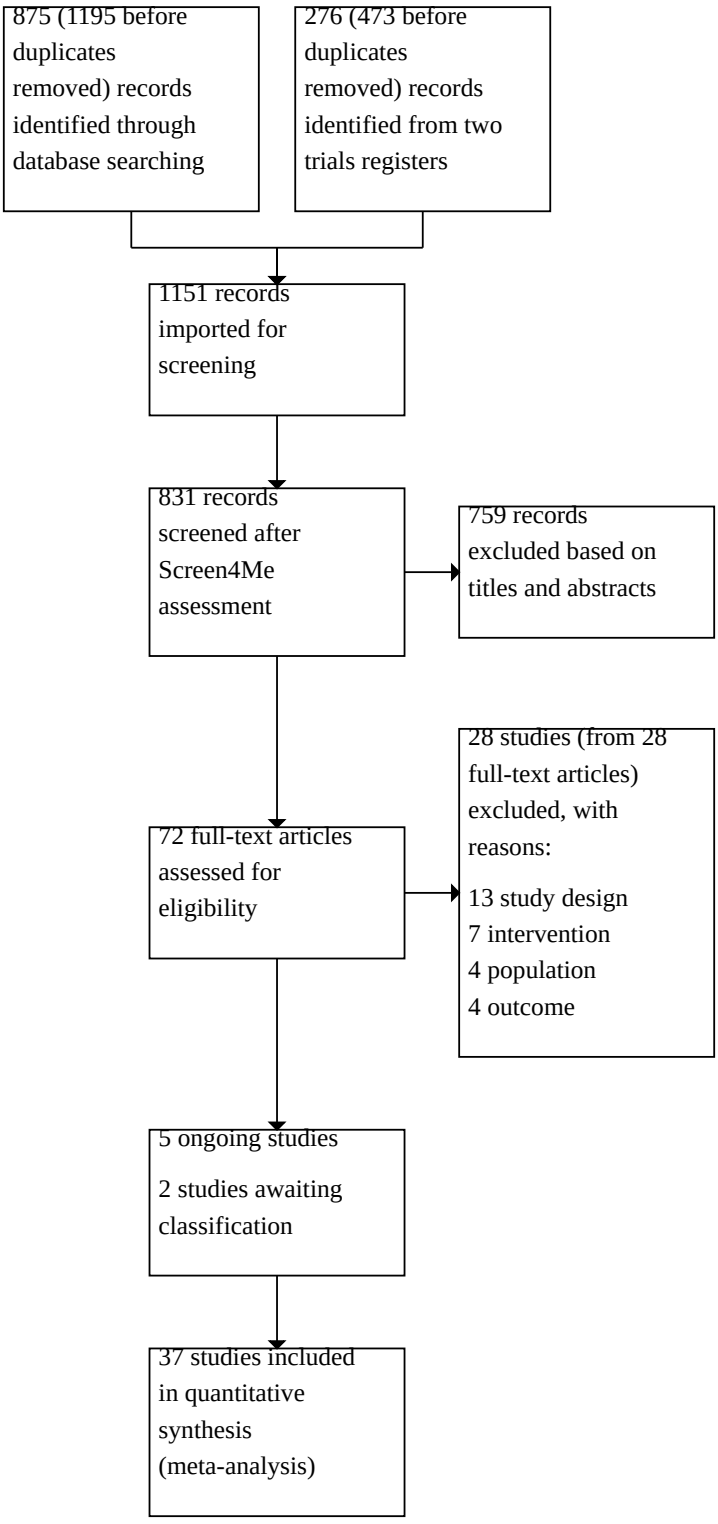
Description of studies

See: Characteristics of included studies; Characteristics of excluded studies; Characteristics of studies awaiting classification; Characteristics of ongoing studies.

Results of the search

The searches of the five databases retrieved 1195 records (see Electronic searches). The Cochrane Skin Information Specialist removed duplicates from this group using EndNote's duplicate identification strategy, and then manually, leaving 875 records. In assessing the trials, we initially used Cochrane's Screen4Me workflow to help identify potential reports of RCTs, 320 records were eliminated at this stage and 831 records went forward for screening after Screen4Me. Our searches of two trials registers retrieved 473 records. After duplicates were removed, we had 276 records. Screening of the reference lists of the included publications did not reveal additional RCTs. We therefore had a total of 831 records to screen. We excluded 759 records based on titles and abstracts. We obtained the full text of the remaining 72 records. We excluded 28 trials (see Characteristics of excluded studies). We identified five ongoing trials (see Characteristics of ongoing studies), and two that are awaiting classification (see Characteristics of studies awaiting classification). We included 37 trials (Characteristics of included studies. We contacted the authors of 12 of the trials to obtain clarification and further data where trial reports were unclear, of which seven did not respond and five replied that they were unable to provide clarity due to the age of their trial. We contacted experts and organisations in the field to obtain further information on unpublished, relevant trials. One expert informed us that their trial had recently been published (Santer 2022). For a further description of our screening process, see the trial flow diagram (Figure 1).

Figure 1. Figure 1. Prisma flow diagram showing identification and screening process



Included studies

Sample size

We included 37 trials with a total of 6170 participants. The sample sizes ranged from 17 participants (Habib 1999; Melin 1986), to 1247 participants (Guerra-Tapia 2007). All included trials were of parallel-group design; the majority (35/37, 95%) randomised individual participants. The two remaining trials (5%) employed cluster randomisation (Rea 2018; Ryu 2015). One trial used a cross-over design (Kimata 2004).

Setting

Most included trials were conducted in high-income countries (34/37, 92%) with around half of these (18 trials) performed in Europe (Broberg 1990; Chinn 2002; Coenraads 2001; Guerra-Tapia 2007; Hedman-Lagerlof 2021; Heratizadeh 2018; Kardorff 2003; Linnet 2001; Melin 1986; Niebel 1999; Noren 2018; Pustisek 2016; Santer 2014; Santer 2022; Schut 2013; Senser 2004; Staab 2002; Staab 2006). Specific European countries included Croatia (Pustisek 2016), Denmark (Linnet 2001), Germany (Heratizadeh 2018; Kardorff 2003; Niebel 1999; Schut 2013; Senser 2004; Staab 2002; Staab 2006), Netherlands (Coenraads 2001), Spain (Guerra-Tapia 2007), Sweden (Broberg 1990; Hedman-Lagerlof 2021; Melin 1986; Noren 2018) and the UK (Chinn 2002; Santer 2014; Santer 2022). The other continental locations for high-income countries included North America (all USA; Armstrong 2011; Brown 2018; Gilliam 2016; LeBovidge 2021; Rea 2018; Shaw 2008; Singer 2018), Oceania (all Australia; Horne 1999; Grillo 2006; Habib 1999; Moore 2009; Morawska 2016), and Asia (Bae 2012; Futamura 2013; Kimata 2004; Ryu 2015). The specific high-income Asian countries included Japan (Futamura 2013; Kimata 2004), and South Korea (Bae 2012; Ryu 2015). The remaining three (8%) trials were performed in upper middle-income countries including China (Liang 2017), and Hong Kong (Fung 2020), in both Asia, and South America (Brazil; Weber 2008). We classified the income level of countries according to the current classification by the World Bank.

Around two-thirds of the included trials (25/37, 68%) were in an outpatient location within a secondary healthcare setting (Armstrong 2011; Bae 2012; Broberg 1990; Brown 2018; Chinn 2002; Coenraads 2001; Horne 1999; Futamura 2013; Gilliam 2016; Guerra-Tapia 2007; Habib 1999; Heratizadeh 2018; Kardorff 2003; Liang 2017; Melin 1986; Moore 2009; Niebel 1999; Noren 2018; Pustisek 2016; Santer 2014; Senser 2004; Shaw 2008; Staab 2002; Staab 2006; Weber 2008). In three of these trials, the information was not explicit but could be inferred from other details provided (Bae 2012; Gilliam 2016; Guerra-Tapia 2007). Three trials described primary care as the healthcare setting (Hedman-Lagerlof 2021; Rea 2018; Santer 2022), whilst a fourth mentioned both primary and secondary care clinics (LeBovidge 2021). Other healthcare settings included inpatient secondary care (Linnet 2001; Singer 2018), a social work context (Fung 2020), school (Ryu 2015), and both schools and healthcare settings (Morawska 2016). Three trials did not specify the healthcare setting but they are most likely to be outpatient settings (Grillo 2006; Kimata 2004; Schut 2013).

Participants

The majority of the included trials (17/37) recruited children or children and adolescents (Brown 2018; Chinn 2002; Futamura 2013; Grillo 2006; Kardorff 2003; Kimata 2004; Liang 2017; Moore 2009; Morawska 2016; Niebel 1999; Noren 2018; Rea 2018; Ryu 2015; Shaw 2008; Staab 2002; Staab 2006; Weber 2008), whilst a further nine (27%) trials enroled solely adults (Armstrong 2011; Coenraads 2001; Habib 1999; Hedman-Lagerlof 2021; Heratizadeh 2018; Linnet 2001; Melin 1986; Schut 2013; Senser 2004). Six trials recruited parents or carers of children with eczema (Fung 2020; Gilliam 2016; LeBovidge 2021; Pustisek 2016; Singer 2018; Santer 2014). Of the remaining trials, one recruited parents and children, delivering the intervention to the parents and measuring outcomes on the children (Broberg 1990). A further three trials recruited mixed populations, one enroling adult parents or carers of children with eczema plus adolescents or young adults (aged 13 to 25 years) who had eczema (Santer 2022), whilst the other two recruited a mix of adults and children (Bae 2012; Guerra-Tapia 2007). One trial did not describe the age category of the participants (Horne 1999).

All trials included both male and female participants, with 27/37 (73%) trials providing absolute numbers or proportions relating to the sex distribution of participants (Armstrong 2011; Bae 2012; Broberg 1990; Brown 2018; Futamura 2013; Gilliam 2016; Grillo 2006; Horne 1999; Habib 1999; Hedman-Lagerlof 2021; Heratizadeh 2018; Kardorff 2003; Kimata 2004; LeBovidge 2021; Liang 2017; Moore 2009; Morawska 2016; Niebel 1999; Noren 2018; Rea 2018; Santer 2014; Santer 2022; Schut 2013; Shaw 2008; Singer 2018; Staab 2006; Weber 2008). One of these reported missing data for two participants (Liang 2017). Amongst the remaining trials, one indicated that they recruited both male and female participants but did not report any numbers (Guerra-Tapia 2007). Nine of 37 trials (24%) did not provide any details of sex (Chinn 2002; Coenraads 2001; Fung 2020; Linnet 2001; Melin 1986; Pustisek 2016; Ryu 2015; Senser 2004; Staab 2002). In terms of ethnicity, we were unable to conduct a subgroup analysis identifying if the intervention effect in the meta-analysis significantly differed by ethnicity.

Where reported, the baseline severity of eczema varied across the 37 included trials. Two (5%) described mild to moderate disease (Linnet 2001; Santer 2014), two (5%) specified moderate eczema (Kardorff 2003; Kimata 2004), and 11 (30%) recruited participants with moderate to severe condition (Bae 2012; Coenraads 2001; Futamura 2013; Hedman-Lagerlof 2021; Heratizadeh 2018; Horne 1999; Liang 2017; Niebel 1999; Pustisek 2016; Staab 2002; Weber 2008). A further six (16%) trials enroled participants with multiple categories of disease severity (e.g. including mild, moderate and severe eczema; Armstrong 2011; Gilliam 2016; Grillo 2006; LeBovidge 2021; Noren 2018; Santer 2022). Two trials (5%) described varying (Broberg 1990), or broad-ranging (Ryu 2015), severity of eczema, and a further two (5%) did not report disease severity as the randomised participants did not have eczema, being physicians (Brown 2018), or parents (Fung 2020). Finally, nearly one-third of included trials (12/37, 32%) failed to provide clear (or any) information about baseline severity of eczema (Chinn 2002; Guerra-Tapia 2007; Habib 1999; Melin 1986; Moore 2009; Morawska 2016; Rea 2018; Schut 2013; Senser 2004; Shaw 2008; Singer 2018; Staab 2006).

Interventions and comparisons

A range of healthcare practitioners delivered the interventions, including dermatologists (n = 14), psychologists (n = 12), multidisciplinary teams (n = 7), nurse practitioners (n = 2) and a mix of nurses and dermatologists (n = 1).

Educational interventions

More than two-thirds of the included trials (26/37, 70%) evaluated at least one educational intervention (Armstrong 2011; Broberg 1990; Brown 2018; Chinn 2002; Coenraads 2001; Futamura 2013; Gilliam 2016; Grillo 2006; Guerra-Tapia 2007; Heratizadeh 2018; Kardorff 2003; LeBovidge 2021; Liang 2017; Moore 2009; Morawska 2016; Niebel 1999; Noren 2018; Pustisek 2016; Rea 2018; Ryu 2015; Santer 2014; Shaw 2008; Singer 2018; Staab 2002; Staab 2006; Weber 2008). One trial compared two educational interventions (Armstrong 2011), two were three-arm trials comparing two educational interventions and a usual-care control group (Niebel 1999; Santer 2014), and one comprised six arms comparing three educational interventions, each with a corresponding usual-care (no education) control group (Staab 2006). The remaining trials (22/26, 85%) were two-arm trials comparing an educational intervention with a usual-care group as the control (Broberg 1990; Brown 2018; Chinn 2002; Coenraads 2001; Futamura 2013; Gilliam 2016; Grillo 2006; Guerra-Tapia 2007; Heratizadeh 2018; Kardorff 2003; LeBovidge 2021; Liang 2017; Moore 2009; Morawska 2016; Noren 2018; Pustisek 2016; Rea 2018; Ryu 2015; Shaw 2008; Singer 2018; Staab 2002; Weber 2008).

Where reported, concomitant interventions included topical applications (e.g. emollients, corticosteroid ointments; Broberg 1990; Brown 2018; Kardorff 2003; Noren 2018; Pustisek 2016), or were described as "standard AD [atopic dermatitis] management" (LeBovidge 2021), or provision of prescriptions as required (Moore 2009). The duration of the interventions ranged from a single educational session (Broberg 1990; Chinn 2002; Grillo 2006), to 10 sessions (Niebel 1999), and 12 months (Santer 2014). The duration of follow-up varied considerably, and ranged between one and 12 months. The length of the session ranged from 10 minutes to six hours. The treatment comparisons are summarised below.

- Seven trials assessed technology-mediated educational interventions including:
  - education via a video compared with printed materials (Armstrong 2011);
  - video versus face-to-face group sessions versus usual care (dermatological advice only; Niebel 1999);
  - face-to-face group versus waiting control group (Heratizadeh 2018);
  - internet resources combined with healthcare professional support compared with internet resources alone and usual care (unspecified; Santer 2014);
  - daily text messages versus usual care (Singer 2018); and
  - a mix of online and face-to-face educational sessions in relation to an eczema care plan versus usual care without the eczema care plan (Brown 2018).
  - Eczema Care Online focused on self-management in relation to use of emollients and corticosteroids, avoidance of irritants and triggers, minimisation of scratching and emotional management in addition to usual care and compared with usual care alone (Santer 2022). Usual care was described as recommendation of a standard informational website and continuation with usual medical advice and prescriptions. The intended duration of the intervention was not clear; the longest follow-up was one year.
- In addition to Armstrong 2011 (mentioned above) four other trials assessed printed educational materials (Coenraads 2001), comprising a caregiver handbook (LeBovidge 2021), and eczema care plans (Gilliam 2016; Rea 2018), with all comparators being usual care.
- Eighteen trials evaluated face-to-face educational approaches versus usual care including single educational sessions (Broberg 1990; Chinn 2002; Grillo 2006; Moore 2009; Pustisek 2016), and longer programmes scheduled over several days (Futamura 2013; Heratizadeh 2018; Morawska 2016), or weeks (Coenraads 2001; Guerra-Tapia 2007; Kardorff 2003; Liang 2017; Niebel 1999; Ryu 2015; Shaw 2008; Staab 2002; Staab 2006; Weber 2008).

Psychological interventions

Nine of the 37 included trials (24%) assessed psychological interventions (Bae 2012; Fung 2020; Habib 1999; Hedman-Lagerlof 2021; Kimata 2004; Linnet 2001; Melin 1986; Schut 2013; Senser 2004). All were two-arm trials and most comparators involved usual care, the exceptions being provision of educational information in printed (Hedman-Lagerlof 2021), and video (Kimata 2004), formats. The reporting of concomitant interventions was scant overall but where provided, the details referred to topical applications and oral antihistamines (Bae 2012; Kimata 2004; Melin 1986). The duration of the intervention ranged from a single group session (Habib 1999), or video viewing (Kimata 2004), to 15.5 individual sessions (average) over six months (Linnet 2001). The duration of follow-up ranged from one to 12 months. Details of the treatment comparisons were as follows.

1. Three trials evaluated psychological interventions in different formats (Fung 2020; Habib 1999; Hedman-Lagerlof 2021). Two were based on face-to-face group sessions delivered over six weeks compared with waiting list control (Fung 2020; Habib 1999). The third trial assessed an internet-based cognitive behavioural intervention delivered over 12 weeks compared with written educational information (Hedman-Lagerlof 2021).
2. Two trials assessed approaches to manage behavioural arousal, one using a combination of face-to-face sessions and video/audio resources versus "conventional treatment" (not specified further; Bae 2012), and the other a humorous film compared with a non-emotional information video (Kimata 2004).
3. One trial assessed an intervention designed to address habit-breaking (two face-to-face sessions) combined with application of corticosteroid ointment compared with corticosteroid ointment alone (Melin 1986).
4. One trial assessed a series of brief dynamic psychotherapy sessions (average 15.5 sessions) over six months versus usual care (unspecified; Linnet 2001).
5. One trial assessed face-to-face group-based cognitive behavioural stress management therapy with unspecified session frequency or length compared with usual care (no further details of the latter provided; Schut 2013).
6. One trial assessed face-to-face individual hypnotherapy sessions (focusing on relaxation and symptom management) provided over three months compared with usual care (unspecified; Senser 2004).
7. One trial assessed a single face-to-face group relaxation session involving progression to imagery, after which participants were given a recording to take home. The control group received the relaxation tape without the imagery component (Horne 1999).

Concomitant interventions and the duration of follow-up were not clear.

Outcomes

Primary outcomes

1. Reduction in disease severity, as measured by clinical signs was reported in 22 trials (Bae 2012; Broberg 1990; Horne 1999; Futamura 2013; Grillo 2006; Habib 1999; Hedman-Lagerlof 2021; Heratizadeh 2018; Kardorff 2003; Liang 2017; Melin 1986; Moore 2009; Niebel 1999; Noren 2018; Pustisek 2016; Ryu 2015; Schut 2013; Senser 2004; Shaw 2008; Singer 2018; Staab 2002; Staab 2006).
2. Reduction in disease severity, as measured by patient-reported symptoms was reported in 10 trials (Armstrong 2011; Broberg 1990; Horne 1999; Hedman-Lagerlof 2021; Heratizadeh 2018; Pustisek 2016; Ryu 2015; Santer 2014; Santer 2022; Senser 2004).
3. Improvement in health-related quality-of-life measures was reported in 22 trials (Brown 2018; Chinn 2002; Horne 1999; Fung 2020; Futamura 2013; Gilliam 2016; Grillo 2006; Hedman-Lagerlof 2021; Heratizadeh 2018; LeBovidge 2021; Liang 2017; Niebel 1999; Noren 2018; Pustisek 2016; Rea 2018; Ryu 2015; Santer 2014; Santer 2022; Senser 2004; Shaw 2008; Staab 2006; Weber 2008).

Secondary outcomes

1. Improvement in psychological well-being measures was reported in 15 trials (Coenraads 2001; Horne 1999; Fung 2020; Guerra-Tapia 2007; Habib 1999; Hedman-Lagerlof 2021; Heratizadeh 2018; Kimata 2004; Linnet 2001; Niebel 1999; Pustisek 2016; Ryu 2015; Schut 2013; Senser 2004; Staab 2006).
2. Improvement in concordance with standard treatment was reported in nine trials (Coenraads 2001; Futamura 2013; Melin 1986; Moore 2009; Morawska 2016; Pustisek 2016; Ryu 2015; Santer 2022; Staab 2002).
3. Improvment in long-term control of eczema symptoms was reported in one trial (Santer 2022).
4. Adverse events: none of the included trials reported on adverse events.

Excluded studies

We excluded 28 trials with reasons given in the Characteristics of excluded studies.

We excluded 13 based on trial design, seven based on intervention, four in relation to population, and four due to outcomes not measured.

Ongoing trials

We identified five ongoing trials.

Trials awaiting classification

Two trials are awaiting classification.

Risk of bias in included studies

We assessed each trial with regard to the criteria defined within the Cochrane risk of bias tool (RoB 2). See Risk of bias table for Analysis 1.1; Risk of bias table for Analysis 2.2; Risk of bias table for Analysis 2.1; Risk of bias table for Analysis 2.3; Risk of bias table for Analysis 2.5; Risk of bias table for Analysis 2.6; Risk of bias table for Analysis 2.7; Risk of bias table for Analysis 3.1; Risk of bias table for Analysis 3.2; Risk of bias table for Analysis 3.4; Risk of bias table for Analysis 3.3; Risk of bias table for Analysis 4.1; Risk of bias table for Analysis 4.2; Risk of bias table for Analysis 5.1; Risk of bias table for Analysis 5.2; Risk of bias table for Analysis 6.2; Risk of bias table for Analysis 6.1; Risk of bias table for Analysis 7.1; Risk of bias table for Analysis 7.2.

In summary, we assessed 34 of the 37 included trials as being at high risk of bias (15 trials) or some concerns (19 trials) for at least one domain. We assessed only three trials as low risk across all risk of bias domains (Futamura 2013; Hedman-Lagerlof 2021; Santer 2022), and no trials as high risk across all domains. The domain with the most trials at high risk of bias was 'Bias in measurement of the outcome' (7 trials). Four trials were at high risk of bias for 'Bias due to missing outcome data'; and four trials for 'Bias in selection of the reported result'. We assessed three trials as high risk of bias for 'Bias arising from the randomisation process'. Only one trial was at high risk of bias for 'Bias due to deviations from the intended interventions'.

Please see RoB 2 data files: https://doi.org/10.18746/bmth.data.00000357.

Effects of interventions

See: **Summary of findings 1** Summary of findings table - Individual educational interventions compared to standard care for people with eczema; **Summary of findings 2** Summary of findings table - Group educational interventions compared to standard care for people with eczema; **Summary of findings 3** Summary of findings table - Technology mediated educational interventions compared to standard care for people with eczema; **Summary of findings 4** Summary of findings table - Habit reversal compared to standard care for people with eczema; **Summary of findings 5** Summary of findings table - Arousal reduction therapies compared to standard care for people with eczema

We report the results of the following interventions below, all compared with standard care:

1. Individual education
2. Group education
3. Technology-mediated education
4. Habit reversal therapy
5. Arousal reduction therapy
6. Self-help psychological interventions
7. Psychological therapies
8. Printed educational interventions

1. Individual education versus standard care

One trial with a total of 30 participants evaluated individual educational interventions (Kardorff 2003). The overall summary of evidence can be seen in Summary of findings 1.

Primary outcomes

Reduction in disease severity assessed by clinical signs

In relation to disease severity as measured by clinical signs (SCORAD) compared to standard care, individual education may reduce short-term disease severity (MD −5.70, 95% CI −9.39 to −2.01;

P < 0.001; 1 trial, 30 participants; low-certainty evidence; Analysis 1.1).

Reduction in disease severity assessed by patient-reported symptoms

We did not identify any trials that reported quantitative data for change in disease severity assessed by participant-reported symptoms.

Improvement in health-related quality of life

We did not identify any trials that reported quantitative data for changes in HRQoL.

Secondary outcomes

Improvement in long-term control of eczema symptoms

We did not identify any trials that reported quantitative data for change in long-term control of eczema symptoms.

Improvement in psychological well-being

We did not identify any trials that reported quantitative data for change in measures of psychological well-being.

Improvement in concordance with standard treatment

We did not identify any trials that reported quantitative data for change in concordance with standard treatment.

Adverse effects

We did not identify any trials that reported quantitative data for adverse effects.

2. Group education versus standard care

Nine trials, including a total of 2426 participants compared group-based educational interventions with standard care (Futamura 2013; Grillo 2006; Heratizadeh 2018; Liang 2017; Morawska 2016; Pustisek 2016; Ryu 2015; Staab 2006; Weber 2008). Eight trials focused on treating eczema in infants, children or adolescents with the educational interventions delivered to the children (depending on their age), their parents or carers, or both children and parents or carers (Futamura 2013; Grillo 2006; Liang 2017; Morawska 2016; Pustisek 2016; Ryu 2015; Staab 2006; Weber 2008). The ninth trial recruited adults with eczema aged 18 to 65 years (Heratizadeh 2018). The overall summary of data is presented in Summary of findings 2.

Primary outcomes

Reduction in disease severity assessed by clinical signs

Five trials reported changes in disease severity assessed by clinical signs using the SCORAD tool (Futamura 2013; Grillo 2006; Liang 2017; Pustisek 2016; Staab 2006). All five trials focused on eczema in infants, children or adolescents. The estimate from pooling three trials suggested that group education interventions probably reduce disease severity as measured by clinical signs in the the long term (MD −7.22, 95% CI −11.01 to −3.43; 3 trials, 1424 participants; moderate-certainty evidence Analysis 2.1; Futamura 2013; Liang 2017; Staab 2006). The estimate from a sensitivity analysis in Analysis 2.1 suggested consistency with the main meta-analysis when removing the trial with overall high risk of bias (MD −8.63, 95% CI −12.68 to −4.59). One trial, included in both of the above meta-analyses, reported outcomes stratified per age group, which suggested consistency with the overall pooled estimates for participants aged three months to seven years (MD −4.70, 95% CI −7.56 to −1.84), eight to 12 years (MD −6.80, 95% CI −11.74 to −1.86) and 13 to 18 years (MD −11.80, 95% CI −16.94 to −6.66; Staab 2006).

In terms of short-term reduction in disease severity as measured by clinical signs, the pooled estimate from a different group of three trials suggested consistency with the long-term effect (MD −9.66; 95% CI −19.04 to −0.29; P = 0.04; I^2 = 88%; 3 trials; 731 participants; Analysis 2.2; Grillo 2006; Liang 2017; Pustisek 2016).

Reduction in disease severity assessed by patient-reported symptoms

Two trials reported changes in disease severity assessed by patient-reported symptoms (Morawska 2016; Staab 2006). Morawska 2016 used the POEM tool, whilst Staab 2006 used a Skin Detective parent-reported, subjective assessment. Both trials focused on eczema in infants, children or adolescents. The estimate from pooling these trials suggested that group education interventions probably result in a reduction in long-term disease severity as measured by patient-reported symptoms when compared with standard care (SMD −0.47 95% CI −0.60 to −0.33; P < 0.00001, I^2 = 2%; 2 trials, 908 participants; moderate-certainty evidence; Analysis 2.3). One trial included in the above meta-analyses reported outcomes stratified per age group, which suggested consistency with the overall pooled estimates for participants aged three months to seven years (MD −1.30, 95% CI −1.91 to −0.69), eight to 12 years (MD −2.10, 95% CI −3.09 to −1.11) and 13 to 18 years (MD −2.30, 95% CI −3.65 to −0.95; Staab 2006).

Improvement in health-related quality of life

Four trials reported changes in HRQoL using the Dermatology Life Quality Index (DLQI; Liang 2017; Pustisek 2016; Ryu 2015) and the Dermatitis Family Impact (DFI; Grillo 2006). The overall age range across the trials was from neonates to 16 years, and all trials additionally recruited the parents of participants. The estimate from pooling all four trials suggested that, compared with standard care, group education may slightly improve short-term quality of life (SMD −0.19, 95% CI −0.36 to −0.01; P = 0.03, I^2 = 21%; 4 trials, 746 participants; low-certainty evidence; Analysis 2.4; Grillo 2006; Liang 2017; Pustisek 2016; Ryu 2015). When converted to mean difference, the estimate suggested no difference between treatment groups (MD −0.83, 95% CI −1.72 to 0.05; P = 0.07, I^2 = 30%; 4 trials, 746 participants; low-certainty evidence; Analysis 2.4). Running a sensitivity analysis by removing Ryu 2015, the trial at highest risk of bias, suggested a negligible effect on the estimate from pooling all four trials. Subgroup analyses according to scores derived from different versions of the DLQI did not suggest between-group differences in HRQoL for the family version (FDLQI; MD −1.87, 95% CI −4.17 to 0.42; P = 0.11, I^2 = 44%; 2 trials, 189 participants; Analysis 2.5), the infant's version (IDLQI; MD 0.02, 95% CI −2.26 to 2.31; P = 0.98, I^2 = 66%; 2 trials, 367 participants; Analysis 2.5) or the children's version (CDLQI; MD −1.64, 95% CI −4.89 to 1.62; P = 0.32, I^2 = 84%; 3 trials, 251 participants; Analysis 2.5). Running a sensitivity analysis for the CDLQI meta-analysis by removing Ryu 2015, the trial at highest risk of bias, suggested a negligible effect on the estimate from pooling all three trials.

Secondary outcomes

Improvement in long-term control of eczema symptoms

We did not identify any trials that reported quantitative data for the change in long-term control of eczema symptoms.

Improvement in psychological well-being

One trial assessed psychological well-being in the short term, reporting measures from the Perceived Stress Scale (PSS) and State Anxiety with questionnaires completed by parents of children with exczema aged three months to seven years (Pustisek 2016). The estimates suggested that compared with standard care, group-based education may make little or no difference to perceived stress (MD −2.47, 95% CI −5.16 to 0.22; P = 0.07; 1 trial, 128 participants; low-certainty evidence; Analysis 2.6), however, a possible reduction in anxiety for group education when compared with standard care was observed (MD −3.91, 95% CI −7.63 to −0.19; P = 0.04; 1 trial, 128 participants; Analysis 2.6).

Improvement in concordance with standard treatment

One trial reported on concordance with standard treatment in parents of children aged two to 10 years with the outcome assessed using the Parents' Self-Efficacy With Eczema Care Index (Morawska 2016). The results suggested that, compared with standard care, group-based education interventions probably have little or no effect on concordance with standard treatment (MD 1.04, 95% CI −1.04 to 3.12; P = 0.33; 1 trial, 59 participants Analysis 2.7).

Adverse effects

We did not identify any trials that reported quantitative data for adverse effects.

3. Technology-mediated educational interventions versus standard care

Five trials, including a total of 661 participants, compared technology-mediated education interventions with standard care (Hedman-Lagerlof 2021; Kimata 2004; Niebel 1999; Santer 2014; Santer 2022). The combination of recruitment focus and intervention delivery was different for each trial and included the following:

- recruitment of, and delivery of the intervention (therapist-guided, internet-delivered cognitive behavioural therapy (CBT) to adult participants with eczema (Hedman-Lagerlof 2021);
- recruitment of, and delivery of the intervention (a video) to participants aged 13 to 15 years (Kimata 2004);
- recruitment of children with eczema and delivery of the intervention (an educational video) to their parents (Niebel 1999);
- delivery of the intervention (web-based) to parents or carers of children aged five years or younger who had eczema (Santer 2014); and
- delivery of the intervention (behavioural, accessed online) to parents or carers of children aged up to 12 years or direct to young people aged 13 to 25 years with eczema (Santer 2022).

The overall summary of data is presented in Summary of findings 3.

Primary outcomes

Reduction in disease severity assessed by clinical signs

One trial reported changes in disease severity assessed by clinical signs using the SCORAD tool (Niebel 1999). Due to very low-certainty evidence, it is not feasible to comment on the effect of technology-mediated interventions (an educational video) on short-term disease severity as measured by clinical signs (SCORAD), when compared with standard care (MD 4.58, 95% CI −11.51 to 20.67; P = 0.58; 1 trial, 29 participants; very low-certainty evidence; Analysis 3.1).

Reduction in disease severity assessed by patient-reported symptoms

Three trials reported changes in disease severity assessed by patient-reported symptoms using the POEM tool (Hedman-Lagerlof 2021; Santer 2014; Santer 2022). The estimate from pooling two trials that assessed web-based interventions suggested that, compared with standard care, technology-mediated education interventions have little or no effect on short-term disease severity (MD −0.76, 95% CI −1.84 to 0.33, P = 0.17, I^2 = 13%; 2 trials, 195 participants; low-certainty evidence; Analysis 3.2; Hedman-Lagerlof 2021; Santer 2014). Although the observed statistical heterogeneity was low, clinical heterogeneity in relation to participants and interventions should be noted, with one trial assessing the treatment of adults with therapist-guided, internet-delivered CBT (Hedman-Lagerlof 2021), and the other evaluating a web-based intervention delivered to parents or carers of children aged five years or younger (Santer 2014). One of the above trials (Santer 2014), included a third arm whereby participants received the same web-based intervention as before, combined with healthcare professional support. When we repeated the meta-analysis comparing this arm against standard care, the result was consistent with the previous pooled estimate (MD 1.6, 95% CI −1.08 to 4.28; Analysis 3.2). The third trial presented data on long-term changes in disease severity according to two age subgroups (Santer 2022). Whilst no between-group difference was suggested amongst children aged up to 12 years (MD −1.10, 95% CI −2.51 to 0.31; P = 0.13; 1 trial, 340 participants Analysis 3.2), a reduction in disease severity was observed in those aged from 13 to 25 years who received the intervention (MD −2.00, 95% CI −3.43 to −0.57; P = 0.006; 1 trial, 337 participants; Analysis 3.2).

Improvement in health-related quality of life

Three trials reported changes in HRQoL (Hedman-Lagerlof 2021; Santer 2014; Santer 2022). The estimate from meta-analysis of two trials suggested no between-group difference when web-based technology-mediated educational interventions were compared with standard care. That is, the intervention probably has no effect on short-term HRQoL (MD 0.0, 95% CI −0.03 to 0.03; P = 0.99, I^2 = 0; 2 trials, 430 participants; moderate-certainty evidence; Analysis 3.3; Santer 2014; Santer 2022). Of note, the two trials recruited participants with eczema of different age groups, up to 25 years (Santer 2014; Santer 2022). Santer 2022 presented data according to two age subgroups and did not detect between-group differences amongst children aged up to 12 years (MD 0.01, 95% CI −0.01 to 0.03; P = 0.41; 1 trial, 248 participants; Analysis 3.3), nor for participants aged from 13 to 25 years (MD 0.02, 95% CI −0.00 to 0.04; P = 0.10; 1 trial, 238 participants; Analysis 3.3). However, results from Hedman-Lagerlof 2021 suggested that in adults with eczema, therapist-guided, internet-delivered CBT improved HRQoL compared with standard care when the outcome was assessed using DLQI (MD −4.2, 95% CI −6.46 to −1.94; P = 0.0003; 1 trial, 102 participants; high-certainty evidence; Analysis 3.3).

Secondary outcomes

Improvement in long-term control of eczema symptoms

One trial reported this outcome assessed by the RECAP tool and provided data for two subgroups according to participant age (up to 12 years and 13 to 25 years) at 24 and 52 weeks (Santer

2022). All estimates suggest that, compared with standard care, technology-mediated educational interventions probably slightly improve long-term control of eczema symptoms. The estimate at 24 weeks for ages up to 12 years was MD −0.70 (95% CI −2.28 to 0.88; 237 participants) and for 13 to 25 years it was MD −1.20 (95% CI −2.75 to 0.35; 242 participants; Analysis 3.4). Estimates for 52 weeks were: up to 12 years MD −0.80 (95% CI −2.45 to 0.85; 236 participants); and 13 to 25 years MD −1.50 (95% CI −3.13 to 0.13; 232 participants; Analysis 3.4).

Improvement in psychological well-being

One trial reported that a technology-mediated intervention (a humorous video) may improve short term psychological well-being compared with a non-humoros video (MD −1.78, 95% CI −2.13 to −1.43; P < 0.00001; 1 trial, 24 participants; low-certainty evidence; Analysis 3.5; Kimata 2004). However, the trial has bias arising from the randomisation process and had a low number of participants (24 participants).

Improvement in concordance with standard treatment

We did not identify any trials that reported quantitative data for change in concordance with standard treatment.

Adverse effects

We did not identify any trials that reported quantitative data for adverse effects.

4. Habit reversal therapy versus standard care

We identified one trial with 33 participants that compared habit reversal therapy with standard care (Noren 2018). The overall evidence is presented in Summary of findings 4.

Primary outcomes

Reduction in disease severity assessed by clinical signs

Compared with standard care, habit reversal treatment may reduce short term disease severity as measured by clinical signs using SCORAD (MD −6.57, 95% CI −13.04 to −0.10; P = 0.05; 1 trial, 33 participants; low-certainty evidence; Analysis 4.1).

Reduction in disease severity assessed by patient-reported symptoms

We did not identify any trials that reported quantitative data for change in disease severity assessed by patient-reported symptoms.

Improvement in health-related quality of life

Compared with standard care, habit reversal treatment may have little or no effect on short-term HRQoL assessed using CDLQI (MD −0.41, 95% CI −2.15 to 1.33; P = 0.64; 1 trial, 30 participants; very low-certainty evidence; Analysis 4.2).

Secondary outcomes

Improvement in long-term control of eczema symptoms

We did not identify any trials that reported quantitative data for change in long-term control of eczema symptoms.

Improvement in psychological well-being

We did not identify any trials that reported quantitative data for change in measures of psychological well-being.

Improvement in concordance with standard treatment

We did not identify any trials that reported quantitative data for change in concordance with standard treatment.

Adverse effects

We did not identify any trials that reported quantitative data for adverse effects.

5. Arousal reduction therapy versus standard care

We identified three trials that assessed arousal reduction therapy versus standard care (Bae 2012; Horne 1999; Fung 2020). The overall summary of evidence is shown in Summary of findings 5.

Primary outcomes

Reduction in disease severity assessed by clinical signs

Results for disease severity as measured by clinical signs came from 24 participants in one trial (Bae 2012). Compared to standard care, we were uncertain whether arousal reduction therapies could reduce short-term disease severity as measured by clinical signs using Eczema Area and Severity Index (EASI; MD 0.20, 95% CI −3.70 to 4.10; P = 0.92; very low-certainty evidence; Analysis 5.1).

Reduction in disease severity assessed by patient-reported symptoms

Results for disease severity as measured by patient-reported symptoms were from 18 participants in one trial (Horne 1999). Compared to standard care, there was insufficient evidence to decide whether arousal reduction therapies could reduce short-term disease severity as measured by patient reported symptoms using visual analogue scale (VAS; MD −11.10, 95% CI −27.47 to 5.27; P = 0.18; very low-certainty evidence; Analysis 6.2).

Improvement in health-related quality of life

One trial assessed changes in HRQoL using the DFI tool (Fung 2020). Compared with standard care, the arousal reduction intervention may have little or no effect on short-term HRQoL (MD −2.10, 95% CI −4.41 to 0.21; P = 0.07; 1 trial, 91 participants; low-certainty evidence; Analysis 7.1).

Secondary outcomes

Improvement in long-term control of eczema symptoms

We did not identify any trials that reported quantitative data for change in long-term control of eczema symptoms.

Improvement in psychological well-being

One trial assessed short-term change in psychological well-being using the PSS, carer depression (Patient Health Questionnaire (PHQ-9)) and carer anxiety (Generalised Anxiety Disorder scale (GAD7); Fung 2020). Compared with standard care, the arousal reduction intervention may have little or no effect on PSS (MD −1.2, 95% CI −3.38 to 0.98; low-certainty evidence). This result was consistent with improvement in psychological well-being measures - carer-depression (PHQ-9; MD −1.00, 95% CI −3.09 to 1.09), and improvement in psychological well-being measures - carer anxiety (GAD7; MD −1.10, 95% CI −3.19 to 0.99; Analysis 7.2).

Improvement in concordance with standard treatment

We did not identify any trials that reported quantitative data for change in concordance with standard treatment.

Adverse effects

We did not identify any trials that reported quantitative data for adverse effects.

6. Self-help interventions

We did not identify any trials that reported quantitative data for self-help interventions.

7. Psychological therapies

We did not identify any trials that reported quantitative data for psychological therapy interventions.

8. Printed educational interventions

We did not identify any trials that reported quantitative data for printed educational interventions.

Brief economic commentary

The search for cost-effectiveness trials retrieved 207 references, with 195 records excluded based on title and abstract. We assessed 12 reports for eligibility, and excluded 10. We included two trials in the economic commentary.

- Mason 2013 conducted a cost-minimisation analysis (CMA) alongside a before and after trial, comparing a 12-week, multi-faceted, technology-mediated educational support programme to promote and support the correct use of emollient therapy compared to standard care prior to intervention delivery amongst children aged three months to six years with mild to moderate atopic eczema. The trial of 132 participants found that the additional intervention delivery costs and additional emollient use costs were offset by reductions in general practitioner (GP) visits. The total UK National Health Service (NHS) costs (2011, GBP) were: mean GBP 4.37 (95% CI GBP −10.55 to GBP 19.30). Whilst the non-randomised trial design may lead to the potential for bias, and whilst the time horizon was short (12 weeks may not be sufficient to capture all relevant costs and benefits, particularly in terms of primary care resource use), the trial nonetheless shows the potential that the intervention may be cost-neutral, at least in the short term.
- Schuttelaar 2011 conducted cost minimisation and cost-effectiveness (cost per unit change in Infant Dermatitis Quality of Life Questionnaire (IDQoL), CDLQI and client satisfaction questionnaire (CSQ-8) measures) alongside a RCT in the Netherlands, that compared a nurse practitioner group education intervention with standard care provided by a dermatologist for patients aged 16 and under with a diagnosis of atopic dermatitis. The nurse practitioner intervention was based on social cognitive theory to promote self-management and self-efficacy, focusing on education on eczema, the role of allergies, coping with itch and dry skin, and practical advice and instruction on how to use emollients. The intervention consisted of individual visits and group education sessions with parents, and a written action plan was developed. Further contact was dependent on eczema severity, and parents had the opportunity for daily contact as necessary for feedback, support and tips. Standard care consisted of two treatment visits with the dermatologist and a five-minute telephone call for laboratory results. Intensity of follow-up contact was dependent on eczema severity, but participants who were receiving standard care received no routinely provided educational intervention. Mean societal costs (2008, EUR) for the nurse practitioner intervention versus standard dermatologist care, over a one-year time horizon were EUR −428 (95% CI EUR −910 to EUR 197), with additional intervention delivery costs offset by reductions in hospital healthcare costs and the opportunity costs of family time. There were no differences in outcomes, meaning that interpretation of theincremental cost-effectiveness ratios for cost-effectiveness analysis was difficult, and the authors focused their conclusions on costs, rather than cost-effectiveness. Incremental cost results were consistent across different levels of eczema severity. The economic evaluations showed that the costs of care provided by the nurse practitioners were lower than care provided by the dermatologists, with comparable effectiveness.

In summary, there are only two analyses of the cost-effectiveness of educational and psychological interventions for dermatitis, making it difficult to draw any strong conclusions from the evidence base. Based on the limited evidence available, there is a suggestion that additional intervention costs may be, at least partially, offset by reductions in healthcare consultations. The magnitude of cost savings that could be achieved is unclear, and dependent on context and the healthcare system. There is a need for future economic evaluations, conducted alongside clinical trials of these interventions. Economic evaluations should be conducted over a sufficient time horizon to capture all the longer-term costs and benefits of treatment. Even if the magnitude of clinical benefit observed in a trial is small, it is still important to consider the totality of the cost and effectiveness evidence base. For example, if interventions can improve confidence to self-manage dermatitis, then there may be cost-savings associated with the need to see healthcare professionals. Such an intervention may be valuable in that it could free up scarce healthcare resources, or free up family and patient time.

DISCUSSION

Eczema is a common, chronic inflammatory skin condition with various treatment options available. Therapeutic options for eczema include educational and psychological interventions. We aimed to give a complete summary of the evidence on clinical effectiveness and brief economic commentary on the different types of educational and psychological approaches for eczema, to detect the gaps in evidence, and to determine the future research agenda.

We included a total of 37 trials and 6170 participants in this review. These covered a wide range of clinically plausible strategies for using educational and psychological interventions for managing eczema, which fall into seven broad categories: direct person-mediated education, technology-mediated education, printed educational interventions, habit reversal treatment, arousal reduction approaches, self-help psychological interventions, and psychological therapies.

Summary of main results

In this section we summarise the results, drawing upon the summary of findings tables, related to our first objective, to assess the clinical outcomes of educational and psychological interventions in children and adults.

The sample sizes of the 37 included RCTs ranged from 17 participants (Habib 1999; Melin 1986) to 1247 participants (Guerra-Tapia 2007). All included RCTs were of parallel-group design, with the majority (34/37, 92%) randomising individual participants. The remaining three RCTs (8%) employed cluster randomisation, where the unit of randomisation was the cluster, but the unit of analysis was the child/parent/dyad (Kimata 2004; Rea 2018; Ryu 2015).

Almost half of the included RCTs (17/37, 46%) recruited children, or children and adolescents, whilst a further 10 (27%) trials enroled solely adults. Six RCTs recruited parents or carers of children with eczema. Of the remaining RCTs, one recruited parents and children, delivering the intervention to the parents and measuring outcomes on the children. A further three RCTs recruited mixed populations, one enroling adult parents or carers of children with eczema plus adolescents and young adults (aged 13 to 25 years) who had eczema, whilst the other two recruited a mix of adults and children.

The included RCTs covered a wide range of intervention strategies intended to alleviate eczema as an adjunct to conventional dermatological treatment, which fall into two main categories, educational interventions and psychological interventions. Both intervention categories include different types (variants) of modality; and variable duration of these adjunct interventions. In the following sections, we summarise the results of educational interventions overall and then break this down by modality (three interventional variants) for the key clinical outcomes and then, similarly, for psychological interventions by modality, specifying the level of certainty for the overall outcome appraisal and those by modality. We also summarise the information on the frequency and duration of interventions.

Overall effectiveness of the different educational intervention modalities

See: Summary of findings 1; Summary of findings 2; Summary of findings 3; Included studies; Effects of interventions

Direct, person-mediated educational interventions

The direct person-mediated educational interventions included individual and group educational strategies and were mainly workshop, or lecture-based. Other approaches included interdisciplinary team programmes, school-based education programmes, parental education programmes and educational activities aimed at children. A few of the trials included a mix of individual and group education. The interventions were mainly delivered by dermatologists, followed by multidisciplinary teams. Only three trials were nurse-practitioner led. We graded the clinical impact of individual education on clinically determined disease severity as low certainty for individual education and moderate certainty for group education modalities.

Individual education compared to standard care may reduce short-term disease severity as determined by clinical signs. However, the MCID in mean difference in SCORAD (8.7 points) for individual education was not reached (MD −5.70, 95% CI −9.39 to −2.01 (Schram 2012)). We found no individual education trials that measured quantitatively the reduction in disease severity, as measured by patient-reported symptoms (POEM), improvement in quality of life, long-term control of eczema symptoms, improvement in psychological measures, and improvement in concordance with standard treatment or adverse effects.

Educational interventions delivered to groups (across all age groups), compared to standard care, probably reduce disease severity as determined by both clinical signs in the long term and the short term and result in a reduction in participant-reported symptoms in the long term. However, the MCID in mean difference in SCORAD (8.7 points) for group education was not reached (MD −7,22, 95% CI −11.01 to −4.43 (Schram 2012)). For patient-reported signs as a result of group education, at its highest reports, SMD was −0.47 (95% CI −0.60 to −0.33), which does not reach the MCID of 3.4 points for POEM (Schram 2012); this is reported as 6 points for children with severe eczema (Simpson 2021). Group education may make little difference to improvement in disease-related quality of life, or on perceived stress alleviation, or concordance with treatment. We found no group education trials that measured quantitatively the improvement in long-term control of eczema symptoms or adverse effects.

Technology-mediated education interventions

Technology-mediated education interventions included use of websites, text messaging and use of video. Compared to standard care, the quality of evidence is insufficient to determine whether technology-mediated education could reduce disease severity measured by clinical signs. However, technology-mediated education may make little or no difference to the reduction of disease severity determined by patient-reported severity of symptoms, and probably has no effect on disease-related quality of life. For patient-reported severity and quality-of-life outcomes, there was no age specification. Relating to improvement in psychological well-being, we found a possible improvement when using a video with humour versus without humour Kimata 2004. We found no trials that measured quantitatively the improvement in concordance with standard treatment or adverse effects. We graded overall certainty of evidence as moderate.

Technology-mediated education probably has no effect on the improvement of long-term control of eczema symptoms (as measured by Recap of Atopic Eczema (Howells 2020), or Atopic Dermatitis Control Test (Pariser 2020). However, Santer 2022 showed promise, finding that two brief online interventions probably provided a slight improvement in eczema severity (as measured by POEM) at 24 weeks, which was sustained at 52 weeks. The number needed to treat for an additional beneficial outcome of 6 compares favourably with many drug treatments and is particularly important in the absence of identifiable harms and in the context of a low cost and highly scalable intervention.

Printed education intervention

Only one trial tested this intervention by means of an Eczema Action Plan, but the data for this pilot trial were not suitable for inclusion in the meta-analysis (Gilliam 2016). However, a recent trial involving printed educational materials found that while they did not improve eczema symptoms more than standard management alone, despite adequate sample size, the handbook improved confidence in management skills for families attending new patient visits for eczema (LeBovidge 2021).

Duration of intervention

The duration of follow-up varied considerably and ranged between one and 12 months. The intervention duration ranged from a single educational session to 10 sessions and 12 months. The session lengths varied from 10 minutes to 6 hours.

Overall effectiveness of the different psychological intervention modalities

See: Summary of findings 4; Summary of findings 5; Included studies; Effects of interventions.

The types of psychological interventions in the included trials ranged from brief dynamic psychotherapy, group relaxation, progressive muscle relaxation, habit reversal, cognitive behavioural stress, and hypnotherapy approaches. However, we could not include all the data from these trials in the meta-analysis.

Habit reversal treatment

Habit reversal treatment may reduce disease severity as measured by clinical signs. However, a MCID in mean difference in SCORAD (8.7 points) for habit reversal was not reached (MD −6.57, 95% CI −13.04 to −0.10 (Schram 2012)), and the we graded the overall certainty of the evidence as low. Habit reversal treatment may provide little or no improvement in the quality of life of children and adults with eczema. Though this was based on one included trial (Noren 2018), we graded the overall certainty of the evidence as moderate. We found no trials that measured quantitatively the improvement in long-term control of eczema symptoms, disease severity as measured by patient-reported symptoms, improvement in psychological measures, improvement in concordance with standard treatment or adverse effects.

Arousal reduction approaches

We were uncertain whether arousal reduction therapy could reduce disease severity as measured by clinical signs using EASI or reduce disease severity as measured by patient-reported VAS, as we graded the overall certainty of evidence as very low. Arousal reduction therapy may provide little or no improvement in quality of life; we graded the overall certainty of evidence as low. The relevant trial only measured outcomes relating to the parents of children with eczema, a "condition of the family", thus might not be representative of all participants in our included trials (Fung 2020). Again, we found no trials that measured quantitatively the improvement in long-term control of eczema symptoms, improvement in concordance with standard treatment, or adverse effects.

Self-help interventions

No trials related to self-help interventions.

Psychological therapies

We found no trials that measured quantitatively psychological therapies versus standard care. However, in it's primary analysis, Hedman-Lagerlof 2021 indicated that participants who received internet-delivered CBT, relative to the controls, had a significantly larger mean weekly reduction in symptoms of eczema as measured with the POEM. Secondary analyses indicated that internet-delivered CBT also produced significantly larger reductions in itch intensity, perceived stress, sleep problems, and depression. Gains were sustained during 12 months of follow-up. Treatment satisfaction was high, and therapists spent on average 34.7 minutes per treated patient providing internet-delivered CBT.

Duration of intervention

The duration of the intervention ranged from a single group session to 15.5 individual sessions (average) over six months. The duration of follow-up ranged from one to 12 months.

Brief economic commentary

The sparse available evidence suggests that additional intervention costs may be offset by reductions in healthcare consultations.

Overall completeness and applicability of evidence

Participants

We excluded some trials because it was not possible to extract the data only for participants with atopic eczema, as these trials had included people with a range of skin diseases or different types of eczema, or both.

No 'type' of participant was over- or under-represented in the trials. However, almost half of the included RCTs (17/37, 46%) recruited children or children and adolescents, whilst a further 10 (27%) trials enroled solely adults, six trials recruited parents or carers of children with eczema. Most comparisons included trials of adults and children, but due to the overall number of trials per comparison, there were rarely enough trials to conduct meaningful subgroup analyses. Therefore, for many comparisons, it is not possible to clearly determine whether the effect is the same or different in adults and children. This could be significant due to the differences in skin between different age groups.

Most of the included trials were conducted in high-income countries (92%) and minimal research was conducted in low- to middle-income countries. Most trials did not report detailed information on the ethnicity of participants; where ethnicity was reported, the participants were predominantly white. Eczema in darker skin may present with different clinical signs to eczema in white skin. As a result, it is unclear how the findings of this review inform educational or psychological interventions for those with darker skin tones.

Almost all trials that stated information about location were conducted in outpatient settings. The severity of the eczema in the trial populations does not accurately reflect eczema in the general population and may be over-representing patients with severe eczema or easy access to secondary care. Whilst eczema in most people in the general population is mild or very mild, trials more commonly included people with a range of eczema severity. Where reported, the baseline severity of eczema varied across the 37 included RCTs. Two (5%) described mild to moderate disease, two (5%) specified moderate eczema and 11 (30%) recruited participants with moderate to severe conditions. Nearly one-third of included RCTs (12/37, 32%) failed to provide clear (or any) information about baseline severity of eczema.

Interventions

Our search included all educational and psychological interventions and had no date restrictions. Therefore, it is likely that some of the interventions are either no longer commonly used or are used in some areas of the world more than others.

A wide range of educational intervention modalities were employed in trials from individual, face-to-face, to those delivered

by group and then those that were mediated technologically. No trials in our meta-analysis were interventions in printed form. These were utilised with children and adults - as parents and as carers of children with eczema.

Owing to the lack of trials that met the inclusion criteria, we did not find sufficient evidence that addressed several comparisons of interest. In particular, there were no trials (included in the meta-analysis) that addressed our key comparison of self-help psychological interventions versus standard care only, or psychological therapies (including counselling and CBT) versus standard care only.

Outcomes

There are more than 20 different instruments for measuring changes in signs of eczema (Schmitt 2007).

- The following included RCTs reported outcomes measured using instruments from HOME 2021:
  - two trials (5%) used the EASI validated scoring system, which grades the physical signs of eczema; Bae 2012; Singer 2018);
  - seven trials (19%) used the Patient Oriented Eczema Measure (POEM), a validated instrument that measures the illness as experienced by the participant (Armstrong 2011; Hedman-Lagerlof 2021; LeBovidge 2021; Morawska 2016; Rea 2018; Santer 2014; Santer 2022);
  - three trials (8%) that measured used DLQI for adults (Hedman-Lagerlof 2021; Heratizadeh 2018; Senser 2004), 10 trials (27%) used CDLQI for children (Brown 2018; Chinn 2002; Grillo 2006; LeBovidge 2021; Liang 2017; Noren 2018; Rea 2018; Ryu 2015; Shaw 2008; Weber 2008), and six trials (16%) used IDQoL for infants (Chinn 2002; Grillo 2006; LeBovidge 2021; Liang 2017; Rea 2018; Shaw 2008) for measuring HRQoL.
- One RCT assessed changes in long-term control (Santer 2022).
- None of the included RCTs used the Numerical Rating Scale (NRS) 11 points for assessing the worst itch over the last 24 hours. However, other measurement instruments were used to assess patient-reported disease severity in some trials. None of the included RCTs reported adverse events.

Quality of the evidence

We rated the quality of evidence for each outcome across trials by addressing one factor to possibly rate up the quality of evidence and five factors to possibly rate down the quality. A large magnitude of effect was the factor that we considered a reason to increase the quality of the evidence. Since we were analysing continuous outcomes with intervention effects measured as mean differences, we standardised the mean difference by dividing it by the pooled standard deviation when estimating the effect magnitude using the cut-offs: ≤ 0.2: small effect, 0.2-0.5: moderate effect, and ≥ 0.8: large effect (add ref). However, we did not rate up any quality of evidence in this review, as no effect magnitude exceeded moderate. We considered inconsistency of results, publication bias, imprecision, indirectness of evidence, and limitations in trial design or execution (risk of bias) as reasons to reduce the quality of the evidence.

When heterogeneity was expected for reasons that warrant variability amongst trials, we did not downgrade the certainty of evidence for inconsistency, such as in the case of using different age groups amongst the trials when examining the long-term reduction in disease severity, as measured by clinical signs (SCORAD) in Summary of findings 2. Because the number of trials for each outcome was a maximum of six, and consequently the power of funnel plot asymmetry tests was too low to distinguish chance from real asymmetry, we decided not to downgrade the certainty of evidence for publication bias. This was because with this low number of trials, considering publication bias would be unwise. We downgraded the certainty of evidence for imprecision if the confidence interval crossed the threshold, such as in the case of Summary of findings 3, improvement in quality-of-life measures. We downgraded the certainty of evidence twice for imprecision if the confidence interval was wide, such as in the case of reduction in disease severity, as measured by clinical signs (SCORAD) in Summary of findings 1, and if it crossed the threshold and the data came from only one trial, such as in the case of improvement in quality of life in Summary of findings 4. There were no downgrades in the quality of evidence for indirectness of evidence in this review because the included trials directly compared the interventions in the populations in which we were interested, and measured important outcomes for people with eczema. We downgraded the certainty of evidence by one level if any trial had a risk of bias, regardless of the number of the other contributed trials with no risk of bias. We sought further information from trial authors relating to risk of bias assessments. Unfortunately, they no longer had the relevant data. In many cases, this is likely owing to the age of the included trials.

Potential biases in the review process

There are some potential biases in our review process, as follows. We excluded hand eczema because hand eczema can be linked to occupation and is not always associated with atopic dermatitis. This could be a source of bias, however, as people with atopic dermatitis are more at risk of developing hand eczema (Ruff 2018).

Trials used a wide range of scales to measure outcomes. The main outcome measures, as reflected in the review on which this review is based (Ersser 2014), focused on children with eczema. The range of trials embraced the two main types of outcome measure; disease severity and disease-related quality of life.

The Harmonising Outcomes for Eczema (HOME) outcome set provides a list of validated, feasible instruments to measure atopic eczema in clinical care. The HOME-recommended outcome measures were limited in use in the educational trials (individual and group education), which used the clinical signs measure SCORAD rather than the HOME measure of EASI. However, trials that evaluated group education compared to standard care used POEM, as the preferred participant-reported measure.

We presented mostly differences in means (MD) when outcome measurements in all trials were made on the same scale. And we used standardised mean difference when the trials assessed the same outcome but measured it in different scales, such as in Summary of findings 2; Improvement in quality-of-life measures. Because MD was used mostly as a summary statistic in this meta-analysis, the overall intervention effects are easier for readers to interpret and understand, as they are reported in familiar units.

Several trials in the review did not contribute data to the meta-analysis because of missing summary data that we were unable to impute. Clearly, the absence of these trials has potential implications for the meta-analysis. It was more appropriate to

include these trials in the review and to discuss their impact qualitatively.

It was not always clear how the total number of participants in the analyses had been arrived at in some trials and this was compounded by the design of trials in which participants withdrew when any eczema flare up had been controlled. Where the number of participants at later time points was unclear, we have assumed the number was randomised, or the sample size reported for the previous visit if available, which may have resulted in overestimation in some instances.

Where a trial stated in the methods that they looked for adverse events, but did not report data in the results, it was difficult to determine whether this is because the outcome was not measured or because the outcome was not reported. We tried to contact trial authors to investigate, but we were not successful.

We attempted to conduct a comprehensive search for trials, but the fact that five trials have not yet been incorporated may be a source of potential bias. Within these ongoing trials there are 970 participants compared to 6170 participants in our included trials, hence the likelihood of inclusion affecting the review outcomes would be very low.

The included trials presented data in different age bands. Consequently, the random-effects analysis that allows for heterogeneity must be interpreted carefully in the presence of this high variability. Moreover, for younger ages where effects of interventions are not self-reported, the third-person effect may fail to capture the accurate effect. Due to limited numbers of trials and participants, some planned comparisons, outcomes, subgroup and sensitivity analyses were uninformative.

trials used different follow-up periods; we ignored shorter follow-ups, which might have led to bias.

We have used the terminology 'long term'. Long term could be a lifetime for a person with eczema. The long term for a researcher is only as long as their randomised control trial permits. This might not be a bias, but it is an acknowledged limitation.

Agreements and disagreements with other studies or reviews

We used the Centre of Evidence Based Dermatology map to identify recent key literature. Below, the results of this review are compared to UK guidelines and relevant systematic reviews:

UK National Institute for Health and Care Excellence (NICE)

- Key similarities to NICE 2007
  - We assessed the evidence for educational interventions found within this review relating to using GRADE as moderate certainty.
  - NICE 2007 recommends that healthcare professionals should spend time educating children with atopic eczema and their parents and carers. This should include verbal, written and practical education, and should cover how to use treatments, how to apply treatments, how to step up or step down treatments, and how to treat infected eczema. Education should be reinforced at every consultation. The current review applied GRADE, and found that face-to-face individual educational interventions or those delivered to groups, compared to standard care, probably reduce disease severity as determined by clinical signs.
  - We found some evidence to support some of the recommendations in NICE, especially educational face-to-face group intervention.
- Key differences from NICE 2007
  - We assessed the evidence for psychological support; there is a lack of evidence regarding the benefits of holistic assessment.
  - NICE 2007 recommend a holistic approach when assessing a child's atopic eczema at each consultation. Quality-of-life assessment should include everyday activities, sleep and psychological well-being. The impact on parents and carers should also be taken into account.
  - NICE 2007 states that there is not necessarily a direct relationship between the severity of atopic eczema and the impact of eczema.
  - NICE 2007 states that children should be referred to if atopic eczema is giving rise to social or psychological problems.
  - The guidelines are for children under the age of 12 years. Therefore, it cannot necessarily be generalised to young people over the age of 12 years nor to adults.

Previous Cochrane review: 'Psychological and educational interventions for atopic eczema in children'

- Key similarities to Ersser 2014
  - Both educational and psychological interventions are predominantly utilised as adjuncts to conventional medical therapy, mainly topical therapy .
  - Both included trials on individual and group educational intervention that can be delivered by a range of health professionals and models of service delivery: these include nurse-led models and multidisciplinary team-led group education.
  - There is a continued tendency to direct interventions at parents but measure child outcomes.
  - There is a continued lack of theoretically informed underpinning to the interventions and interventions are not being described consistently.
- Key differences from Ersser 2014
  - Ersser 2014 focused on children. The scope of this review was widened to include adults and so, the full range of patient groups.
  - This more recent review was able to include a more extensive analysis of technologically-mediated education.
  - The current review had sufficient homogeneity in the outcome measures for some interventions to enable us to pool data and undertake meta-analysis, unlike the last review of such interventions for eczema, providing a clearer picture of what interventions may be potentially effective or not in achieving clinical outcomes.
  - The current review employed GRADE to appraise the certainty of evidence, whereas the earlier review used a simpler, less rigorous method to estimate the degree of risk of bias.
  - The foregoing enables us for the first time to determine a greater certainty in:
    - the probable effectiveness of both individual and group education in reducing disease from clinical signs

- the probable effectiveness for group education alone on reducing patient-reported symptoms
- the probable lack of effect of group education alone on improving quality of life.

Previous meta-analyses relating to educational interventions for eczema in children

- Li 2020**: key similarities**
  - The results of the review showed that the health education group in the treatment of children with eczema had significantly improved SCORAD scores compared with the non-educational group. This is in agreement with the findings of our review, that either individual education or group education, compared to standard care, probably reduces disease severity as determined by clinical signs.
- Li 2020**: key differences**
  - The systematic review conducted by Li 2020 only included children and their parents and did not include POEM as an outcome.
  - The review showed significant improvement in the IDQOL scores of the intervention group shown at three and six months.
  - The review pooled all types of education together, including online videos, pamphlets, and eczema workshops, hence a direct comparison with the results of our trial is not possible.
- Zhao 2020**: key similarities**
  - The review also excluded trials where only hand eczema was evaluated.
  - Significant reduction in SCORAD was found, which supports the role of patient education, though the type of education was not specified.
  - Health economics matrices were under-reported.
- Zhao 2020**: key differences**
  - The systematic review conducted by Zhao 2020 only included children and their parents and did not include POEM as an outcome.
  - A greater reduction in SCORAD in trials with shorter follow-up durations was observed. This was probably influenced by the parents' knowledge-guided practice returning to their pre-interventional states after a longer washout period in trials with extended post-intervention follow-ups. Interestingly, a greater effect was found in the group of participants who were educated "once and for all", when compared with those receiving a cumulative curriculum regime.

AUTHORS' CONCLUSIONS

Implications for practice

The purpose of this review was to summarise all the available evidence on the relative effectiveness of educational and psychological interventions for adults and children to inform practice, accompanied by a health economic evaluation to aid decision-making.

Face-to-face education, delivered to the individual, as an adjunct to conventional topical therapy, may reduce short-term disease severity as determined by clinical signs. Direct education delivered to groups (across all age groups), probably reduces disease severity as determined by both clinical signs in the long term and the short term, and results in a reduction in participant-reported symptoms in the long term. The favourable effects seen for individual face-to-face or group face-to-face education are of uncertain clinical significance because the confidence intervals for the estimates include effect sizes that are less than the minimal clinically important difference (MCID). Despite not reaching the MCID threshold, long-term reduction in disease severity (measured by POEM), relating to group education, will be of particular interest to people with eczema and their carers. When mediated via technology, educational interventions probably slightly improve long-term control of eczema symptoms. These data suggest that educational interventions may be relevant additions to conventional topical treatment for eczema.

With educational interventions, there is a varied array of configurations of different components of these interventions that are complex in nature. This includes the active component of the mode of educational delivery, such as direct didactic teaching, the use of aids or not, and the extent to which health professionals promote active participation of the patient or carer within the educational process. Healthcare professionals involved in the delivery also varied, including dermatologists, nurses, psychologists, and multidisciplinary groups. Another dimension of the 'dose effect' of such intervention is their frequency of delivery and its duration. Frequency varied from a single session up to 10 educational sessions, and duration varied from 10 minutes to six hours within a single clinic; education was sustained over a longer period of a month up to 10 months. Consideration should also be given to the preferences of people with eczema (children, parents, and adults) for individual versus group delivery, such as the desire to receive group education or individual delivery alongside another group of people with eczema.

Within resource-constrained health systems, the health economic appraisal of group versus individual delivery is an important consideration as well as a logistical or organisational consideration, in bringing together a team of health professionals to deliver an educational programme. The limited health economic evidence for educational interventions is based on one trial in which there was a combination of individual and group education. It was targeted at children under 16, delivered by a nurse practitioner, and compared to standard dermatologist care. It suggests that the costs of care provided by the nurse practioners were lower than care provided by the dermatologists, yet with comparable effectiveness. Further research will hopefully guide how best to deliver educational interventions for eczema in the most efficient and cost-effective way, considering which people with eczema are most likely to benefit from such interventions.

In this review, nine of the 37 included trials assessed psychological interventions. These ranged from watching a humorous video, cognitive behavioural stress management, individual hypnotherapy, habit reversal, brief dynamic psychotherapy, and group relaxation sessions. We did not find any trials that could be considered to be self-help psychological interventions or counselling.

In relation to the mode of delivery of the interventions, only one intervention was technology-mediated (a cognitive behavioural internet intervention delivered over 12 weeks), whilst the other eight trials were face-to-face. The majority (6/9) of interventions were group-based rather than delivered to individuals. Again, this should be a consideration for clinical psychologists when deciding

how to structure their treatments, balancing resourcing, cost and time pressures for people with eczema and their family preferences.

Relating to the dose effect, the duration of the intervention ranged from a single group session or video viewing to 15.5 individual sessions (on average) over six months. The duration of follow-up ranged from one to 12 months. We could not make any conclusions about optimal dose effect, but this would be an important factor for psychologists and would have cost and time resource implications. Clinical psychology remains a limited resource in health systems due to variable resource constraints and specifically, the availability of appropriately trained clinical psychologists. It is therefore important to consider which patient groups will benefit most from specialist psychological intervention and whether the impact of these interventions can be widened through the use of group interventions, web-based interventions (as reviewed in Hedman-Lagerlof 2021), and possibly lower-grade interventions that can be delivered by healthcare professionals other than fully trained clinical psychologists.

The finding that habit reversal treatment may reduce disease severity as measured by clinical signs (SCORing Atopic Dermatitis (SCORAD)) makes it a potential option for psychologists treating children and adults with eczema, though it made little or no improvement in the quality of life of children with eczema. In the relevant trial included in this review, clenching the fists, pinching or pressing the itchy area with a nail were used until the itching caused by eczema stopped. This was repeated several times a day to reverse the scratching habit. Instructions were given to children that were child-friendly and included them in the treatment process. Although the participants were children, it seems reasonable to think that this would also be effective with adults with eczema.

We were uncertain whether arousal reduction interventions, including relaxation, and body, mind and spirit interventions, could reduce disease severity as measured by clinical signs using Eczema Area and Severity Index (EASI) or reduce disease severity as measured by visual analogue scales. Both relevant trials included were conducted with adult participants. We would expect a similar inconclusive finding for child participants. Arousal reduction interventions may have little or no improvement in quality of life. However, the relevant trials involved children and families; these interventions might be more effective for improving quality of life in adult populations.

Implications for research

There is a clear need for further work to better understand the impact of educational and psychological interventions to support eczema management. Most of the trials included in this review were trials of educational, rather than psychological interventions. We were unable to identify with confidence whether specific approaches provided meaningful improvement in eczema signs, symptoms, or quality of life. However, the findings do suggest that face-to-face group education and habit reversal may be of value, and further work is justified to explore these specific approaches. We were unable to make confident conclusions for most other types of interventions, due to low-certainty, very low-certainty or absent information.

The domain where we assessed most trials as high risk of bias was the 'Bias in measurement of the outcome' domain, for which there were seven trials (19%), but this may relate somewhat to the nature of the interventions making patient blinding impossible. It may be that cross-over trials or waiting list designs may reduce this bias. Four trials (11%) were at high risk of bias in the 'Bias due to missing outcome data' domain and four (11%) for the 'Bias in selection of the reported result' domain. We assessed three trials (8%) as being at high risk of bias in the 'Bias arising from the randomisation process' domain, and these may represent poor trial design. There is a requirement for trials designed to minimise bias in the deployment of the outcome measures, ensuring greater completion of data gathering and the use of intention-to-treat analysis, addressing the randomisation weaknesses and a clear reporting of the nature and risk of biases. A better trial design would include consideration of the degree and source of risk of bias.

People with eczema

There is an urgent need to explore whether the effectiveness of educational and psychological interventions differs in participants from different settings, especially lower-income countries and settings. Future trials should aim to include more diverse patient populations and for interventions to be tested in a variety of settings and healthcare systems, including primary care and lower-income countries. Further subgroup analyses may help to ascertain further which patient groups may benefit most from educational and psychological interventions in health systems where there may be limited resource interventions.

Future trials that compare the effectiveness and cost-effectiveness of different methods and frequencies and duration of educational and psychological intervention delivery in children and young people with eczema are warranted. When educational and psychological interventions are reported, the frequency and duration of the component elements needs to be clearly specified. Future randomised controlled trials could be designed to assess the efficacy of counselling and psychological self-help, and printed education interventions.

Comparison

There is scope to undertake comparative trials evaluating the relative effectiveness and cost-effectiveness of individual versus group educational and psychological interventions. Further research is required in the comparative effectiveness and economic appraisal of nurse-led delivery of education compared to that by dermatologists. Head-to-head trials of face-to-face interventions versus technologically mediated interventions showing non-inferiority would be helpful as technological interventions may be further reaching. It would also be clinically useful to know if interventions for older children and young people are best aimed at the person with eczema, the carer or the family as a unit.

Outcomes

It is important that future research reflects the real gaps in clinical evidence apparent to both people with eczema and clinicians - patient involvement in trial design is paramount. Of note, the Rapid Eczema Trials project is an initiative in place at the time of publishing that involves working with members of the public to prioritise, design and conduct high-quality online trials for eczema (NIHR203279).

With regard to trials measuring the outcomes of interventions in children, there seems to be a significant variation in the use of

outcomes based on the child and those of the parent or the family unit as a whole. It would be useful for future trials to consistently consider measuring outcomes for children, parents and family units.

There is a need for further trials designed using standardised outcome measures such as those recommended by the Harmonising Outcome Measures for Eczema (HOME) initiative. It is encouraging to see more trials using outcomes such as the Patient-Oriented Eczema Measure (POEM) and the Dermatology Life Quality Index (DLQI), Children's Dermatology Life Quality Index (CDLQI) and the Infants' Dermatitis Quality of Life Index (IDQOL); though the measures Eczema Area and Severity Index (EASI), Recap of Atopic Eczema (RECAP) and Atopic Dermatitis Control Test (ADCT) need to be employed more frequently. Only six trials measured other outcomes at one year. There is a need for further data to assess the clinical benefit of psychological and educational interventions in the long term.

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CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Armstrong 2011

Study characteristics	
Methods	Design: parallel-group Unit of randomisation: the patient Unit of analysis: the patient Setting: secondary care (dermatology clinic) Country: USA Number of centres: 1 Duration: 12 weeks
Participants	Inclusion criteria: • ≥ 18 years • fullfilling diagnostic criteria (Hanafin and Rajka) • English-speaking • able to view videos online Randomised: n = 80 (online video = 40, pamphlet = 40) Lost to follow-up = 8
Interventions	Intervention: online video "The online video contained education on the clinical manifestations of AD, contributing environmental factors, bathing and handwashing techniques, moisturizer vehicles, and com]mon treatment modalities." Active comparator: pamphlet "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"
Outcomes	Primary outcome • Disease severity using POEM

Armstrong 2011 *(Continued)*

	Secondary outcome • Improvement in patient's knowledge (14-item questionaire) • Overall satisfaction with educational material (10-point scale)
Notes	Funding: none

Bae 2012

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Unit of randomisation: the patient Unit of analysis: the patient Setting: secondary care (outpatients) Number of trial sites: 1 Country: South Korea Duration: 1 month
Participants	Patients with atopic dermatitis, aged 12-40. Inclusion criteria: - Diagnosis of AD according to Hanifin & Rajka criteria - At least moderate severity Exclusion criteria: - Concomitant dermatological, medical or psychological disorders except atopic manifestations, including allergic asthma, allergic rhinitis and allergic keratoconjunctivitis Randomised n = 25 (intervention n = 15, control n = 10)
Interventions	Intervention: progressive muscle relaxation (PMR) with conventional treatment. Performed at home with video and audio programmes twice a day for 4 weeks Control: conventional treatment
Outcomes	• EASI scores • BDI • STAI • IAS • PBC subscale • VAS for pruritis and loss of sleep Not relevant to review: serum levels of NGF, NPY, IL-4. IL-5 and IL13
Notes	Funding: Korea Health 21 R&D Project (Ministry of Health & Welfare and Family Affairs, Republic of Korea A080892)

Broberg 1990

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Unit of randomisation: the child Unit of analysis: the child Number of trial sites: 1 Setting: secondary care (outpatients) Country: Sweden Duration: 3 months
Participants	Patients with AD, aged 4 months-6 years 2 months - Based on Hanifin & Rajka Randomised n = 50
Interventions	Intervention: "Eczema school"; single session for educational intervention. Given by trained nurse for 2 h with further information on eczema treatment and practical training in controlling atopic eczema. Monthly physician visits for 3 months Control: monthly physician visits for 3 months only Both groups received emollients, topical hydrocortisone and, where indicated, topical triamcinolone with or without topical antimycotics, systemic antibiotics, antihistamines
Outcomes	Eczema score based on intensity of erythema, lichenification, vesiculation, excoriation, papules and dryness and distribution Itch score 0-4
Notes	Funding: nil disclosed

Brown 2018

Study characteristics	
Methods	Trial design: cluster-RCT Unit of randomisation: clinician Unit of analysis: patient Treatment arms: 2 Setting: primary care Country: USA Number of centres: 1 Duration: 1 month
Participants	Inclusion: - Paediatric patients who presented for urgent or well-care visits.

Brown 2018 *(Continued)*

	- Diagnosis of AD on initial 10-question survey - English and Spanish speaking Average age: intervention group 6.4 (4.7 SD), control 3.6 (SD 3.2) Total participants: n = 114 (intervention = 11, control = 26, lost to follow-up = 77)
Interventions	Intervention: written eczema action plan and usual eczema care Comparator: routine care without eczema action plan
Outcomes	• Quality of life: IDQOL, CDLQI • Survey of parental/caregiver "understanding of their child's eczema management, their doctors' explanations, and their comfort managing their child's eczema" (1-5-point Likert-type scale) • Survey "on the effect of the EAP [eczema action plan] on the care of their child's AD"
Notes	Funding: nil

Chinn 2002

Study characteristics	
Methods	Design: parallel-group Unit of randomisation: the child Unit of analysis: the child-parent dyad Number of arms: 2 Setting: primary care Number of trial sites: 2 Country: UK Duration: 12 weeks
Participants	Inclusion criteria • Age 6 months up to 16th birthday • Diagnosis of AD based on British Association of Dermatology guidelines • New cases and patients requesting repeat prescriptions for medications for AD Exclusion criteria • Poorly controlled asthma • Child frpom the same family as a child who had already participated in the trial Randomised n = 240 (intervention n = 120, control n = 120)
Interventions	Nature: nurse-led parental education consultation Format: face-to-face session with a trained dermatology nurse Theoretical basis: Duration: 30 min Frequency: one-off session
Outcomes	• Quality of life using the CDLQI (4-16 years) or Infant Dermatitis Quality of Life questionnaire (< 4 years)

Chinn 2002 *(Continued)*

	• Family Dermatitis Index
Notes	Funding source: Northern and Yorkshire R&D fund

Coenraads 2001

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Unit of randomisation: the patient Unit of analysis: the patient Number of arms: 2 Setting: secondary care (outpatients) Number of trial sites: 1 Country: Netherlands Duration: 40 weeks
Participants	Inclusion criteria • Moderate to severe AD (SCORAD > 20) • Age 18-35 Exclusion criteria: psychotherapeutic treatment within last 3 months Randomised n = 54 (intervention n = 31, control n = 23)
Interventions	Intervention: intensive education and treatment programme (ISBP). In groups of 5, face to face 6 h a day for 2 weeks (working days only). Delivered by multidisciplinary team. Included 3 x weekly "dermatological therapy" Control: unspecified
Outcomes	• Marburg neurodermatitis questionnaire (MNF) • Cost questionnaire – including number of doctor visits, hospital admissions, consumption of ointments • VAS for incapacity for work • Appraisal of Self Care Agency Scale (ASA) for self-management ability • SF-36 questionaire on quality of life • SCORAD • Questionaire about the ISBP's experience ("Influence of eczema on that daily life")
Notes	Funding: not specified

Fung 2020

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT). Waiting list control

Fung 2020 *(Continued)*

	Unit of randomisation: the parent-child dyad Unit of analysis: the parent or family (depending on outcome) Setting: unspecified Number of trial sites: 1 Country: China (Hong Kong) Duration: 12 weeks
Participants	Children aged 6-11 with AD Exclusion criteria: other major chronic disease, parent not the father or mother of the child or not having a key role of taking care of the child for at least 6 months. Participants unable to express Cantonese Randomised n = 163 (intervention n = 58, control n = 55, note 50 patients declined to participate)
Interventions	Intervention: Integrative Body-Mind-Spirit Group Intervention for parents. 6 x 3-h consecutive weekly sessions Control: waiting list
Outcomes	Parent outcomes • PSS • PHQ-9 • GAD-7 Family outcomes • DFI
Notes	Funding: UBS Optimus Foundation

Futamura 2013

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Unit of randomisation: child-parent dyad Unit of analysis: child or parent (depending on outcome) Setting: secondary care (outpatients) Number of sites: 1 Country: Japan Duration: 6 months
Participants	Inclusion criteria • Age 6 months to 6 years • Moderate to severe AD • Requiring topical corticosteroid application daily

Futamura 2013 *(Continued)*

	Exclusion criteria • Emergency admission • Undergoing psychological therapy • Serious comorbidity which might interfere with the management of AD • Unable to afford the one-night hospital stay • Not capable of caring for themselves • Not eligible according to paediatric allergist's judgement Randomised n = 59 (intervention n = 29, control n = 30)
Interventions	Intervention: short-term parental education programme. Conducted over 2 days, 5-h content, comprising 3 lectures, 3 practical sessions and a group discussion. Delivered by a paediatric allergist and nurse practitioner. Information booklet also given. Control: normal care. Normal care included emollients and appropriate potency topical steroids with up- or down-titration or frequency as appropriate but changes to oral medications and topical calcineurin inhibitors were not allowed
Outcomes	• SCORAD (objective and subjective with individual scores for itch and sleeplessness) • DFI • Corticosteroid anxiety score • Corticosteroid use
Notes	Funding: KAKENHI from Japan Society for the Promotion of Science

Gilliam 2016

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT). Pilot study Unit of randomisation: the child-parent dyad Unit of analysis: the child-parent dyad Setting: secondary care Number of sites: multiple Country: USA, Canada Duration: 3 months
Participants	Caregivers of children with AD. Aged 1 month to 12 years. No other specified inclusion/exclusion cirteria Randomised n = 88 (intervention n = 41, control n = 47)
Interventions	Intervention: Eczema Action Plan with standard care Control: standard care
Outcomes	Outcomes: Childhood Eczema Study questionnaire (derived from Childhood AD Impact Score)
Notes	Funding: nil

Grillo 2006

Study characteristics	
Methods	Design: parallel group Unit of randomisation: the child Unit of analysis: Setting: not clear Country: Number of centres: Duration: SCORAD: child IDQOL: children under 4 (scored by parents) CDLQI: children aged 5 to 16 DFI: parent Only 3 dropouts, so statistical comparisons not useful
Participants	Setting: not clear where education took place or the follow-up measures, although limitations section refers to data collected from 1 hospital site only Diagnostic criteria: "diagnosed by physician" Disease severity: baseline mean SCORAD, intervention = 50.97 (SD 21.83), control = 47.73 (SD 22.61) Inclusion criteria • Paediatric patients diagnosed with AE and their parents Participants randomised: 61 in total (intervention: n = 32; control n = 29 (control) Participants who took part: 61 (intervention n = 32; control n = 29) Age: 38 infants aged < 5 years, 23 children aged 5 + years (intervention/control numbers not stated) Sex: 35 boys, 26 girls (intervention/control numbers not stated) Duration of condition: not stated **Withdrawals** Number of: not stated Reason for: not stated Loss to follow-up: total of 3 (change of address, not possible to contact them) ITT analysis: not stated
Interventions	Intervention Nature: parental education workshop Format: face-to-face session Theoretical basis: not stated Duration: 2 h

Grillo 2006 *(Continued)*

	Frequency: one-off session
Outcomes	• Severity of eczema: SCORAD • Quality of life: CDLQI or IDQOL (< 4 years) • Family impact: DFI
Notes	Funding source: The trial was partially funded by a Flinders Medical Centre Volunteer Study Award

Guerra-Tapia 2007

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Unit of randomisation: the patient Unit of analysis: the patient, or the parent if patient under 9 years old Setting: unspecified Number of sites: multicentre Country: Spain Duration: 6 months
Participants	Patients with a diagnosis of AD. Age not specified (children and adults) No other specified inclusion or exclusion criteria Randomised n = 1247 (intervention n = 564, control n = 683)
Interventions	Intervention: investigator's standard clinical practice plus educational material and information including: • information leaflet given to each patient by the investigator at each 3-month visit during the monitoring period. This leaflet contained information about important everyday patient-oriented aspects of AD • a diary for recording itch and redness intensity with instructions on usage; symptom intensity was recorded using a VAS ranging from 0-10. • a calendar card showing the dates of future visits within the trial programme. Control: investigator's standard clinical practice only
Outcomes	Outcomes • STAI including STAI for children and assessment of parents of children under 9 • Disease severity, measured by IGA • Itch intensity score • Location of lesions, presence of the symptom "change in skin temperature"
Notes	Funding: sponsored by Novartis Farmaceutica

Habib 1999

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT). Waiting list control Unit of randomisation: the patient Unit of analysis: the patient Setting: secondary care (outpatients) Number of centres: 1 Country: Australia Duration: 14 weeks
Participants	Adults with AD No specific inclusion or exclusion criteria Randomised n = 17 (intervention n = 9, control n = 8)
Interventions	Intervention: psychoeducational stress management programme. Group sessions lasting 2 h, every week for 6 weeks. Including cognitive restructuring, habit reversal, response substitution, positive reinforcement, self-monitoring, anger management and time management Control: waiting list
Outcomes	Atopic Dermatitis Assessment Measure (ADAM) consisting of 1) subjective rating of itch, 2) objective assessment of individual body sites for scale/dryness, lichenification and erythema and 3) global assessment Psyhcological outcome measures, including: • Positive Affect Negative Affect Scale (PANAS) • Stressful Life Events Inventory • Self-consciousness Scale • State-Trait Anger Expression Inventory (STAXI)
Notes	Funding: nil reported

Hedman-Lagerlof 2021

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Unit of randomisation: the patient Unit of analysis: the patient Number of arms: 2 Setting: primary care Number of sites: 1 Country: Sweden

Hedman-Lagerlof 2021 *(Continued)*

	Duration: 12 months
Participants	Adults with AD inclusion criteria • Meet diagnostic criteria for AD • Have at least moderate severity of AD symptoms Exclusions: • Ongoing cancer treatment • Severe psychiatric illness • Pregnancy • Regular use of benzodiazepines • Recent on ongoing psychological treatment • recent or ongoing lioght therapy • psoriasis • Recent or ongoing oral treatment for AD Randomised n = 102 (intervention n = 51, control n = 51)
Interventions	Intervention: 12 weeks of therapist-guided internet-delivered CBT Control: waiting list/cross-over at 12 weeks (no between group effects reported after this time)
Outcomes	POEM
Notes	

Heratizadeh 2018

Study characteristics	
Methods	Trial design: controlled, randomised, multicentre trial (wait control) Unit of randomisation: the patient Unit of analysis: the patient Number of arms: 2 Setting: secondary care (outpatients) Number of centres: 15 Country: Germany Duration: 1 year
Participants	Adult patients with AD Inclusion criteria • aged 18-65 • Diagnosis of AD according to United Kingdom Working Party Criteria • SCORAD ≥ 20 (moderate to severe) Exclusion criteria

Heratizadeh 2018 *(Continued)*

	• Previous participation in any patient-education on AD • AD on hands only • Clinically relevant psychiatric disorders, including personality disorder • Other disease judged by patient to have more effect on QoL Randomised n = 315 (intervention n = 168, control n = 147)
Interventions	Structured interdisciplinary educational programme (delivered by dermatologists, psychologists or pedagogues, and dieticians). Groups of 5 to 8 participants. Total 12 h (1 double lesson per session). Also called the ARNE educational programme
Outcomes	At baseline and after 1 year, trial patients were examined for their disease signs and symptoms and filled in questionnaires. • SCORAD • Subjective skin burden measured by Skindex-29 • DLQI • Coping strategy questionaires, including: Juckreiz-Kognitions-Fragebogen (JKF) specifically "catastrophizing cognitions" as primary outcome and Marburger Hautfragebogen (MHF) specifically "social anxiety" as primary outcome • HADS-D
Notes	Funding: in part by Astellas Pharma GmbH. Endorsed by German Society for Dermatology (Deutsche Dermatologische Gesellschaft)

Horne 1999

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Unit of randomisation: the patient Unit of analysis: the patient Setting: secondary care (outpatients) Number of sites: 1 Country: Australia Duration: 6 months
Participants	Adults with AD Inclusion criteria • AD as diagnosed by a dermatologist • ≥ 6 month history • No prior psychological or psychiatric treatment Randomised n = 18 (intervention n = 9, control n = 9)
Interventions	Intervention: relaxation with imagery instructions via 14-min audio tape (1 episode) Control: comparable relaxation instructions but without the imagery induction component
Outcomes	• 3 VAS scores: itch, mental relaxation, physical relaxation

Horne 1999 *(Continued)*

- STAI-Y: anxiety
- Anger Expression Inventory (STAXI)
- Questionaire Upon Mental Imagery (QMI)

Notes	Funding: nil declared

Kardorff 2003

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Unit of randomisation: the child-parent dyad Unit of analysis: the child Setting: secondary care (outpatients) Number of sites: 1 Country: Germany Duration: 6 weeks
Participants	Children with AD Inclusion criteria • Ages between 3 and 6 • Presenting to practice for first time as patients • Attended with one or both parents • SCORAD between 25 and 50 Exclusion criteria: nil specified Randomised n = 30 (intervention n = 15, control n = 15)
Interventions	Intervention: active 10-min demonstration with skin model on day 0 and 14 Control: verbal instructions of the same duration, as in routine dermatological practice Both cohorts received tapering course of topical steroids and emollients
Outcomes	SCORAD
Notes	Funding: nil specified

Kimata 2004

Study characteristics	
Methods	Trial design: parallel-group, cross-over design (RCT) Unit of randomisation: the patient Unit of analysis: the patient

Kimata 2004 *(Continued)*

	Setting: unspecified Number of centres: 1 Country: Japan Duration: 2 weeks
Participants	Aged 13-15 years Moderate AD No other specific inclusion or exclusion criteria Note also contained 24 age-matched "normal subjects" (ie without eczema) as a control Randomised n = 24 (intervention n = 12, control n = 12)
Interventions	Intervention: 87-minute-long humorous video Control: 87-minute-long nonhumourous video Crossover after 2 weeks
Outcomes	• One-item overall stress rating scale Not relevant to the review: • plasma levels of nerve growth factor (NGF), brain-derived neurotrophic factor (BDNF), neurotrophin-3 (NT-3), and neutrophin-4 (NT-4)
Notes	Funding: nil specified

LeBovidge 2021

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Number of arms: 2 Setting: primary care and secondary care clinics Number of trial sites: 1 Country: USA Duration: 3 months
Participants	Caregivers of children with AD ages 1 month to 16 years Inclusion criteria • AD diagnosis confirmed by healthcare provider at time of visit • Caregiver comfortable speaking English
Interventions	Intervention: caregiver educational handbook in addition to standard care Control: standard care only
Outcomes	• AD symptoms measured by POEM

LeBovidge 2021 *(Continued)*

	• Confidence in AD management as measured by 9 questions from Parental Self-Efficacy with Eczema Care index (PASECI) • Disease seveity measured by EASI • Quality of life measured by IDQOL or CDLQI and DFI • Handbook satisfaction assessed by questionaire
Notes	Funding: Pfizer Independent Grant for Learning and Change

Liang 2017

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Unit of randomisation: the child-parent dyad Unit of analysis: the child or the parent (depending on outcome) Setting: secondary care Number of centres: 6 Country: China Duration: 6 months
Participants	Children aged 2-14 years and their parents Inclusion criteria • Meet diagnostic criteria of Hanifin and Rajka • Moderate to severe disease (SCORAD > 20) Exclusion criteria • Systemic corticosteroids within 2 weeks of trial • Other acute or chronic illnesses • Psychiatric illness Randomised n = 542 (intervention n = 293, control n = 249)
Interventions	Intervention: therapeutic patient education. 4 once-weekly group sessions (30-40 participants). Each session comprised a 2-h lecture, covering 5 aspects: long term treatmnet and managemnet of AD, food allergy and AD, how to increase the family happiness index of patients using psychological interventions, skin care, and the use of emollients for AD. Delivered by multidisciplinary team including paediatric dermatologists, psychologist and advanced dermatology practice nurse
Outcomes	• SCORing Atopic Dermatitis SCORAD • CDLQI or IDQOL • Questionnaire on knowledge of emollients
Notes	Funding: Foundation fro Atopic Dermatitis, Pierre Fabre Laboratory

Linnet 2001

Study characteristics	
Methods	Trial design: parallel-group (RCT) Unit of randomisation: the patient Unit of anlysis: the patient Number of treatment arms: 2 Number of trial sites: 1 Setting: all (secondary care and community) Country: Denmark Duration: 12 months
Participants	inclusion criteria • Age 18-60 • Mild to moderate AD diagnosed by dermatologist according to Hanifin and Rajka criteria Exclusion criteria • Other somatic and psychiatric disease (except mild hayfever and asthma) Randomised n = 32 (intervention n = 16, control n = 16)
Interventions	6 months of brief dynamic psychotherapy, face to face. Average 15.5 sessions (range 11 to 18)
Outcomes	The participants were compared using Spielberger's STAI and SCORAD pre- and post-therapy, and at follow-up after 12 months.
Notes	Funding: Danish National Board of Health (Sundhedsstyrelsens), Educational Network in Clinical Psychology at the University of Copenhagen

Melin 1986

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Unit of randomisation: the patient Unit of anlysis: the patient Number of arms: 2 Setting: secondary care (outpatients) Number of centres: 1 Country: Sweden Duration: 28 days
Participants	Adults with AD Inclusion criteria

Melin 1986 *(Continued)*

	• Age between 18 and 45 years • Dermatitis present for at least 3 years immediately prior to the trial • Consultation with at least one physician about the dermatitis during that period • No obvious psychiatric problems Randomised n = 17 (intervention n = 7, control n = 1, 1 dropout - no info)
Interventions	Intervention: behavioural habit-breaking method with corticosteroid ointment. 2 sessions of psychological treatment within 1 week Control: corticosteroid ointment
Outcomes	• Clinical skin score (graded for dryness, erythema, infiltration and scaling: graded 0-3) • Annoyance questionaire including scratching, itching, annoyance with treatment restrictions and cosmetic problems • Total scratching episode count per day • Itching and scratching in 'worst situation' form: patient recorded number of scratching episodes, intensity of urge to scratch and localisation of urge
Notes	Funding: in part by Edvard Welander's Foundation and Pharmacia

Moore 2009

Study characteristics	
Methods	Design: parallel-group Unit of randomisation: the child Unit of analysis: the child
Participants	Setting: dermatology clinic (secondary care implied) Diagnostic criteria: SCORAD at new referral visit Disease severity: baseline mean SCORAD, intervention = 38 (SD 11), control = 42 (SD 15) Inclusion criteria • new patients referred to a hospital dermatology clinic Participants randomised: 165 in total = 80 (intervention) and 85 (control) Participants who took part: 112 in total = 54 (intervention) and 58 (control) Mean age (months: SD): intervention 34 (33), control 45 (44) • 0-24 months intervention n = 27, control n = 21 • 25-144 months intervention n = 21, control n = 27 • 145-192 months intervention n = 1, control n = 2 Sex: intervention men = 30, control men = 24 Duration of condition: mean age of onset (months: SD): intervention = 5 (5) and control = 9 (16) **Withdrawals** Loss to follow-up: 5 (intervention) and 8 (control) Final number of participants evaluable: intervention = 49, control = 50

Moore 2009 *(Continued)*

	ITT analysis: not stated
Interventions	• Nature: nurse-led parental education workshop • Format: face-to-face session • Theoretical base: not stated • Duration: 90 min contact time • Frequency: one-off session
Outcomes	• SCORAD • Comparison of treatments used 'at review'
Notes	Funding source: not stated

Morawska 2016

Study characteristics	
Methods	Trial design: parallel-group Unit of randomisation: the family Unit of analysis: the family Number of arms: 2 Setting: all (primary schools, child care centres, family medical centres, paediatricians, dermatologists, respiratory physicians) Trial sites: 1 Country: Australia Duration: 6 months
Participants	Inclusion criteria • Parents of 2-10-year-old children with asthma and/or eczema with concerns about the child's behaviour, emotions, or illness management • Confirmed diagnosis from children's treating doctor Exclusions • Children with disability or developmental disorder • Parents receiving professional help with children's behaviour difficulty • Parents receiving psychological help or counselling for themselves
Interventions	The intervention consists of two interactive 2-h group discussion sessions, Positive Parenting for Healthy Living, and draws on theoretical 8 principles that form the basis of Triple P.
Outcomes	• POEM • Modified Parental Self-Efficacy with Eczema Care Index (PASECI) • Eczema Behaviour Checklist. • Pediatric Quality of Life Generic Core Scale. • Parent HRQL Summary score. • Family Functioning Summary score.

Morawska 2016 *(Continued)*

Notes	

Niebel 1999

Study characteristics	
Methods	Design: parallel-group Blinding: not explained Unit of randomisation: the parent Unit of analysis: the child-parent dyad
Participants	Setting: dermatology clinic (secondary) Diagnostic criteria: yes (Hanifin 1980) Disease severity: medium to severe level of AE Inclusion criteria: none Participants randomised: 47 in total = 14 (control), 18 (intervention 1), and 15 (intervention 2) Age ranges not stated in paper Mean age: children = 3 years (control), 4.7 years (intervention 1), and 4 years (intervention 2) Sex: 8 male, 6 female (control); 12 male, 6 female (intervention 1); and 8 male, 7 female (intervention 2) Mean duration of condition: 1.58 years (control), 1.6 years (intervention 1), and 1.25 years (intervention 2) Severity of condition: SCORAD baseline = 4 (control), 3.9 (intervention 1), and 4.2 (intervention 2) **Withdrawals** N/A Loss to follow-up: no dropouts from trial Dropouts differed significantly: N/A
Interventions	**Intervention 1** • Nature: parental educational training programme delivered in groups (details given of the topic content) • Format: nurse-led sessions on theoretical and practical information • Theoretical basis: • Frequency: 10 x 2-h sessions • Duration: maximum of 16 weeks **Intervention 2** • Nature: parental educational training programme • Format: video film (100 min) and booklet with information on theoretical and practical information • Theoretical basis: theory element and practical element, designed to promote more therapeutically effective self-help • Frequency duration: maximum 16 weeks **Control group:** conventional dermatology consultation with no other intervention
Outcomes	• Disease severity (SCORAD-summary scores given only). Timing: pre- and post-assessment • Psychological problems with mothers

Niebel 1999 *(Continued)*

Notes	Group comparability at baseline: the parents' (mothers') age and sociodemographic features were comparable (except for level of school education). Children, comparable age and severity distribution across groups Conventional topical treatment: for both groups, when an exacerbation occurred, topical steroids were used for approximately 1 week. Wet lesions were treated with antiseptic compressions Funding source: Ministerium für Arbeit, Soziales, Jugend und Gesundheit des Landes Schleswig-Holstein

Noren 2018

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Unit of randomisation: the child unit of analysis: the child Number of treatment arms: 2 Setting: secondary care (outpatients) Country: Sweden Duration: 11 weeks
Participants	Children Inclusion criteria (itch and 3 of below required) • Characteristic distribution pattern • Dry skin in past year • Visible eczema and itch, starting before 2 years of age • History of asthma and/or hayfever Exclusion criteria • Skin infection • Objective SCORAD index > 66 or < 20 • Seemed unwilling to co-operate • Previous participation in a trial • Age < 5 or > 13 years • Eczema duration < 2 years • Dark skin • Known food allergy or intolerance Randomised n = 39 (intervention n = 18, control n = 21)
Interventions	Intervention: habit-breaking therapy (in addition to tailored information re steroids at week 3) in addition to topical mometasone once daily for 3 weeks Control: topical mometasone only once daily for 3 weeks Both groups: face-to-face appointment at week 0 (visit 2), week 3 (visit 3) and week 11 (visit 4)
Outcomes	• Objective and subjective SCORAD • CDLQI

Noren 2018 *(Continued)*

	• Mean number of scratching episodes • Score of skin status (redness, oedema, scratch marks) and itch as assessed by parents
Notes	No external funding

Pustisek 2016

Study characteristics	
Methods	Trial design: paralell-group, individual (RCT) Unit of randomisation: the parent (i.e. the child-parent dyad) Unit of analysis: the child or the parent, depending on outcomes Number of arms: 2 Setting: secondary care (outpatients) Number of sites: 1 Country: Croatia Duration: 2 months
Participants	Parents of children with moderate to severe AD, aged 3 months to 7 years Inclusion criteria • Diagnosis of AD using criteria of Hanifin and Rajka • Child age 3 months to 7 years • Duration of AD at least 3 months • Moderate to severe disease (SCORAD > 25) Exclusion • Parents of those children who suffered from another, non-atopic chronic disease alongside AD Randomised, n = 128 (intervention n = 64, control n = 64)
Interventions	Short-term structured educational programme. Face-to-face group education. Delivered by dermatologist and nurse. One session but printed material also and a follow-up at 2 months Control: topical corticosteroids only
Outcomes	• SCORAD • Stress level according to PSS • Anxiety levels according to STAI • Parental quality of life according to Croatian version of FDLQI
Notes	Funding: none

Rea 2018

Study characteristics

Rea 2018 *(Continued)*

Methods	Trial design: parallel-group (cluster) Unit of randomisation: provider "randomized...based on provider" Unit of analysis: the child Number of arms: 2 Setting: primary care Number of trial sites: 1 Country: USA Duration: 1 month
Participants	Inclusion criteria for child • Children from 1 month to 16 years of age with a diagnosis of eczema (based on billing code for eczema or problem list notation and prescription of topical corticosteroids) Inclusion criteria for caregiver • Confirmed diagnosis of eczema by caregiver • Wishing to discuss eczema with provider on day of visit • Comfortable speaking English • Took care of child most days of week Randomised n = 224 (intervention n = 119, control n = 105)
Interventions	Written Eczema Care Plan
Outcomes	Both groups completed a validated eczema severity scale (POEM) and a QOL scale (IDQOL) or CDLQI) before the visit and again ~1 month later.
Notes	Funding: "Supported by the Program for Patient Safety and Quality at Boston Children's Hospital"

Ryu 2015

Study characteristics	
Methods	Design: parallel-group (cluster) Unit of randomisation: the school Unit of anlysis: the child/parent/family, depending on outcome Number of treatment arms: 2 Setting: schools Country: Korea Duration: 12 months
Participants	Children with AD and their parents inclusion criteria • Children aged 8-12 years

Ryu 2015 *(Continued)*

	Exclsuion criteria • No history of itchy eczema lasting more than 6 months. • Children were excluded from the trial if they had other chronic diseases, other skin diseases aside from AD, or any other medically severe condition. n = 121 included, n = 98 analysed (intervention n = 32, control n = 66)
Interventions	School-based atopy care program (SACP) - group, face-to-face educational programme Group education was conducted in 6 lessons (children and parents) each lasting 40 min. Then 1-6 sessions of case management interviews and atopy diary with parents and student interviews lasting 10 min
Outcomes	For the child • Objective SCORAD • Subjective Atopic Dermatitis Severity (SAS) test • CDLQI For the family: • 30 - item Parent's Knowledge on Atopic Dermatitis test (PK) • Nine-item Parental Efficacy (PE) test • Parent Compliance (PC) scale • Atopic Dermatitis Impact Scale (AIS)
Notes	Funding: grant from Korea Health Promotion Foundation (ministry of Health and Welfare)

Santer 2014

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Unit of randomisation: the child-parent dyad Unit of analysis: the child Number of trial arms: 3 Setting: primary care Number of sites: 31 GP practices Country: UK Duration: 12 weeks
Participants	Carers of children with eczema Inclusion criteria • Parent/carer of a child aged ≤ 5 years • -GP diagnosis of eczema who had obtained a prescription for this in the past year Exclusion criteria • Child aged > 5 years • Known severe mental distress

Santer 2014 *(Continued)*

	• Recent bereavement • Opposition to involvement in research • Carer unable to give informed consent • With insufficient English to use website or complete outcome measures If a family had more than one child meeting eligibility criteria, they were asked to choose one child when answering questionnaire items about their child's eczema. Randomised n = 148
Interventions	Patients randomised to: • Web-based intervention plus usual care (n = 46) • Web-based intervention plus healthcare professional support plus usual care (n = 51) • Usual care alone (n = 51) Website: Supporting Parents and Carers with Eczema (SPaCE). Includes 2 x 20-min compulsory modules then open access to multiple other modules Healthcare professional support: 1-off phone call with health care professionsal (nurse, general practitioner or healthcare assistant) to encourage engagemnet with website only
Outcomes	• POEM • DFI questionnaire • IDQoL index • CDLQI • Problematic Experiences of Therapy scale (PETS) • Questionnaire items to measure adherence and attitudes that should predict adherence
Notes	Funding: Research for Patient Benefit grant from the National Institute of Health Research

Santer 2022

Study characteristics	
Methods	Trial design: two independent, pragmatic, parallel-group, unmasked RCTs (for parents/carers of children with eczema and young people with eczema) Treatment arms: 2 x 2 Country: UK Setting: primary care
Participants	Randomised • Parents/carers n = 340 (169 ususal care; 171 intervention) • Young people n = 337 (169 ususal care; 168 intervention) Inclusion criteria • Parent/carer of child aged 0-12 years OR young person aged 13-25 years • GP electronic record code for eczema (any date) and having obtained a prescription fro eczema treatment in 12 months prior to invitation (emollient, topical corticosteroid or topical calcineurin inhibitor) • - POEM score greater than 5 Exclusion criteria

Santer 2022 *(Continued)*

	• Unable to give informed consent • Unable to read and write English (as the intervention content and outcome measures were in English) • Had taken part in another eczema trial in the past three months • Had no internet access • Only one person per household could take part in either trial
Interventions	Intervention: "Intervention plus usual care group Participants randomised to the intervention group received access to Eczema Care Online behavioural interventions in addition to usual eczema care, as above. The interventions were theory-based and developed following the person-based approach to intervention development, and delivered via LifeGuide software. The two Eczema Care Online interventions were developed separately in parallel: one for parents/carers of children with eczema and one for young people with eczema. The interventions were entirely online and self-guided and participants could use as much or as little of the intervention as they wished. Full details of development and optimisation of both interventions have been published separately, and TIDieR checklists are detailed in appendices 1 and 2. The interventions were co-produced by a team consisting of behavioural psychologists, patient representatives, clinicians (GPs, dermatology nurse consultant, dermatologists with expertise in eczema) and skin researchers before being optimised through extensive user feedback to ensure they were acceptable, feasible and optimally engaging to target users. The aim of the online interventions was to reduce eczema severity and target core behaviours linked to eczema management: • Regular use of emollients • Appropriate use of topical corticosteroids • Avoiding eczema irritants and triggers • Minimising scratching • Emotional management All intervention content was based on evidence, or expert consensus where evidence was lacking. The interventions provide tailored content to suggest topics that may be of relevance and include interactive and audio-visual features (e.g brief eczema assessment, videos, stories and advice from other young people/families). The interventions take participants through a core section comprising key information/behaviour change content about eczema self-management before giving access to the main menu with the choice of various topics of interest to families and young people with eczema." Comparator: "Usual care group Participants randomised to usual care were recommended a standard informational website and continued to receive their usual medical advice and prescriptions from their usual healthcare provider. They could seek online support but did not have access to Eczema Care Online interventions during their participation in the trial, although were given access to the intervention after 52-week follow-up."
Outcomes	Primary outcomes • POEM score every 4 weeks up to week 24 Secondary outcomes • "Difference in POEM scores 4-weekly over 52 weeks • Eczema control at 24 and 52 weeks, measured by RECAP (Recap for atopic eczema patients) • Itch intensity at 24 and 52 weeks, measured as worst itch in the last 24 h (not validated for proxy completion for children, and therefore included for young people only) • Patient enablement at 24 and 52 weeks: the self-perceived ability to understand and cope with health issues was measured using the Patient Enablement Instrument (PEI)

Santer 2022 *(Continued)*

	• Quality of life at 24 and 52 weeks: measured by proxy using the Child Health Utility-Nine Dimensions (CHU-9D) for children aged 2 to 12 years; measured using the EQ-5D-5L amongst young people aged 13 to 25; for children aged 0-2 quality of life was not assessed • Health service use and medication use was measured by medical notes review for the 3-month period prior to baseline and the whole 52-week trial period Other measures Prior belief about the effectiveness of the intervention was asked at baseline, as was use of other online resource use (websites or apps for eczema). Process measures Self-reported barriers to adherence to eczema treatments were measured at 24 and 52 weeks using the Problematic Experiences of Therapy Scale (PETS) and frequency of eczema treatment use (treatment adherence) was measured by self-report at 24 and 52 weeks. Intervention usage data (e.g. time spent on the intervention, number of logins, pages viewed) for each participant was recorded by LifeGuide software for the duration of the 52-week trial period. A full process evaluation is currently in preparation, but in this paper we report proportions of users meeting the minimum effective engagement threshold that we predefined for the interventions, i.e. completing the core content. Health service use and medication use will be reported separately as part of a full health economic evaluation."
Notes	Funding: NIHR (National Institute for Health and Care Research, UK)

Schut 2013

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Healthcare setting: unspecified Country: Germany Number of trial sites: 1 Duration: 14 weeks
Participants	Adults with AD Inclusion criteria • Diagnosis of AD following Hanifin and Rajka crirteria Exclsuion criteria • Absence of AD symptoms for > 1 year, • Use of > 10 g/month of steroid-containing ointments • Chronic psychiatric or other somatic diseases (including asthma) • Chronic mediation • Acute symptoms of rhinitis • Infectious diseases • Use of antibiotics • Innoculations 4 weeks prior to the trial • Body mass index < 18 or > 30 • Drug abuse

Schut 2013 *(Continued)*

	• Work in 3 shifts • Prior participation in a trial including stress induction or in a stress managemnet programme • Preganancy or lactation Randomised n = 28 (intervention n = 14, control n = 14)
Interventions	Intervention: cognitive behavioural stress management. In groups of 6-8 patients, face to face). 4 x 3-h sessions within 2-week period Control: usual care
Outcomes	• SCORAD • Multidemensional mood questionaire, measuring 'Mood', 'Alertness' and 'Calmness' prior to and after acute stress (Not relevant to review - Cortisol Awakening Response)
Notes	

Senser 2004

Study characteristics	
Methods	Trial design: parallel group, individual (RCT). Waiting list control Setting: secondary care (outpatients) Country: Germany Number of sites: 1 Duration: 3 months
Participants	Inclusion criteria: • Age 18-60 • Diagnosis of AD as diagnosed by a dermatologist Randomised n = 33 (intervention n = 15, control n = 18)
Interventions	12 single sessions of hypnotherapy, lasting 1 h Control: waiting list
Outcomes	SCORAD
Notes	

Shaw 2008

Study characteristics	
Methods	Design: parallel-group Unit of randomisation: the parent Unit of analysis: the child-parent dyad

Shaw 2008 *(Continued)*

Participants	Setting: dermatology clinic (secondary care) Diagnostic criteria: referral to hospital clinic, no criteria used Disease severity: not stated Inclusion criteria: none Participants randomised: 151 in total = 74 (control) and 77 (intervention) Age ranges: newborn to 18 years Mean age: children = 4.62 (control) and intervention (6.34) Sex: control men = 25, control women = 27, intervention men = 21, intervention women = 29 Mean duration of condition: not stated Severity of condition: SCORAD baseline, control mean = 32.02, intervention = 33.54 Withdrawals: N/A
Interventions	• Nature: parental education, 15-min individual session following outpatient appointment, given verbal and written information training programme delivered in groups (outline given of the topic content) • Format: senior medical student-led session giving theoretical and practical information • Theoretical basis: not stated • Frequency: 1 x 15-min session • Duration: once only, but telephone and email support available post-session
Outcomes	• Child quality of life (IDQOL, CDLQI) • Disease severity
Notes	Funding source: The Doris Duke Clinical Research Fellowship Program

Singer 2018

Study characteristics	
Methods	Trial design: parallel-group, individual (RCT) Unit of randomisation: the patient Unit of analysis: the patient or parent (depending on outcome) Setting: secondary care (inpatient or ambulatory settings) Number of sites: 1 Country: USA Duration: 8 weeks
Participants	Inclusion criteria • New patients < 7 years • Clinical diagnosis of AD • AD severity that necessitated anticipated follow-up within 8 weeks • Caregiver with fluency in written and spoken English • Mobile phone capable of receiving text messages Randomised n = 41 (intervention n = 20, control n = 21)
Interventions	Intervention: educational text messages sent to the patient every day for 42 days

Singer 2018 *(Continued)*

	Control: usual care
Outcomes	• EASI score • Score on a 16-question multiple-choice AD knowledge quiz
Notes	

Staab 2002

Study characteristics	
Methods	Design: parallel-group design Unit of randomisation: the child Unit of analysis: the child-parent dyad
Participants	Setting: secondary-care evening sessions Diagnostic criteria: yes (Hanifin 1980) Age range: 5 months to 12 years Disease severity: participants had moderate to severe symptoms (SCORAD scale > 20 points) Inclusion criteria: the physician confirmed diagnosis and severity of AD. Participants were to have a SCORAD scale > 20 points and duration of at least 4 months Participants randomised: 204 in total = 93 (intervention) and 111 (control) Mean age: child 2.7 years (treatment group) and child 3.4 years (control group) Sex: not stated Duration of condition: 2.1 years (intervention group) and 2.4 years (control group) Severity of condition: SCORAD 44 SD +/- 17 (intervention group) and 42 SD +/- 15 (control group) Withdrawals Number of: not stated Reason for: not stated Number lost to follow-up: 21 (control) and 38 (intervention) ITT analysis: not stated
Interventions	**Intervention** Nature: parental educational training program Format: group sessions with presentations from various experts Theoretical basis: Frequency: once a week and for 2 h in an evening session Duration: 6 weeks
Outcomes	Primary outcomes • Disease severity (SCORAD - NB: does not distinguish between objective and subjective scores) • Disease-specific (AE) parental QoL (untitled) • Generic parental QoL (Daily Life Questionnaire) • Coping strategies (Trier Scales of Coping) Secondary outcomes: • Questionnaire (unspecified), 2 key items: (1) treatment behaviour - regularity of use of skin medication (topical steroids) and help seeking from unconventional treatments (indoor allergy reduction) (and initiated dietary restrictions) • Direct cost of treatment - calculated costs for previous 6 months and after 1 year
Notes	Group comparability at baseline: yes Conventional topical treatment

Staab 2002 *(Continued)*

	Allocation concealment: After this visit, they were told in what group they had been allocated Funding source: German Federal Ministry of Education, Science, Research and Technology (no. 01EG9523)

Staab 2006

Study characteristics	
Methods	Design: parallel group design Unit of randomisation: child Unit of analysis: child-parent dyad Setting: secondary care Number of centres: 7
Participants	Diagnostic criteria: yes (Hanifin 1980) Disease severity: eczema duration, minimum of 3 months, and severity of =/> 20 points on SCORAD Inclusion criteria: children/young people aged 3 months to 18 years in 3 age bands (< 7 years, 8 to 12, 13 to 18 years), diagnosed by dermatologist or paediatrician Participants randomised: 992, with 496 allocated to each group (645 in the < 7 band; 214 in the 8-12 band; and 151 in the 13-18 band) Mean age (SD): • < 7 band = intervention group: 2.4 (1.8), control group: 2.4 (1.9); • 8-12 band = intervention group: 9.5 (1.6), control group: 9.5 (1.5); • 13-18 band = intervention group: 14.9 (1.7), control group: 14.8 (1.7) Sex (per cent male): • < 7 band = both groups: 52; • 8-12 band = intervention group: (40), control group: (48); • 13-18 band = intervention group: (41), control group: (36) Condition (duration): not specified other than minimum of 3 months Withdrawls Loss to follow-up: 169 (I = 50, C = 119) Reasons: tabulated, most gave 'no sufficient response'
Interventions	• Nature: standardised (structured) educational programme delivered by a multiprofessional team (dermatologists, paediatricians, psychologists, dieticians) who had undergone 40 h of training • Format: content and structure of the programme and teaching methods were agreed by an inter-disciplinary consensus group. Parents of children aged 8 to 12 attended separate sessions. Adolescents aged 13 to 18 attended tailored sessions. A manual and handouts were used. NB: did not contain a therapy mandate, remained responsibility of patients' doctors • Theoretical basis: not specified • Duration: 6 once-weekly sessions lasting 2 h each Control conditions: no education
Outcomes	• Severity of eczema: ◦ SCORAD

Staab 2006 *(Continued)*

	◦ subjective severity score (the 'Skin detective' tool) ◦ itch questionnaires: used 2 standardised tools (abbreviations only given in paper): JUCKKI 15-item tool for 8-12 age group and JUCKJU of 18 items for the 13-18 group • Quality of life of parents of children aged < 13 years: Tool (German): 'Quality of life in parents of children with AD'. 26-item validated tool structured by factor analysis into 5 subscales (with abbreviations): psychosomatic well-being (pw); well-being (w); effects on social life (esl); confidence in medical treatment (cmt); emotional coping (ec); acceptance of disease (aod)
Notes	Also known as the GADIS trial Funding source: German Federal Ministry of Health and Social Services (grant No 01GL0010)

Weber 2008

Study characteristics	
Methods	Design: parallel-group design Unit of randomisation: child-parent dyad CDLQI: child FDI: child Pruritus: child
Participants	Setting: not stated Diagnostic criteria: yes (Hanifin 1980) Disease severity: AD defined by Hanifin and Rajka's 21 criteria as moderate or severe and that did not respond appropriately to conventional treatment Inclusion criteria: children aged 2-16 meeting clinical criteria (see above) Participants randomised: 36 Participants who took part: 36 Age: average intervention = 79.31 +/- 49.82 months and control = 79.44 +/- 53.86 months Sex: intervention men = 11 and women = 5, control men = 7 and women = 9 Duration of condition: average intervention = 61.25 +/- 42.84 months and control = 56.25 +/- 51.59 months Withdrawals Number of: 32/36 completed the follow-up over a 24-month period Loss to follow-up: 4 (reasons not stated) ITT analysis: not stated
Interventions	• Nature: children's group meetings (co-ordinated by child psychiatrist and volunteers, education and play) • Parents' group meetings (co-ordinated by dermatologists education and discussion) • Format: face-to-face sessions • Theoretical basis: not stated • Duration: 90 min • Frequency: fortnightly meetings for 6 months (minimum 75% audience)
Outcomes	• Quality of life: CDLQI

Weber 2008 *(Continued)*

- Family impact: FDI questionnaire
- Pruritus: based on the McGill pain questionnaire, adapted from Yosipovitch 2002

Notes	Funding source: not stated

AD: atopic dermatitis; **AE:** atopic eczema; **BDI:** Beck Depression Index; **CBT:** cognitive behavioural therapy; **CDLQI:** Children's Dermatology Life Quality Index; **DFI:** Dermatitis Family Impact; **DLQI:** Dermatology Life Quality Index; **EASI:** Eczema Area and Severity Index; **FDLQI:** Family Dermatology Life Quality Index; **GAD-7:** Generalised Anxiety Disorder Scale 7; **GP:** general practitioner; **HADS-D:** Hospital Anxiety and Depression Score; **HRQOL:** health-related quality of life; **HWS:** Holistic Well-Being Scale; **IAS:** Interaction Anxiousness Scale; **IDQOL:** Infants' Dermatitis Quality of Life Index; **IGA:** Investigator's Global Assessment scale; **ITT:** intention-to-treat; **N/A:** not applicable; **PBC:** Private Body Consciousness subscale; **PHQ-9:** Patient health Questionaire 9; **POEM:** Patient Orientated Eczema Measure; **PSS:** Perceived Stress Scale; **QoL:** quality of life; **RCT:** randomised controlled trial; **SCORAD:** SCORing Atopic Dermatitis; **SD:** standard deviation; **STAI:** State Trait Anxiety Index; **VAS:** visual analogue scale

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Anderson 2000	Ineligible intervention
Armstrong 2014	Ineligible intervention
Bashyam 2020	Ineligible outcome
Bergmo 2009	Ineligible intervention
Brown 1971	Ineligible outcome
ChiCTR1800018353	Ineligible trial design
Dahiya 2011	Ineligible trial design
Ehlers 1995	Ineligible outcome
Ersser 2013	Ineligible trial design
Gradwell 2002	Ineligible population
Guido 2020	Ineligible population
Haubrock 2009	Ineligible trial design
Hedman-Lagerlof 2019	Ineligible trial design
Jordan 1974	Ineligible intervention
Jung 2020	Ineligible population
Klinger 2007	Ineligible trial design
Leibovici 2009	Ineligible population
Muzzolon 2021	Ineligible trial design
Noren 1989	Ineligible outcome

Study	Reason for exclusion
Papoiu 2011	Ineligible trial design
Rotter 2023	Ineligible intervention
Santer 2016	Ineligible trial design
Schuttelaar 2010	Ineligible trial design
Shenefelt 2005	Ineligible trial design
Shi 2013	Ineligible trial design
Stewart 1995	Ineligible trial design
Van Os-Medendorp 2012	Ineligible intervention
Zijlstra 2019	Ineligible intervention

Characteristics of studies awaiting classification *[ordered by study ID]*

NCT04174651

Methods	Cross-over randomisation within the arms
Participants	Participants with AD
Interventions	Behavioural: • Trier Social Stress Test (TSST) • Landscape video
Outcomes	Primary outcomes: changes in brain activity (time frame: baseline, 15 min) • Changes in brain activity will be measured as change in Arterial spin Labeling (ASL) which reflects regional cerebral blood flow. This will be evaluated using fMRI • Change in time of spontaneous scratching (time frame: baseline, 15 min) • Change in spontaneous scratching for behavioural-only arms will be calculated by subtracting total duration of scratching behaviour before and after the TSST and Landscape video. Secondary outcome measures • Correlation of perceived stress with stress-induced brain activity (time frame: 60 min) The correlation of stress-induced brain activity evaluated as ASL signals will be evaluated against participant's stress questionnaire scores and biological stress marker (saliva cortisol levels).
Notes	

NCT04633616

Methods	Parallel assignment
Participants	≥ 18 years

NCT04633616 *(Continued)*

Interventions	Communication will be tailored as the mode of weblink delivery will be customised to patient preference
Outcomes	Primary outcome measures • Patient Response Rates (time frame: 3 months) • Patient response rate will determine the first step of patient engagement and assesses a patient's willingness to 'interact' with the weblink delivered. Patient response rates will be measured by click rates. Click rates will be calculated using the proportions of patients in both trial populations who choose to click on the weblinks delivered throughout the trial, regardless of whether or not questionnaires are completed. The time elapsed from when the weblink is sent and when the weblink is clicked will also be recorded.
Notes	

AD: atopic dermatitis; **fMRI:** functioning magnetic resonance imaging

Characteristics of ongoing studies *[ordered by study ID]*

ACTRN12618000940279

Study name	EEE (Triple E project)
Methods	Interventional
Participants	Up to age 6 years
Interventions	Series of educational videos and pamphlets
Outcomes	Improved eczema severity, as determined by change in POEM score from baseline to the clinic appointment (4 weeks later), versus those receiving standard care
Starting date	29 November 2021
Contact information	Sarah Miller, WACIC@health.wa.gov.au, 0478603794
Notes	

NCT03664271

Study name	Educational eczema video intervention
Methods	Parallel assignment
Participants	18-80 years
Interventions	Intervention: caregivers will watch an educational video in clinic, and also be given information about how to access the video from home (ideal condition). The intervention video will contain educational information about eczema, as well as routine skincare and common treatments.
Outcomes	Primary outcome measures • Change in eczema severity (time frame: 3-month follow-up) measured by POEM (0-28 range, higher score = worse eczema severity)

NCT03664271 *(Continued)*

Starting date	10 September 2018
Contact information	Contact: Corinna Rea, MD, MPH 6173554188 corinna.rea@childrens.harvard.edu
Notes	

NCT04352270

Study name	Clinic-based atopic dermatitis therapeutic patient education (AD-TPE)
Methods	Parallel assignment
Participants	Up to 17 years
Interventions	Parent-child dyads randomised to this group will receive printed educational materials in English or Spanish about AD. Parent-child dyads randomised to this group will receive an investigator-developed educational video in English or Spanish about AD.
Outcomes	Primary outcome measures • Change in eczema severity based on the POEM (time frame: baseline, up to 2 months). • Change in eczema severity based on EASI (time frame: baseline, up to 2 months) • Change in the severity of itch (time frame: baseline, up to 2 months) assessed by an investigator-developed survey completed by participants with questions about itch • Change in sleep quality (time frame: baseline, up to 2 months) assessed by an investigator-developed survey completed by participants with questions about sleep quality.
Starting date	20 April 2020
Contact information	Contact: Margaret Lee, MD PhD (617) 638-5500 Margaret.Lee@bmc.org
Notes	

NCT04919330

Study name	Acceptance and commitment therapy-based eczema management programme (ACTeczema)
Methods	Parallel assignment; repeated-measures 2-arm RCT
Participants	6-65 years
Interventions	1 x 4-weekly 2-h sessions of family ACT-based eczema management programme (FACT-EMP) and routine eczema care provided by the trial hospital, including medical follow-ups and nurses' consultation
Outcomes	Primary outcome measures

NCT04919330 *(Continued)*

	• Child's eczema severity (time frame: change from baseline to 3 months post-intervention) assessed with SCORAD, including the extent and intensity of the disease, and the degree of itching and sleep disturbance • Parent's self-efficacy of eczema management (time frame: change from baseline to 3 months post-intervention). The 29-item Chinese Version of Parental Self-Efficacy with Eczema Care Index (PASECI) will be adopted to assess the parents' self-efficacy for performing eczema management tasks, managing the child's symptoms and behaviour.
Starting date	9 June 2021
Contact information	Contact: Yuen Yu CHONG, PhD(852) 3943 0665conniechong@cuhk.edu.hkContact: Shu Yan LAM(852) 24686847lamsyd@ha.org.hk
Notes	

NCT05502848

Study name	The effect of intervention and mechanism of ICBT on chronic itching in patients with atopic dermatitis
Methods	Parallel assignment
Participants	18-45 years
Interventions	Internet CBT
Outcomes	Primary outcome measures • Change from baseline on the POEM (time frame: baseline and weeks 2, 4, 8 and months 6, 12) • Change from baseline on the SCORAD Index (time frame: baseline and weeks 2, 4, 8 and months 6, 12) • Change from baseline on scratching times (time frame: baseline and weeks 2, 4, 8 and months 6, 12) • Change from baseline on the Itchy Quality of Life (ItchyQoL) (time frame: baseline and month 6) • Change from baseline on structural MRI (3D; DTI) and fMRI (resting state; task state) (time frame: baseline and month 6)
Starting date	16 August 2022
Contact information	Xiangya Hospital of Central South University
Notes	

AD: atopic dermatitis; **CBT:** cognitive behavioural therapy; **EASI:** Eczema Area and Severity Index; **POEM:** Patient-Orientated Eczema Measure; **RCT:** randomised controlled trial; **SCORAD:** severity SCORing of Atopic Dermatitis

RISK OF BIAS

Legend: Low risk of bias High risk of bias Some concerns

Risk of bias for analysis 1.1 Reduction in disease severity, as measured by clinical signs (SCORAD)

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Kardorff 2003	✗	~	✓	✓	✓	✗

Risk of bias for analysis 2.1 Long-term reduction in disease severity, as measured by clinical signs (SCORAD) across all age groups

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Futamura 2013	✓	✓	✓	✓	✓	✓
Liang 2017	~	✓	✓	✗	✓	✗
Staab 2006	✓	✓	✓	✓	~	~
Staab 2006	✓	✓	✓	✓	~	~
Staab 2006	✓	✓	✓	✓	~	~

Risk of bias for analysis 2.2 Short-term reduction in disease severity, as measured by clinical signs (SCORAD)

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Subgroup 2.2.1 Short Term Reduction in disease severity, as measured by clinical signs, unspecified age- SCORAD						
Grillo 2006	~	✓	✓	~	✓	~
Liang 2017	~	✓	✓	✗	✓	✗
Pustisek 2016	~	~	✓	~	✓	~

Risk of bias for analysis 2.3 Reduction in disease severity, as measured by patient-reported symptoms

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Morawska 2016	✓	✓	✓	✓	~	~
Staab 2006	✓	✓	✓	~	✗	~
Staab 2006	✓	✓	✓	~	✗	~
Staab 2006	✓	✓	✓	~	✗	~

Risk of bias for analysis 2.5 Improvement in quality-of-life measures: family impact

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Subgroup 2.5.1 Improvement in quality-of-life measures-Family-impact						
Grillo 2006	~	✓	✓	~	✓	~
Pustisek 2016	~	~	✓	~	✓	~
Subgroup 2.5.2 Improvement in Quality of Life Measures- Infants-IDLQI						
Grillo 2006	~	✓	✓	~	✓	~
Liang 2017	~	✓	✓	✗	✓	✗
Subgroup 2.5.3 Improvement in Quality of Life Measures -Children-CDLQI						
Grillo 2006	~	✓	✓	~	✓	~
Liang 2017	~	✓	✓	✗	✓	✗
Ryu 2015	~	~	✗	✗	~	✗

Risk of bias for analysis 2.6 Improvement in psychological well-being measures

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Subgroup 2.6.1 Improvement in psychological measures-State Anxiety						
Pustisek 2016	~	~	✓	~	✓	~
Subgroup 2.6.2 Improvement in psychological measures-Perceived Stress Scale						
Pustisek 2016	~	~	✓	~	✓	~

Risk of bias for analysis 2.7 Change in concordance with standard treatment: Parents' Self-Efficacy with Eczema Care Index

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Morawska 2016	✓	✓	✓	✓	~	~

Risk of bias for analysis 3.1 Reduction in disease severity, as measured by clinical signs (SCORAD)

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Niebel 1999	~	✓	~	✗	✗	✗

Risk of bias for analysis 3.2 Reduction in disease severity, as measured by patient-reported symptoms (POEM)

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Subgroup 3.2.1 Reduction in disease severity as measured by patient-POEM-unspecified age						

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Hedman-Lagerlof 2021	✓	✓	✓	✓	✓	✓
Santer 2014	✓	✓	✓	✓	✗	~
Subgroup 3.2.2 Long Term Reduction in disease severity as measured by patient (0-12 years)-POEM						
Santer 2022	✓	✓	✓	✓	✓	✓
Subgroup 3.2.3 Long term reduction in disease severity as measured by patient (13 -25 years)-POEM						
Santer 2022	✓	✓	✓	✓	✓	✓

Risk of bias for analysis 3.3 Improvement in quality-of-life measures

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Subgroup 3.3.1 Improvement in quality of life measures- Health related quality of life-unspecified age						
Santer 2014	✓	~	✓	✓	~	~
Santer 2022	✓	✓	✓	✓	✓	✓
Subgroup 3.3.2 Improvement in quality of life measures (0-12 years)-Health related quality of life						
Santer 2022	✓	✓	✓	✓	✓	✓
Subgroup 3.3.3 Improvement in quality of life measures (13-25 years)-Health related quality of life						
Santer 2022	✓	✓	✓	✓	✓	✓
Subgroup 3.3.4 Improvment in quality of life measures-DLQI						
Hedman-Lagerlof 2021	✓	✓	✓	✓	✓	✓

Risk of bias for analysis 3.4 Improvement in long-term control of eczema symptoms (RECAP)

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Subgroup 3.4.1 Improvement in long-term control in eczema symptoms (0-12 years)-RECAP at 24 wks						
Santer 2022	✓	✓	✓	✓	✓	✓
Subgroup 3.4.2 Improvement in long-term control in eczema symptoms (0-12 years)-RECAP at 52 wks						
Santer 2022	✓	✓	✓	✓	✓	✓
Subgroup 3.4.3 Improvement in long-term control in eczema symptoms (13-25 years)-RECAP at 24 wks						
Santer 2022	✓	✓	✓	✓	✓	✓
Subgroup 3.4.4 Improvement in long-term control in eczema symptoms (13-25 years)-RECAP at 52 wks						
Santer 2022	✓	✓	✓	✓	✓	✓

Risk of bias for analysis 4.1 Reduction in disease severity, as measured by clinical signs (SCORAD)

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Noren 2018	✓	~	✓	✓	✓	~

Risk of bias for analysis 4.2 Improvement in quality-of-life measures: children (CDLQI)

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Noren 2018	✓	~	✓	✓	✓	~

Risk of bias for analysis 5.1 Reduction in disease severity, as measured by clinical signs (EASI)

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Bae 2012	~	✗	~	~	~	✗

Risk of bias for analysis 5.2 Improvement in psychological measures: State Anxiety

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Horne 1999	~	✓	✗	~	✓	~

Risk of bias for analysis 6.1 Improvement in psychological well-being measures: State Anxiety

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Subgroup 6.1.1 Improvment in psychological well-being measures- State Anxiety-STAXI-S)						
Horne 1999	~	✓	✗	~	✓	✗

Risk of bias for analysis 6.2 Reduction in disease severity, as measured by patient-reported symptoms (VAS)

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Horne 1999	~	✓	✗	~	✓	✗

Risk of bias for analysis 7.1 Improvement in quality-of-life measures (DFI)

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Fung 2020	✓	~	✓	✓	~	~

Risk of bias for analysis 7.2 Improvement in psychological well-being measures

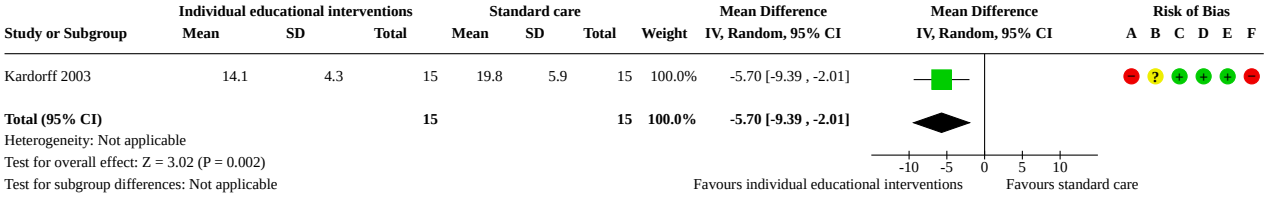
	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Subgroup 7.2.1 Perceived Stress- Carers-Perceived Stress (PSS) Intervention						
Fung 2020	✓	~	✓	✓	~	~
Subgroup 7.2.2 Depression - Carer-Depression (PHQ-9) Intervention						
Fung 2020	✓	~	✓	✓	~	~
Subgroup 7.2.3 Anxiety Carer -Anxiety (GAD7) Intervention						
Fung 2020	✓	~	✓	✓	~	~

DATA AND ANALYSES

Comparison 1. Individual educational interventions versus standard care only

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1.1 Reduction in disease severity, as measured by clinical signs (SCORAD)	1	30	Mean Difference (IV, Random, 95% CI)	-5.70 [-9.39, -2.01]

Analysis 1.1. Comparison 1: Individual educational interventions versus standard care only, Outcome 1: Reduction in disease severity, as measured by clinical signs (SCORAD)



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 2. Group educational interventions versus standard care only

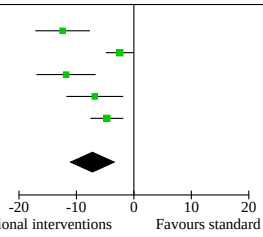
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.1 Long-term reduction in disease severity, as measured by clinical signs (SCORAD) across all age groups	3	1424	Mean Difference (IV, Random, 95% CI)	-7.22 [-11.01, -3.43]
2.2 Short-term reduction in disease severity, as measured by clinical signs (SCORAD)	3		Mean Difference (IV, Random, 95% CI)	Subtotals only
2.2.1 Short Term Reduction in disease severity, as measured by clinical signs, unspecified age- SCORAD	3	731	Mean Difference (IV, Random, 95% CI)	-9.66 [-19.04, -0.29]
2.3 Reduction in disease severity, as measured by patient-reported symptoms	2	908	Mean Difference (IV, Random, 95% CI)	-1.76 [-2.36, -1.17]
2.4 Improvement in quality-of-life measures (DLQI): all scales, infants, children, and family	4	746	Mean Difference (IV, Random, 95% CI)	-0.83 [-1.72, 0.05]
2.5 Improvement in quality-of-life measures: family impact	4		Mean Difference (IV, Random, 95% CI)	Subtotals only
2.5.1 Improvement in quality-of-life measures-Family-impact	2	189	Mean Difference (IV, Random, 95% CI)	-1.87 [-4.17, 0.42]
2.5.2 Improvement in Quality of Life Measures- Infants-IDLQI	2	367	Mean Difference (IV, Random, 95% CI)	0.02 [-2.26, 2.31]
2.5.3 Improvement in Quality of Life Measures -Children-CDLQI	3	251	Mean Difference (IV, Random, 95% CI)	-1.64 [-4.89, 1.62]
2.6 Improvement in psychological well-being measures	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
2.6.1 Improvement in psychological measures-State Anxiety	1	128	Mean Difference (IV, Random, 95% CI)	-3.91 [-7.63, -0.19]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.6.2 Improvement in psychological measures-Perceived Stress Scale	1	80	Mean Difference (IV, Random, 95% CI)	-2.47 [-5.16, 0.22]
2.7 Change in concordance with standard treatment: Parents' Self-Efficacy with Eczema Care Index	1	59	Mean Difference (IV, Random, 95% CI)	1.04 [-1.04, 3.12]

Analysis 2.1. Comparison 2: Group educational interventions versus standard care only, Outcome 1: Long-term reduction in disease severity, as measured by clinical signs (SCORAD) across all age groups

Study or Subgroup	Group educational interventions Mean	SD	Total	Standard care Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Futamura 2013	15.4	7.6	29	27.8	10.8	30	18.4%	-12.40 [-17.15 , -7.65]	+ + + + + +
Liang 2017	15.47	13.48	293	17.93	14.88	249	23.5%	-2.46 [-4.87 , -0.05]	? + + - + -
Staab 2006[a]	23.4	12.6	70	35.2	15.2	50	17.5%	-11.80 [-16.94 , -6.66]	+ + + + ? ?
Staab 2006[b]	25.8	17.7	102	32.6	16.5	83	18.0%	-6.80 [-11.74 , -1.86]	+ + + + ? ?
Staab 2006[c]	23.7	16.7	274	28.4	16.5	244	22.6%	-4.70 [-7.56 , -1.84]	+ + + + ? ?
Total (95% CI)			**768**			**656**	**100.0%**	**-7.22 [-11.01 , -3.43]**	

Heterogeneity: Tau² = 14.43; Chi² = 20.54, df = 4 (P = 0.0004); I² = 81%
Test for overall effect: Z = 3.73 (P = 0.0002)
Test for subgroup differences: Not applicable



Footnotes
[a]participants aged 13 to 18 years
[b]participants aged eight to 12 years
[c]participants aged three months to seven years

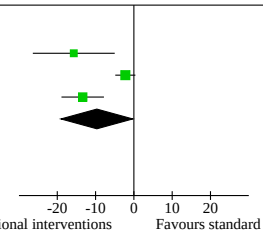
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 2.2. Comparison 2: Group educational interventions versus standard care only, Outcome 2: Short-term reduction in disease severity, as measured by clinical signs (SCORAD)

Study or Subgroup	Group educational interventions Mean	SD	Total	Standard care Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
2.2.1 Short Term Reduction in disease severity, as measured by clinical signs, unspecified age- SCORAD									
Grillo 2006	28.51	16.61	32	44.2	24.75	29	26.3%	-15.69 [-26.38 , -5.00]	? + + ? + ?
Liang 2017	20.71	15.37	293	22.94	15.67	249	38.7%	-2.23 [-4.85 , 0.39]	? + + - + -
Pustisek 2016	23.08	15.188	64	36.44	16.76	64	35.0%	-13.36 [-18.90 , -7.82]	? ? + ? + ?
Subtotal (95% CI)			**389**			**342**	**100.0%**	**-9.66 [-19.04 , -0.29]**	

Heterogeneity: Tau² = 57.32; Chi² = 16.84, df = 2 (P = 0.0002); I² = 88%
Test for overall effect: Z = 2.02 (P = 0.04)

Test for subgroup differences: Not applicable

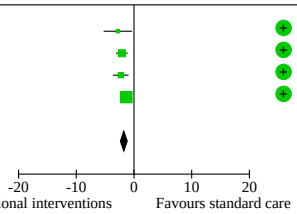


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 2.3. Comparison 2: Group educational interventions versus standard care only, Outcome 3: Reduction in disease severity, as measured by patient-reported symptoms

Study or Subgroup	Group educational interventions Mean	SD	Total	Standard care Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Morawska 2016	9.31	6.03	39	12.11	5.43	46	5.5%	-2.80 [-5.26 , -0.34]
Staab 2006[a]	4.9	2.9	102	7	3.8	83	26.9%	-2.10 [-3.09 , -1.11]
Staab 2006[b]	5.8	3.3	70	8.1	4	50	16.4%	-2.30 [-3.65 , -0.95]
Staab 2006[c]	4.8	3.4	274	6.1	3.6	244	51.1%	-1.30 [-1.91 , -0.69]
Total (95% CI)			**485**			**423**	**100.0%**	**-1.76 [-2.36 , -1.17]**

Heterogeneity: Tau² = 0.08; Chi² = 3.80, df = 3 (P = 0.28); I² = 21%
Test for overall effect: Z = 5.82 (P < 0.00001)
Test for subgroup differences: Not applicable



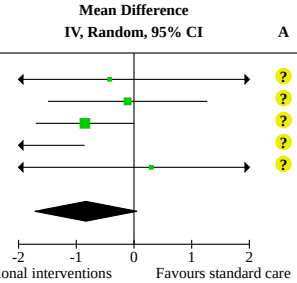
Footnotes
[a]Participants aged eight to 12 years
[b]Participants aged 13 to 18 years
[c]Participants aged three months to seven years

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 2.4. Comparison 2: Group educational interventions versus standard care only, Outcome 4: Improvement in quality-of-life measures (DLQI): all scales, infants, children, and family

Study or Subgroup	Group educational interventions Mean	SD	Total	Standard care Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Grillo 2006	7.47	5.79	32	7.89	5.85	29	8.1%	-0.42 [-3.35 , 2.51]
Liang 2017[a]	6.11	4.37	96	6.22	4.96	83	25.7%	-0.11 [-1.49 , 1.27]
Liang 2017[b]	4.23	3.51	178	5.08	4.25	151	41.8%	-0.85 [-1.70 , 0.00]
Pustisek 2016	10.27	5.584	64	13.09	5.759	64	15.7%	-2.82 [-4.79 , -0.85]
Ryu 2015	4.6	4.5	16	4.3	5	33	8.8%	0.30 [-2.49 , 3.09]
Total (95% CI)			**386**			**360**	**100.0%**	**-0.83 [-1.72 , 0.05]**

Heterogeneity: Tau² = 0.30; Chi² = 5.69, df = 4 (P = 0.22); I² = 30%
Test for overall effect: Z = 1.84 (P = 0.07)
Test for subgroup differences: Not applicable

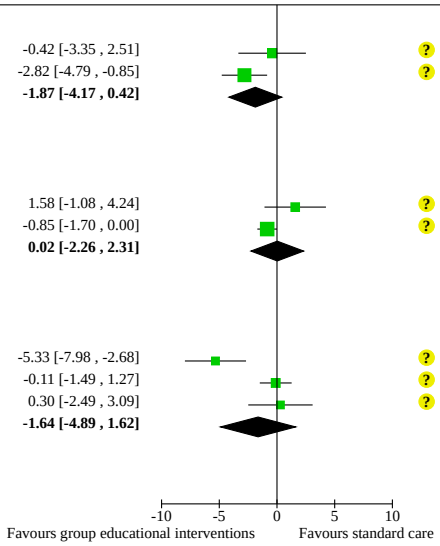


Footnotes
[a]Children
[b]infants

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 2.5. Comparison 2: Group educational interventions versus standard care only, Outcome 5: Improvement in quality-of-life measures: family impact

Study or Subgroup	Group educational interventions Mean	SD	Total	Standard care Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
2.5.1 Improvement in quality-of-life measures-Family-impact								
Grillo 2006	7.47	5.79	32	7.89	5.85	29	39.4%	-0.42 [-3.35 , 2.51]
Pustisek 2016	10.27	5.584	64	13.09	5.759	64	60.6%	-2.82 [-4.79 , -0.85]
Subtotal (95% CI)			**96**			**93**	**100.0%**	**-1.87 [-4.17 , 0.42]**
Heterogeneity: Tau² = 1.26; Chi² = 1.78, df = 1 (P = 0.18); I² = 44%								
Test for overall effect: Z = 1.60 (P = 0.11)								
2.5.2 Improvement in Quality of Life Measures- Infants-IDLQI								
Grillo 2006	6.91	5	18	5.33	3.02	20	36.0%	1.58 [-1.08 , 4.24]
Liang 2017	4.23	3.51	178	5.08	4.25	151	64.0%	-0.85 [-1.70 , 0.00]
Subtotal (95% CI)			**196**			**171**	**100.0%**	**0.02 [-2.26 , 2.31]**
Heterogeneity: Tau² = 1.94; Chi² = 2.90, df = 1 (P = 0.09); I² = 66%								
Test for overall effect: Z = 0.02 (P = 0.98)								
2.5.3 Improvement in Quality of Life Measures -Children-CDLQI								
Grillo 2006	1.75	1.16	11	7.08	4.52	12	31.7%	-5.33 [-7.98 , -2.68]
Liang 2017	6.11	4.37	96	6.22	4.96	83	37.4%	-0.11 [-1.49 , 1.27]
Ryu 2015	4.6	4.5	16	4.3	5	33	31.0%	0.30 [-2.49 , 3.09]
Subtotal (95% CI)			**123**			**128**	**100.0%**	**-1.64 [-4.89 , 1.62]**
Heterogeneity: Tau² = 6.90; Chi² = 12.71, df = 2 (P = 0.002); I² = 84%								
Test for overall effect: Z = 0.98 (P = 0.32)								

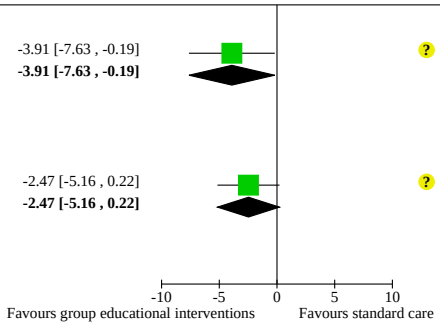


Risk of Bias: A B C D E F

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 2.6. Comparison 2: Group educational interventions versus standard care only, Outcome 6: Improvement in psychological well-being measures

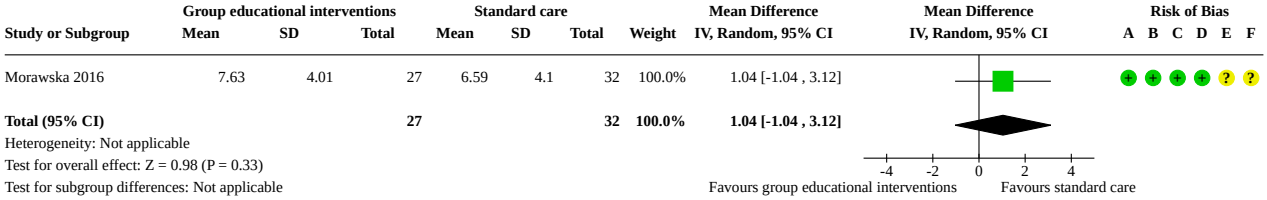
Study or Subgroup	Group educational interventions Mean	SD	Total	Standard care Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
2.6.1 Improvement in psychological measures-State Anxiety								
Pustisek 2016	36.59	10.641	64	40.5	10.817	64	100.0%	-3.91 [-7.63 , -0.19]
Subtotal (95% CI)			**64**			**64**	**100.0%**	**-3.91 [-7.63 , -0.19]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 2.06 (P = 0.04)								
2.6.2 Improvement in psychological measures-Perceived Stress Scale								
Pustisek 2016	16.97	6.149	40	19.44	6.118	40	100.0%	-2.47 [-5.16 , 0.22]
Subtotal (95% CI)			**40**			**40**	**100.0%**	**-2.47 [-5.16 , 0.22]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 1.80 (P = 0.07)								



Risk of Bias: A B C D E F

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 2.7. Comparison 2: Group educational interventions versus standard care only, Outcome 7: Change in concordance with standard treatment: Parents' Self-Efficacy with Eczema Care Index



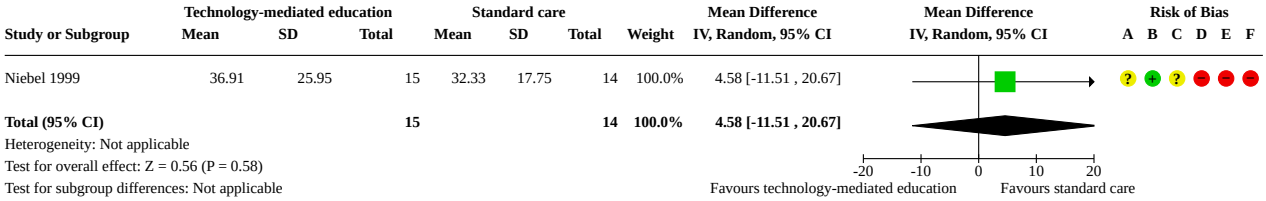
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 3. Technology-mediated educational interventions versus standard care only

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
3.1 Reduction in disease severity, as measured by clinical signs (SCORAD)	1	29	Mean Difference (IV, Random, 95% CI)	4.58 [-11.51, 20.67]
3.2 Reduction in disease severity, as measured by patient-reported symptoms (POEM)	3		Mean Difference (IV, Random, 95% CI)	Subtotals only
3.2.1 Reduction in disease severity as measured by patient-POEM-unspecified age	2	195	Mean Difference (IV, Random, 95% CI)	-0.76 [-1.84, 0.33]
3.2.2 Long Term Reduction in disease severity as measured by patient (0-12 years)-POEM	1	340	Mean Difference (IV, Random, 95% CI)	-1.10 [-2.51, 0.31]
3.2.3 Long term reduction in disease severity as measured by patient (13 -25 years)-POEM	1	337	Mean Difference (IV, Random, 95% CI)	-2.00 [-3.43, -0.57]
3.3 Improvement in quality-of-life measures	3		Mean Difference (IV, Random, 95% CI)	Subtotals only
3.3.1 Improvement in quality of life measures- Health related quality of life-unspecified age	2	430	Mean Difference (IV, Random, 95% CI)	-0.00 [-0.03, 0.03]
3.3.2 Improvement in quality of life measures (0-12 years)-Health related quality of life	1	248	Mean Difference (IV, Random, 95% CI)	0.01 [-0.01, 0.03]
3.3.3 Improvement in quality of life measures (13-25 years)-Health related quality of life	1	238	Mean Difference (IV, Random, 95% CI)	0.02 [-0.00, 0.04]
3.3.4 Improvment in quality of life measures-DLQI	1	102	Mean Difference (IV, Random, 95% CI)	-4.20 [-6.46, -1.94]
3.4 Improvement in long-term control of eczema symptoms (RECAP)	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

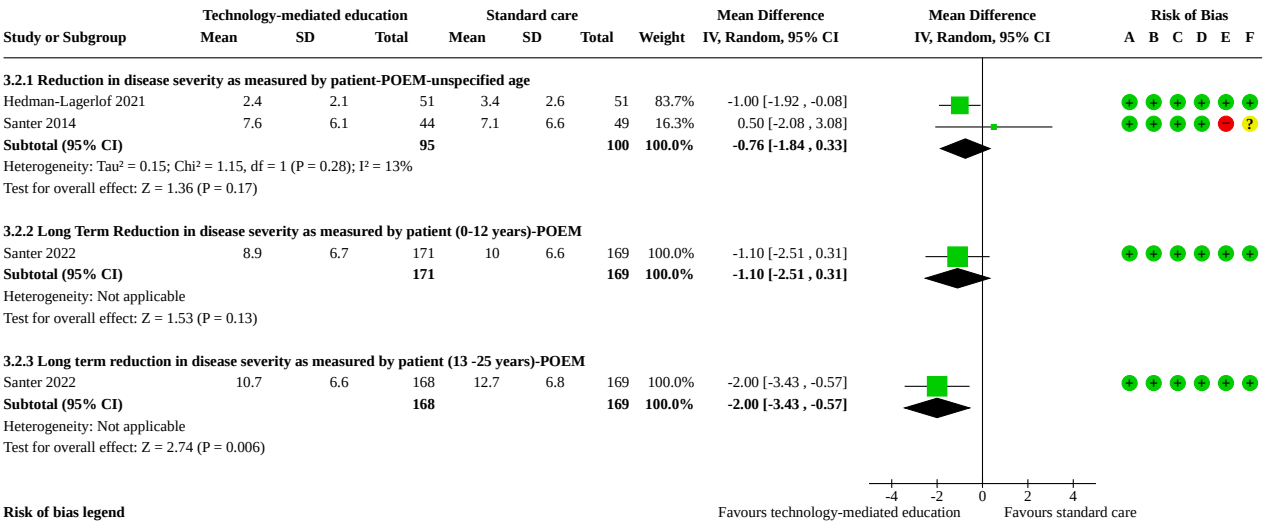
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
3.4.1 Improvement in long-term control in eczema symptoms (0-12 years)-RECAP at 24 wks	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
3.4.2 Improvement in long-term control in eczema symptoms (0-12 years)-RECAP at 52 wks	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
3.4.3 Improvement in long-term control in eczema symptoms (13-25 years)-RECAP at 24 wks	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
3.4.4 Improvement in long-term control in eczema symptoms (13-25 years)-RECAP at 52 wks	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
3.5 Improvement in psychological well-being measures: one-item overall stress-rating scale	1	48	Mean Difference (IV, Random, 95% CI)	-1.78 [-2.13, -1.43]

Analysis 3.1. Comparison 3: Technology-mediated educational interventions versus standard care only, Outcome 1: Reduction in disease severity, as measured by clinical signs (SCORAD)



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

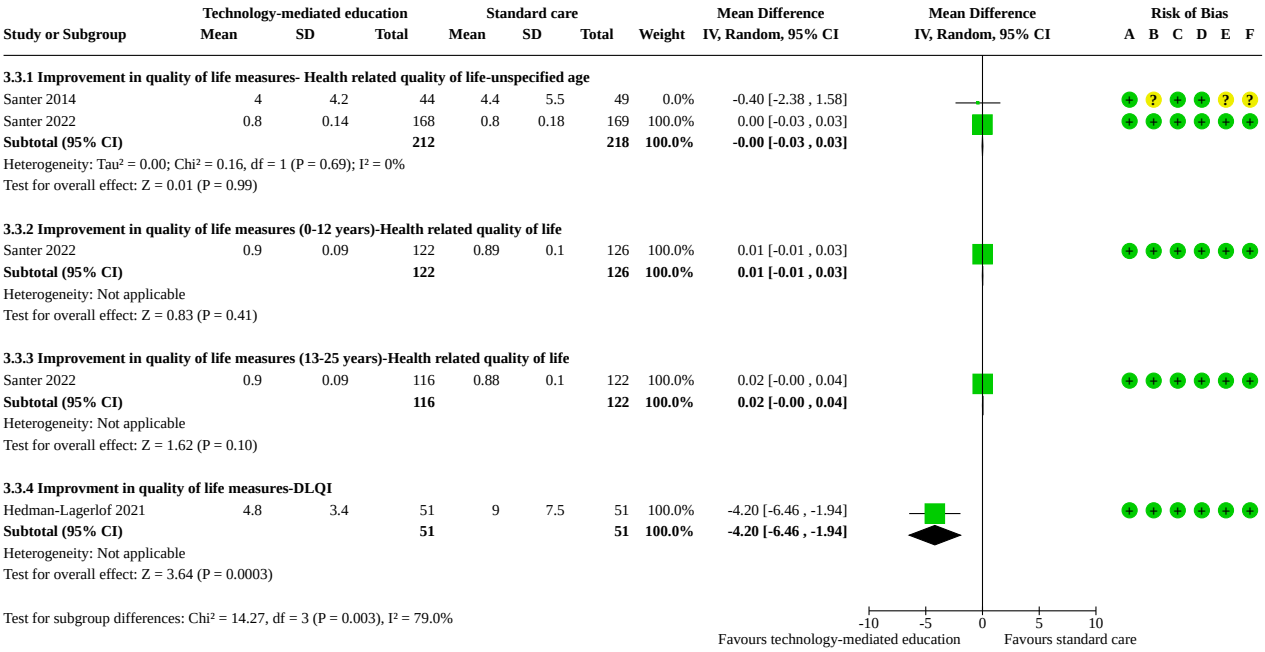
Analysis 3.2. Comparison 3: Technology-mediated educational interventions versus standard care only, Outcome 2: Reduction in disease severity, as measured by patient-reported symptoms (POEM)



Study or Subgroup	Technology-mediated education Mean	SD	Total	Standard care Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
3.2.1 Reduction in disease severity as measured by patient-POEM-unspecified age									
Hedman-Lagerlof 2021	2.4	2.1	51	3.4	2.6	51	83.7%	-1.00 [-1.92 , -0.08]	+ + + + + +
Santer 2014	7.6	6.1	44	7.1	6.6	49	16.3%	0.50 [-2.08 , 3.08]	+ + + + - ?
Subtotal (95% CI)			**95**			**100**	**100.0%**	**-0.76 [-1.84 , 0.33]**	
Heterogeneity: Tau² = 0.15; Chi² = 1.15, df = 1 (P = 0.28); I² = 13%									
Test for overall effect: Z = 1.36 (P = 0.17)									
3.2.2 Long Term Reduction in disease severity as measured by patient (0-12 years)-POEM									
Santer 2022	8.9	6.7	171	10	6.6	169	100.0%	-1.10 [-2.51 , 0.31]	+ + + + + +
Subtotal (95% CI)			**171**			**169**	**100.0%**	**-1.10 [-2.51 , 0.31]**	
Heterogeneity: Not applicable									
Test for overall effect: Z = 1.53 (P = 0.13)									
3.2.3 Long term reduction in disease severity as measured by patient (13 -25 years)-POEM									
Santer 2022	10.7	6.6	168	12.7	6.8	169	100.0%	-2.00 [-3.43 , -0.57]	+ + + + + +
Subtotal (95% CI)			**168**			**169**	**100.0%**	**-2.00 [-3.43 , -0.57]**	
Heterogeneity: Not applicable									
Test for overall effect: Z = 2.74 (P = 0.006)									

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 3.3. Comparison 3: Technology-mediated educational interventions versus standard care only, Outcome 3: Improvement in quality-of-life measures

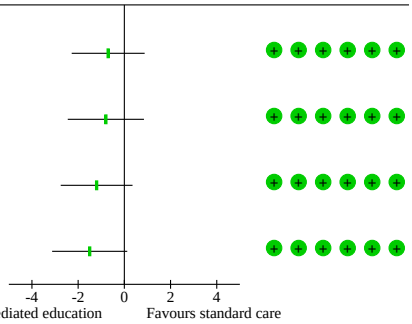


Study or Subgroup	Technology-mediated education Mean	SD	Total	Standard care Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
3.3.1 Improvement in quality of life measures- Health related quality of life-unspecified age									
Santer 2014	4	4.2	44	4.4	5.5	49	0.0%	-0.40 [-2.38 , 1.58]	+ ? + + ? ?
Santer 2022	0.8	0.14	168	0.8	0.18	169	100.0%	0.00 [-0.03 , 0.03]	+ + + + + +
Subtotal (95% CI)			**212**			**218**	**100.0%**	**-0.00 [-0.03 , 0.03]**	
Heterogeneity: Tau² = 0.00; Chi² = 0.16, df = 1 (P = 0.69); I² = 0%									
Test for overall effect: Z = 0.01 (P = 0.99)									
3.3.2 Improvement in quality of life measures (0-12 years)-Health related quality of life									
Santer 2022	0.9	0.09	122	0.89	0.1	126	100.0%	0.01 [-0.01 , 0.03]	+ + + + + +
Subtotal (95% CI)			**122**			**126**	**100.0%**	**0.01 [-0.01 , 0.03]**	
Heterogeneity: Not applicable									
Test for overall effect: Z = 0.83 (P = 0.41)									
3.3.3 Improvement in quality of life measures (13-25 years)-Health related quality of life									
Santer 2022	0.9	0.09	116	0.88	0.1	122	100.0%	0.02 [-0.00 , 0.04]	+ + + + + +
Subtotal (95% CI)			**116**			**122**	**100.0%**	**0.02 [-0.00 , 0.04]**	
Heterogeneity: Not applicable									
Test for overall effect: Z = 1.62 (P = 0.10)									
3.3.4 Improvment in quality of life measures-DLQI									
Hedman-Lagerlof 2021	4.8	3.4	51	9	7.5	51	100.0%	-4.20 [-6.46 , -1.94]	+ + + + + +
Subtotal (95% CI)			**51**			**51**	**100.0%**	**-4.20 [-6.46 , -1.94]**	
Heterogeneity: Not applicable									
Test for overall effect: Z = 3.64 (P = 0.0003)									
Test for subgroup differences: Chi² = 14.27, df = 3 (P = 0.003), I² = 79.0%									

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 3.4. Comparison 3: Technology-mediated educational interventions versus standard care only, Outcome 4: Improvement in long-term control of eczema symptoms (RECAP)

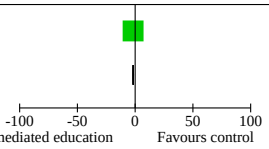
Study or Subgroup	Technology-mediated education Mean	SD	Total	Standard care Mean	SD	Total	Mean Difference IV, Random, 95% CI
3.4.1 Improvement in long-term control in eczema symptoms (0-12 years)-RECAP at 24 wks							
Santer 2022	9	6.1	116	9.7	6.3	121	-0.70 [-2.28 , 0.88]
3.4.2 Improvement in long-term control in eczema symptoms (0-12 years)-RECAP at 52 wks							
Santer 2022	8.6	6	117	9.4	6.9	119	-0.80 [-2.45 , 0.85]
3.4.3 Improvement in long-term control in eczema symptoms (13-25 years)-RECAP at 24 wks							
Santer 2022	10.3	6	109	11.5	6.3	133	-1.20 [-2.75 , 0.35]
3.4.4 Improvement in long-term control in eczema symptoms (13-25 years)-RECAP at 52 wks							
Santer 2022	9.2	6	102	10.7	6.6	130	-1.50 [-3.13 , 0.13]

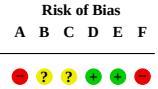


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 3.5. Comparison 3: Technology-mediated educational interventions versus standard care only, Outcome 5: Improvement in psychological well-being measures: one-item overall stress-rating scale

Study or Subgroup	Technology-mediated education Mean	SD	Total	Standard care Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Kimata 2004[a]	1.46	0.49	24	3.24	0.73	24	100.0%	-1.78 [-2.13 , -1.43]
Total (95% CI)			**24**			**24**	**100.0%**	**-1.78 [-2.13 , -1.43]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 9.92 (P < 0.00001)								
Test for subgroup differences: Not applicable								





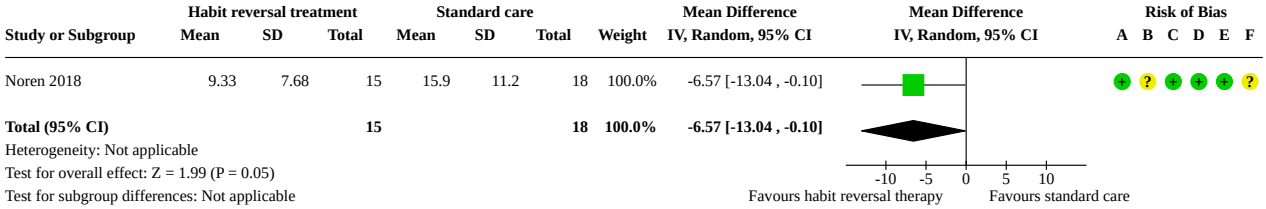
Footnotes
[a]cross-over design

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 4. Habit reversal versus standard care only

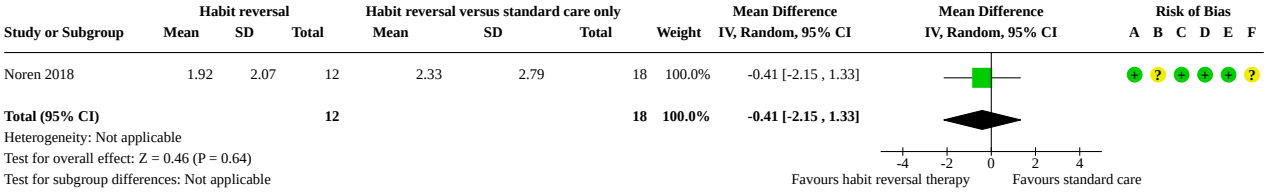
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
4.1 Reduction in disease severity, as measured by clinical signs (SCORAD)	1	33	Mean Difference (IV, Random, 95% CI)	-6.57 [-13.04, -0.10]
4.2 Improvement in quality-of-life measures: children (CDLQI)	1	30	Mean Difference (IV, Random, 95% CI)	-0.41 [-2.15, 1.33]

Analysis 4.1. Comparison 4: Habit reversal versus standard care only, Outcome 1: Reduction in disease severity, as measured by clinical signs (SCORAD)



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 4.2. Comparison 4: Habit reversal versus standard care only, Outcome 2: Improvement in quality-of-life measures: children (CDLQI)

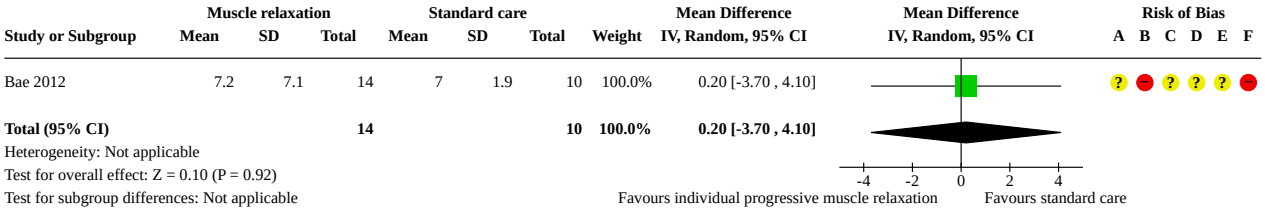


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 5. Arousal reduction therapy: individual progressive muscle relaxation versus standard care

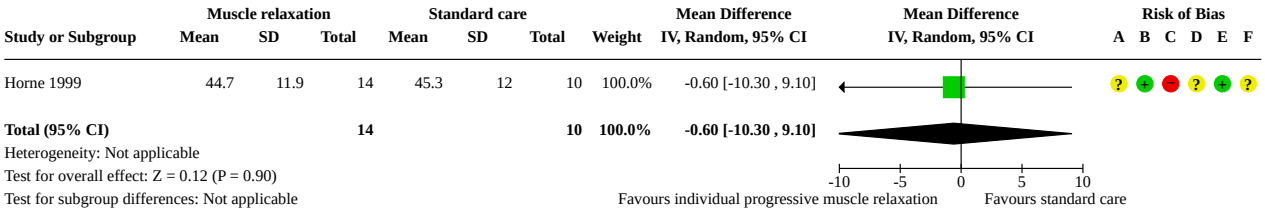
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
5.1 Reduction in disease severity, as measured by clinical signs (EASI)	1	24	Mean Difference (IV, Random, 95% CI)	0.20 [-3.70, 4.10]
5.2 Improvement in psychological measures: State Anxiety	1	24	Mean Difference (IV, Random, 95% CI)	-0.60 [-10.30, 9.10]

Analysis 5.1. Comparison 5: Arousal reduction therapy: individual progressive muscle relaxation versus standard care, Outcome 1: Reduction in disease severity, as measured by clinical signs (EASI)



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 5.2. Comparison 5: Arousal reduction therapy: individual progressive muscle relaxation versus standard care, Outcome 2: Improvement in psychological measures: State Anxiety

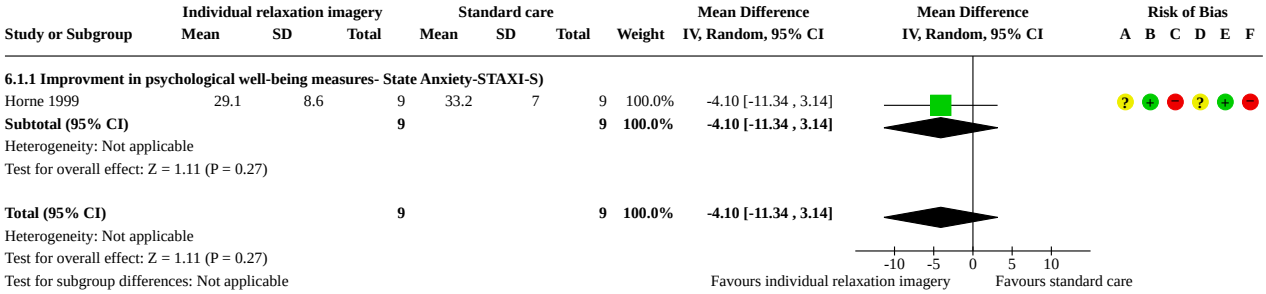


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 6. Arousal reduction therapy: individual relaxation imagery versus standard care

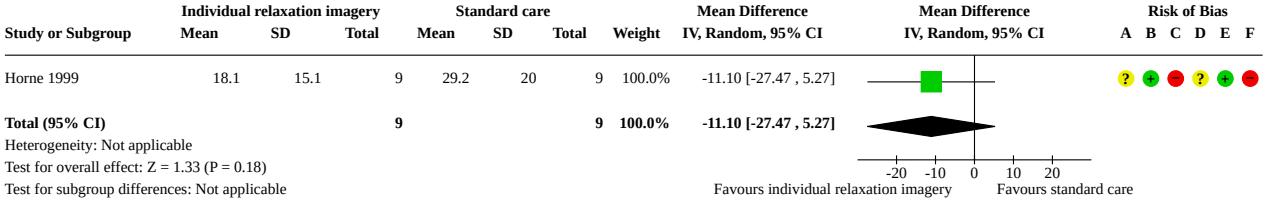
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
6.1 Improvement in psychological well-being measures: State Anxiety	1	18	Mean Difference (IV, Random, 95% CI)	-4.10 [-11.34, 3.14]
6.1.1 Improvment in psychological well-being measures- State Anxiety-STAXI-S)	1	18	Mean Difference (IV, Random, 95% CI)	-4.10 [-11.34, 3.14]
6.2 Reduction in disease severity, as measured by patient-reported symptoms (VAS)	1	18	Mean Difference (IV, Random, 95% CI)	-11.10 [-27.47, 5.27]

Analysis 6.1. Comparison 6: Arousal reduction therapy: individual relaxation imagery versus standard care, Outcome 1: Improvement in psychological well-being measures: State Anxiety



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 6.2. Comparison 6: Arousal reduction therapy: individual relaxation imagery versus standard care, Outcome 2: Reduction in disease severity, as measured by patient-reported symptoms (VAS)



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

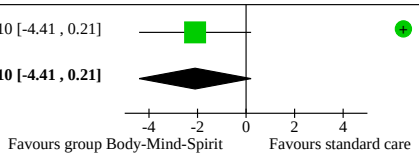
Comparison 7. Arousal reduction therapy: group integrated Body-Mind-Spirit versus standard care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
7.1 Improvement in quality-of-life measures (DFI)	1	91	Mean Difference (IV, Random, 95% CI)	-2.10 [-4.41, 0.21]
7.2 Improvement in psychological well-being measures	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
7.2.1 Perceived Stress- Carers-Perceived Stress (PSS) Intervention	1	91	Mean Difference (IV, Random, 95% CI)	-1.20 [-3.38, 0.98]
7.2.2 Depression - Carer-Depression (PHQ-9) Intervention	1	91	Mean Difference (IV, Random, 95% CI)	-1.00 [-3.09, 1.09]
7.2.3 Anxiety Carer -Anxiety (GAD7) Intervention	1	91	Mean Difference (IV, Random, 95% CI)	-1.10 [-3.19, 0.99]

Analysis 7.1. Comparison 7: Arousal reduction therapy: group integrated Body-Mind-Spirit versus standard care, Outcome 1: Improvement in quality-of-life measures (DFI)

Study or Subgroup	Group Body-Mind-Spirit Mean	SD	Total	Standard care Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Fung 2020	10.5	5.5	48	12.6	5.7	43	100.0%	-2.10 [-4.41 , 0.21]	+ ? + + ? ?
Total (95% CI)			**48**			**43**	**100.0%**	**-2.10 [-4.41 , 0.21]**	

Heterogeneity: Not applicable
Test for overall effect: Z = 1.78 (P = 0.07)
Test for subgroup differences: Not applicable

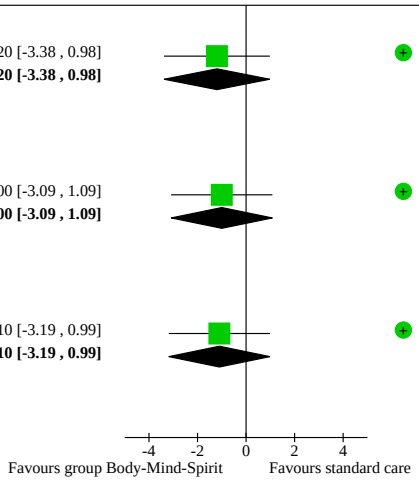


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 7.2. Comparison 7: Arousal reduction therapy: group integrated Body-Mind-Spirit versus standard care, Outcome 2: Improvement in psychological well-being measures

Study or Subgroup	Group Body-Mind-Spirit Mean	SD	Total	Standard care Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
7.2.1 Perceived Stress- Carers-Perceived Stress (PSS) Intervention									
Fung 2020	19.3	5.8	48	20.5	4.8	43	100.0%	-1.20 [-3.38 , 0.98]	+ ? + + ? ?
Subtotal (95% CI)			**48**			**43**	**100.0%**	**-1.20 [-3.38 , 0.98]**	
Heterogeneity: Not applicable									
Test for overall effect: Z = 1.08 (P = 0.28)									
7.2.2 Depression - Carer-Depression (PHQ-9) Intervention									
Fung 2020	5.8	4.1	48	6.8	5.8	43	100.0%	-1.00 [-3.09 , 1.09]	+ ? + + ? ?
Subtotal (95% CI)			**48**			**43**	**100.0%**	**-1.00 [-3.09 , 1.09]**	
Heterogeneity: Not applicable									
Test for overall effect: Z = 0.94 (P = 0.35)									
7.2.3 Anxiety Carer -Anxiety (GAD7) Intervention									
Fung 2020	5.5	4.1	48	6.6	5.8	43	100.0%	-1.10 [-3.19 , 0.99]	+ ? + + ? ?
Subtotal (95% CI)			**48**			**43**	**100.0%**	**-1.10 [-3.19 , 0.99]**	
Heterogeneity: Not applicable									
Test for overall effect: Z = 1.03 (P = 0.30)									

Test for subgroup differences: Chi² = 0.02, df = 2 (P = 0.99), I² = 0%



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

ADDITIONAL TABLES

Table 1. Glossary of terms

Term	Definition
Aetiology	Refers to the cause of the disease

Table 1. Glossary of terms *(Continued)*

Allergens	Antigens (see below) which produce an abnormally severe immune response (leading to allergy symptoms) but would otherwise be harmless to the body
Antigens	Substances from outside the body that interact with the immune system, specifically by being bound to an antibody
Biologic drug	A medicine that has been produced from a living organism. Monoclonal antibodies (see below) are a form of biologic drug.
Calcineurin inhibitors	A class of medicines that inhibit the immune system by blocking the action of calcineurin, a chemical that activates T-cells (a type of white blood cell). In eczema, these are commonly used in a form that can be applied directly to the skin, although ciclosporin is a systemic form (see below) of calcineurin inhibitor which is sometimes used to treat more severe cases.
Chronicity	The propensity for a disease to have a long duration (note: this does not relate to the severity of a disease).
Concordance	A method of communication and shared decision making, which recognises that within normal circumstances the decision whether to take a medicine or not lies, ultimately, with the patient.
Epidermis	The outermost layer of the skin
Erythema	Red appearance of the skin due to increased blood flow, often a marker of inflammation
Excoriation	Clinical sign of the top layer of the skin having been removed. In the context of eczema, usually due to scratching
Filaggrin	A protein within the outermost skin cells that contributes to the flattening and strengthening of cells to create a strong barrier. Its broken-down products also help maintain the water content in the skin.
Hyper/hypo-pigmentation	Increased/decreased appearance of pigment in the skin
Keratin	One of the major constituents of hair, nails and the top layer of the skin. It forms a network within skin cells (keratinocytes)
Lamellar lipid bilayers	A double layer of molecules in the skin that do not dissolve in water and are therefore helpful in maintaining water content of the skin
Leukotriene antagonists	A group of drugs that have an effect on the immune system by blocking leukotrienes, a class of chemicals involved in inflammation and the immune response. They are most commonly used in the treatment of asthma.
Monoclonal antibody	A protein produced in a laboratory from cloning a single white blood cell. The resulting protein can be used to interact with the immune system for a specific purpose.
Pathological inflammation	Inflammation in the body that causes symptoms or is harmful and is due to an overactivity or abnormality with the immune system itself, rather than an external cause such as infection or trauma
Percutaneous	Through the skin
Systemic form	A form of a drug that can be administered into the body, whether by mouth or injection, and therefore has an effect on the whole body not just a specific site.
Vesicles	Small blisters of the skin that contain clear fluid

APPENDICES

Appendix 1. Search strategy for the Cochrane Skin Register (CRS-Web)

1. eczema* or dermatiti* or neurodermatiti* AND INREGISTER
2. (psychotherap* or relaxation or counseling or counselling or biofeedback or mindfulness or meditation or empowerment or distraction or habit or stress or imagery):TI,AB AND INREGISTER
3. "behavio* therap*":TI,AB AND INREGISTER
4. "family therap*":TI,AB AND INREGISTER
5. "psychodynamic therap*":TI,AB AND INREGISTER
6. "talking therap*":TI,AB AND INREGISTER
7. health NEAR2 (promotion or education or training or teaching):TI,AB AND INREGISTER
8. (patient* or caregiver* or carer* or parent* or dermatolo* or communit* or group*) NEAR2 (education or training or teaching or learning or information or course* or program*):TI,AB AND INREGISTER
9. (cognitive or autogenic) NEAR2 (therap* or counsel* or training):TI,AB AND INREGISTER
10. psychological NEAR2 (therap* or intervention*):TI,AB AND INREGISTER
11. "arousal reduction technique*":TI,AB AND INREGISTER
12. behavio* NEAR2 (management or contracting or change):TI,AB AND INREGISTER
13. #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12
14. #1 AND #13

Appendix 2. Search strategy for CENTRAL (Cochrane Library)

#1 MeSH descriptor: [Eczema] explode all trees

#2 MeSH descriptor: [Dermatitis, Atopic] explode all trees

#3 MeSH descriptor: [Neurodermatitis] explode all trees

#4 MeSH descriptor: [Dermatitis] explode all trees

#5 (eczema* or dermatiti* or neurodermatiti*):ti,ab

#6 #1 or #2 or #3 or #4 or #5

#7 MeSH descriptor: [Psychotherapy] explode all trees

#8 MeSH descriptor: [Behavior Therapy] explode all trees

#9 MeSH descriptor: [Cognitive Behavioral Therapy] explode all trees

#10 MeSH descriptor: [Relaxation Therapy] explode all trees

#11 MeSH descriptor: [Family Therapy] explode all trees

#12 MeSH descriptor: [Autogenic Training] explode all trees

#13 MeSH descriptor: [Counseling] explode all trees

#14 MeSH descriptor: [Biofeedback, Psychology] explode all trees

#15 (psychotherap* or relaxation or counseling or counselling or biofeedback or mindfulness):ti,ab

#16 (behavio* next therap*):ti,ab

#17 (family next therap*):ti,ab

#18 (psychodynamic next therap*):ti,ab

#19 (talking next therap*):ti,ab

#20 MeSH descriptor: [Psychotherapy, Psychodynamic] explode all trees

#21 MeSH descriptor: [Mindfulness] explode all trees

#22 (behavioral or behavioural) next contracting:ti,ab

#23 cognitive next (therap* or counsel* or training):ti,ab

#24 autogenic next (therap* or counsel* or training):ti,ab

#25 (behavio* next management):ti,ab

#26 (behavio* next change*):ti,ab

#27 MeSH descriptor: [Health Education] explode all trees

#28 MeSH descriptor: [Patient Education Handout] explode all trees

#29 MeSH descriptor: [Health Promotion] explode all trees

#30 MeSH descriptor: [Patient Education as Topic] explode all trees

#31 (Eczema next Education next Program*):ti,ab

#32 health next (promotion or education or training or teaching):ti,ab

#33 (patient* or caregiver* or carer* or parent* or dermatolo* or communit* or group*) next (education or training or teaching or learning or information or course* or program*):ti,ab

#34 psychological next (therap* or intervention*):ti,ab

#35 (arousal next reduction next technique*):ti,ab

#36 MeSH descriptor: [Imagery, Psychotherapy] explode all trees

#37 stress near/2 (managing or manage$):ti,ab

#38 MeSH descriptor: [Empowerment] explode all trees

#39 (distraction next technique*):ti,ab

#40 "habit reversal":ti,ab

#41 MeSH descriptor: [Meditation] explode all trees

#42 {OR #7-#41}

#43 #6 and #42

#44 MeSH descriptor: [Eczema] explode all trees and with qualifier(s): [psychology - PX]

#45 MeSH descriptor: [Dermatitis, Atopic] explode all trees and with qualifier(s): [psychology - PX]

#46 MeSH descriptor: [Neurodermatitis] explode all trees and with qualifier(s): [psychology - PX]

#47 MeSH descriptor: [Dermatitis] explode all trees and with qualifier(s): [psychology - PX]

#48 {OR #44-#47}

#49 #43 OR #48

Appendix 3. Search strategy for MEDLINE (Ovid)

1. Eczema/
2. eczema$.ti,ab.
3. dermatitis, atopic/ or dermatitis/
4. dermatiti$.ti,ab.
5. Neurodermatitis/
6. neurodermatiti$.ti,ab.
7. 1 or 2 or 3 or 4 or 5 or 6

8. exp Psychotherapy/
9. exp Behavior Therapy/
10. exp Cognitive Therapy/
11. exp Relaxation Therapy/
12. exp Family Therapy/
13. exp Autogenic Training/
14. exp Counseling/
15. exp Biofeedback, Psychology/
16. psychotherap$.ti,ab.
17. behavio$ therap$.ti,ab.
18. ((cognitive or autogenic) adj2 (therap$ or counsel$ or training)).ti,ab.
19. relaxation.ti,ab.
20. family therap$.ti,ab.
21. (counseling or counselling).ti,ab.
22. Biofeedback.ti,ab.
23. psychotherapy, psychodynamic/
24. psychodynamic therap$.ti,ab.
25. talking therap$.ti,ab.
26. behavio$ management.ti,ab.
27. ((Behavioral or behavioural) adj contracting).ti,ab.
28. behavio$ change$.ti,ab.
29. Mindfulness/
30. mindfulness.ti,ab.
31. exp Health Education/
32. exp Patient Education Handout/
33. exp Health Promotion/
34. exp Patient Education as Topic/
35. Eczema Education Program$.ti,ab.
36. (health adj (promotion or education or training or teaching)).ti,ab.
37. ((patient$ or caregiver$ or carer$ or parent$ or dermatolo$ or communit$ or group$) adj (education or training or teaching or learning or information or course$ or program$)).ti,ab.
38. (psychological adj (therap$ or intervention$)).ti,ab.
39. arousal reduction technique$.ti,ab.
40. Imagery, Psychotherapy/
41. (stress adj2 (managing or manage$)).ti,ab.
42. Empowerment/
43. distraction technique$.ti,ab.
44. habit reversal.ti,ab.
45. Meditation/
46. or/8-45
47. exp Eczema/px [Psychology]
48. exp Dermatitis, Atopic/px [Psychology]
49. exp Neurodermatitis/px [Psychology]
50. exp Dermatitis/px [Psychology]
51. 47 or 48 or 49 or 50
52. randomized controlled trial.pt.
53. controlled clinical trial.pt.
54. randomized.ab.
55. placebo.ab.
56. clinical trials as topic.sh.
57. randomly.ab.
58. trial.ti.
59. 52 or 53 or 54 or 55 or 56 or 57 or 58
60. exp animals/ not humans.sh.
61. 59 not 60
62. 51 and 61
63. 7 and 46 and 61
64. 62 or 63

[Lines 52-61: Cochrane Highly Sensitive Search Strategy for identifying randomized trials in MEDLINE: sensitivity- and precision-maximizing version (2008 revision); Ovid format, from section 3.6.1 in Lefebvre C, Glanville J, Briscoe S, Littlewood A, Marshall C, Metzendorf M-I, et al. Technical Supplement to Chapter 4: Searching for and selecting studies. In: Higgins JPT, Thomas J, Chandler J, Cumpston MS,

Li T, Page MJ, Welch VA (eds). Cochrane Handbook for Systematic Reviews of Interventions Version 6. Cochrane, 2019. Available from: www.training.cochrane.org/handbook]

Appendix 4. Search strategy for Embase (Ovid)

Embase <1974 to 2021 November 17>

1 exp ECZEMA/ 28637

2 eczema$.ti,ab. 28113

3 exp DERMATITIS/ 166699

4 dermatiti$.ti,ab. 87625

5 exp atopic dermatitis/ 48306

6 exp NEURODERMATITIS/ 2910

7 neurodermatiti$.ti,ab. 761

8 or/1-7 186042

9 exp psychotherapy/ or autogenic training/ or behavior contracting/ or behavior modification/ or behavior therapy/ or cognitive rehabilitation/ or cognitive therapy/ or family therapy/ or mindfulness/ or psychodynamic psychotherapy/ or relaxation training/ 266884

10 exp counseling/ 181870

11 exp biofeedback/ 6152

12 psychotherap$.ti,ab. 60822

13 behavio$ therap$.ti,ab. 35157

14 ((cognitive or autogenic) adj2 (therap$ or counsel$ or training)).ti,ab. 39425

15 relaxation.ti,ab. 136504

16 family therap$.ti,ab. 5555

17 (counseling or counselling).ti,ab. 148051

18 Biofeedback.ti,ab. 10725

19 psychodynamic therap$.ti,ab. 845

20 talking therap$.ti,ab. 232

21 behavio$ management.ti,ab. 2483

22 ((Behavioral or behavioural) adj contracting).ti,ab. 78

23 behavio$ change$.ti,ab. 50821

24 mindfulness.ti,ab. 12162

25 health education/ or exp health literacy/ or exp health promotion/ or exp patient education/ or exp school health education/ 319525

26 eczema education program$.ti,ab. 15

27 education program/ 52304

28 (health adj (promotion or education or training or teaching)).ti,ab. 76669

29 ((patient$ or caregiver$ or carer$ or parent$ or dermatolo$ or communit$ or group$) adj (education or training or teaching or learning or information or course$ or program$)).ti,ab. 82593

30 (psychological adj (therap$ or intervention$)).ti,ab. 12699

31 arousal reduction technique$.ti,ab. 3

32 imagery.ti,ab. 19119

33 imagery/ 9553

34 (stress adj2 (managing or manage$)).ti,ab. 10264

35 stress management/ or coping behavior/ 70831

36 exp empowerment/ 11225

37 distraction technique$.ti,ab. 656

38 habit reversal.ti,ab. 366

39 meditation/ 8141

40 or/9-39 1169957

41 Randomized controlled trial/ 683714

42 Controlled clinical study/ 464458

43 random$.ti,ab. 1724827

44 randomization/ 92198

45 intermethod comparison/ 277084

46 placebo.ti,ab. 332128

47 (open adj label).ti,ab. 92300

48 ((double or single or doubly or singly) adj (blind or blinded or blindly)).ti,ab. 250261

49 double blind procedure/ 189568

50 parallel group$1.ti,ab. 28389

51 (crossover or cross over).ti,ab. 113487

52 ((assign$ or match or matched or allocation) adj5 (alternate or group$1 or intervention$1 or patient$1 or subject$1 or participant $1)).ti,ab. 366846

53 (controlled adj7 (study or design or trial)).ti,ab. 392417

54 trial.ti. 343319

55 or/41-54 2772906

56 exp animal/ or exp invertebrate/ or animal experiment/ or animal model/ or animal tissue/ or animal cell/ or nonhuman/ 29744747

57 human/ or normal human/ 22943995

58 56 and 57 22943995

59 56 not 58 6800752

60 55 not 59 2479645

61 8 and 40 and 60 404

[Lines 41-60: Based on terms suggested for identifying RCTs in Embase (section 3.6.2) in Lefebvre C, Glanville J, Briscoe S, Littlewood A, Marshall C, Metzendorf M-I, Noel-Storr A, Rader T, Shokraneh F, Thomas J, Wieland LS. Technical Supplement to Chapter 4: Searching for and selecting studies. In: Higgins JPT, Thomas J, Chandler J, Cumpston MS, Li T, Page MJ, Welch VA (eds). Cochrane Handbook for Systematic Reviews of Interventions Version 6. Cochrane, 2019. Available from: www.training.cochrane.org/handbook]

Appendix 5. Search strategy for APA PsycINFO (Ovid)

APA PsycInfo <1806 to November Week 2 2021>

1 eczema$.ti,ab. or exp Eczema/ 427

2 dermatiti$.ti,ab. or exp Dermatitis/ 912

3 neurodermatiti$.ti,ab. or exp Neurodermatitis/ 94

4 1 or 2 or 3 1182

5 double-blind.tw. 23950

6 random$ assigned.tw. 38709

7 control.tw. 474870

8 5 or 6 or 7 515943

9 4 and 8 158

Lines 5-8 of this strategy are a therapy filter for PsycINFO (OVID) (best optimization of sensitivity and specificity version) created by the Health Information Research Unit at McMaster University and reported in Eady AM, Wilczynski NL, Haynes RB. PsycINFO search strategies identified methodologically sound therapy studies and review articles for use by clinicians and researchers. Journal of Clinical Epidemiology. 2008 Jan;61(1):34-40. doi: 10.1016/j.jclinepi.2006.09.016. PMID: 18083460.

Appendix 6. Search strategy for ClinicalTrials.gov

We will use the 'advanced search' function and search for:

Condition or disease: eczema OR dermatitis OR neurodermatitis

Combined with these Intervention terms searched in batches:

1. psychotherapy OR biofeedback OR mindfulness OR meditation OR imagery OR empowerment OR “habit reversal” OR stress
2. Eczema Education Programme
3. health AND (promotion OR education OR training OR teaching OR learning OR information OR course OR programme OR program)
4. (behavior OR behaviour OR behavioural OR behavioral) AND (therapy OR therapies OR management OR manage OR managing OR change OR contracting OR counselling OR counseling OR training)
5. (cognitive OR relaxation OR family OR talking OR psychodynamic OR psychological OR autogenic OR stress) AND (therapy OR therapies OR management OR manage OR managing OR change OR contracting OR counselling OR counseling OR training)

Study type: interventional studies (Clinical Trials)

Study results: all studies

Appendix 7. Search strategy for WHO ICTRP

We will use the 'advanced search' function and search for:

Eczema* OR dermatiti* OR neurodermatiti* **in condition**

Combined with the following two groups of intervention terms (split due to character limit in the search facility)

1. education* OR psycholog* OR psychother* OR training OR teaching OR learning OR information OR course* OR programme* OR program* OR behavio* OR counsel* OR stress **in intervention**

2. cognitive OR relaxation OR family OR autogenic OR biofeedback OR psychodynamic OR talking OR mindfulness OR health promotion OR empowerment OR meditation **in intervention**

Appendix 8. Search strategies for economic evaluation searches

NHS EED, University of York Centre for Reviews and Dissemination
https://www.crd.york.ac.uk/crdweb/HomePage.asp

eczema* or dermati* or neurodermati* (Any Field)

Ovid MEDLINE(R) ALL <1946 to June 07, 2022>
Date limit 2015 to date
1 Eczema/ 12043
2 eczema$.ti,ab. 20295
3 dermatitis, atopic/ or dermatitis/ 35378
4 dermatiti$.ti,ab. 64212
5 Neurodermatitis/ 1581
6 neurodermatiti$.ti,ab. 834
7 1 or 2 or 3 or 4 or 5 or 6 92641
8 exp Psychotherapy/ 212236
9 exp Behavior Therapy/ 85436
10 exp Cognitive Therapy/ 34252
11 exp Relaxation Therapy/ 9880
12 exp Family Therapy/ 9111
13 exp Autogenic Training/ 1134
14 exp Counseling/ 47599
15 exp Biofeedback, Psychology/ 12564
16 psychotherap$.ti,ab. 46042
17 behavio$ therap$.ti,ab. 26193
18 ((cognitive or autogenic) adj2 (therap$ or counsel$ or training)).ti,ab. 29660
19 relaxation.ti,ab. 128122
20 family therap$.ti,ab. 3878
21 (counseling or counselling).ti,ab. 106778
22 Biofeedback.ti,ab. 7490
23 psychotherapy, psychodynamic/ 718
24 psychodynamic therap$.ti,ab. 591
25 talking therap$.ti,ab. 186
26 behavio$ management.ti,ab. 2056
27 ((Behavioral or behavioural) adj contracting).ti,ab. 55
28 behavio$ change$.ti,ab. 42220
29 Mindfulness/ 5349
30 mindfulness.ti,ab. 10271
31 exp Health Education/ 258377
32 exp Patient Education Handout/ 5536
33 exp Health Promotion/ 83299
34 exp Patient Education as Topic/ 88371
35 Eczema Education Program$.ti,ab. 4
36 (health adj (promotion or education or training or teaching)).ti,ab. 68604
37 ((patient$ or caregiver$ or carer$ or parent$ or dermatolo$ or communit$ or group$) adj (education or training or teaching or learning or information or course$ or program$)).ti,ab. 57395
38 (psychological adj (therap$ or intervention$)).ti,ab. 9499
39 arousal reduction technique$.ti,ab. 1
40 Imagery, Psychotherapy/ 2139
41 (stress adj2 (managing or manage$)).ti,ab. 8074
42 Empowerment/ 683
43 distraction technique$.ti,ab. 525
44 habit reversal.ti,ab. 262
45 Meditation/ 3513
46 or/8-45 845851
47 exp Eczema/px [Psychology] 211
48 exp Dermatitis, Atopic/px [Psychology] 658
49 exp Neurodermatitis/px [Psychology] 83
50 exp Dermatitis/px [Psychology] 1189
51 47 or 48 or 49 or 50 1189
52 7 and 46 1517
53 51 or 52 2520
54 Economics/ 27450
55 exp "costs and cost analysis"/ 258312
56 Economics, Dental/ 1920
57 exp economics, hospital/ 25582
58 Economics, Medical/ 9199
59 Economics, Nursing/ 4013

60 Economics, Pharmaceutical/ 3065
61 (economic$ or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic$).ti,ab. 949435
62 (expenditure$ not energy).ti,ab. 34297
63 value for money.ti,ab. 1973
64 budget$.ti,ab. 33214
65 or/54-64 1110562
66 ((energy or oxygen) adj cost).ti,ab. 4544
67 (metabolic adj cost).ti,ab. 1606
68 ((energy or oxygen) adj expenditure).ti,ab. 27678
69 or/66-68 32792
70 65 not 69 1103006
71 letter.pt. 1182787
72 editorial.pt. 607437
73 historical article.pt. 368423
74 or/71-73 2137755
75 70 not 74 1063943
76 exp animals/ not humans/ 5015432
77 75 not 76 994282
78 bmj.jn. 85247
79 "cochrane database of systematic reviews".jn. 15876
80 health technology assessment winchester england.jn. 1468
81 or/78-80 102591
82 77 not 81 987639
83 53 and 82 177
84 limit 83 to yr="2015 -Current"

Ovid Embase <1974 to 2022 June 07>
Date limit 2015 to date

1 exp ECZEMA/ 29857
2 eczema$.ti,ab. 28969
3 exp DERMATITIS/ 172455
4 dermatiti$.ti,ab. 90476
5 exp atopic dermatitis/ 50657
6 exp NEURODERMATITIS/ 3012
7 neurodermatiti$.ti,ab. 764
8 or/1-7 192322
9 exp psychotherapy/ or autogenic training/ or behavior contracting/ or behavior modification/ or behavior therapy/ or cognitive rehabilitation/ or cognitive therapy/ or family therapy/ or mindfulness/ or psychodynamic psychotherapy/ or relaxation training/ 274330
10 exp counseling/ 187826
11 exp biofeedback/ 6628
12 psychotherap$.ti,ab. 62350
13 behavio$ therap$.ti,ab. 36512
14 ((cognitive or autogenic) adj2 (therap$ or counsel$ or training)).ti,ab. 41117
15 relaxation.ti,ab. 140178
16 family therap$.ti,ab. 5626
17 (counseling or counselling).ti,ab. 154322
18 Biofeedback.ti,ab. 10993
19 psychodynamic therap$.ti,ab. 870
20 talking therap$.ti,ab. 238
21 behavio$ management.ti,ab. 2560
22 ((Behavioral or behavioural) adj contracting).ti,ab. 79
23 behavio$ change$.ti,ab. 53369
24 mindfulness.ti,ab. 13196
25 health education/ or exp health literacy/ or exp health promotion/ or exp patient education/ or exp school health education/ 327343
26 eczema education program$.ti,ab. 15
27 education program/ 53152
28 (health adj (promotion or education or training or teaching)).ti,ab. 79708
29 ((patient$ or caregiver$ or carer$ or parent$ or dermatolo$ or communit$ or group$) adj (education or training or teaching or learning or information or course$ or program$)).ti,ab. 85903
30 (psychological adj (therap$ or intervention$)).ti,ab. 13402
31 arousal reduction technique$.ti,ab. 3

32 imagery.ti,ab. 19943
33 imagery/ 9867
34 (stress adj2 (managing or manage$)).ti,ab. 10780
35 stress management/ or coping behavior/ 74022
36 exp empowerment/ 11663
37 distraction technique$.ti,ab. 682
38 habit reversal.ti,ab. 374
39 meditation/ 8568
40 or/9-39 1207920
41 8 and 40 4413
42 Health Economics/ 34323
43 exp Economic Evaluation/ 334182
44 exp Health Care Cost/ 319187
45 pharmacoeconomics/ 8827
46 42 or 43 or 44 or 45 588103
47 (econom$ or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic$).ti,ab. 1256399
48 (expenditure$ not energy).ti,ab. 46328
49 (value adj2 money).ti,ab. 2743
50 budget$.ti,ab. 43613
51 47 or 48 or 49 or 50 1297604
52 46 or 51 1535282
53 letter.pt. 1227109
54 editorial.pt. 728293
55 note.pt. 896165
56 53 or 54 or 55 2851567
57 52 not 56 1423869
58 (metabolic adj cost).ti,ab. 1724
59 ((energy or oxygen) adj cost).ti,ab. 4793
60 ((energy or oxygen) adj expenditure).ti,ab. 35101
61 58 or 59 or 60 40451
62 57 not 61 1415604
63 animal/ 1577446
64 exp animal experiment/ 2854622
65 nonhuman/ 6923500
66 (rat or rats or mouse or mice or hamster or hamsters or animal or animals or dog or dogs or cat or cats or bovine or sheep).ti,ab,sh. 6169441
67 63 or 64 or 65 or 66 9771361
68 exp human/ 23693926
69 human experiment/ 578032
70 68 or 69 23695965
71 67 not (67 and 70) 6973089
72 62 not 71 1278654
73 0959-8146.is. 64611
74 (1469-493X or 1366-5278).is. 23430
75 1756-1833.en. 38950
76 73 or 74 or 75 112522
77 72 not 76 1271210
78 conference abstract.pt. 4417435
79 77 not 78 1032933
80 41 and 79 297
81 limit 80 to yr="2015 -Current"

HISTORY

Protocol first published: Issue 11, 2021

CONTRIBUTIONS OF AUTHORS

HS was the contact person with the editorial base and Cochrane.
HS co-ordinated contributions from the co-authors.

LD and DB conducted the searches, HSc updated the searches.

DB conducted the Brief economic commentary and responded to reviewer comments relating to it.

HS and AH screened papers against eligibility criteria (VH was consulted for any discrepancices).

HS obtained data on ongoing and unpublished trials.
HS and AH appraised the quality of papers.
HS, AH, JVO and SOM extracted data for the review and sought additional information about papers.
VH entered data into Review Manager Software.

OA analysed the data and created the summary of findings tables. RB and HS checked the summary of findings tables.
OA, SOM, SE, HS, AH, RB, interpreted data.
HS, AH, SE and AT drafted the clinical sections of the background and HS/AH/SE/RB and AT responded to the clinical comments of the referees.

OA, HS, AH, SE, SOM, AT and RB worked on the Methods section.
OA, HS, SOM, RB, and AH responded to the methodology and statistics comments of the referees.

All authors responded to general comments of the referees.

HS, SE, AH, JVO, VH, RB, SOM and AT wrote the Discussion and Authors' conclusions sections.

HS and RB wrote the Abstract.

HS and AH created the additional tables and the figures.

VH proofread for typographical errors and review consistency.

HS created the references.

HSc responded to referencing and trial searching comments from the referees.
AR was the consumer co-author, wrote the lay summary and checked the review for readability and clarity, as well as ensuring outcomes were relevant to consumers. AR replied to PLS comments from the referees.

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DECLARATIONS OF INTEREST

Singleton H: none known. Heidi works as a Senior Lecturer at Bournemouth University, is currently the Programme Lead for Children and Young People's Nursing and is on the Nursing and Midwifery Council register.

Hodder A reports receiving support for attending meetings or travel as part of an Associate Fellowship with the UK Dermatology Clinical Trials Network (personal payment). AH works for University Hospitals Dorset NHS Trust as a Locum Consultant, and formerly the Royal Cornwall Hospitals NHS Trust as an Associate Specialist undertaking NHS clinical work in dermatology (treating patients with eczema).

Almilaji O: none known. Orouba works in the Department of Health Service Research and Policy within the Faculty of Public Health and Policy at LSHTM as a full-time Research Fellow in Medical Statistics/Data Science at The London School of Hygiene and Tropical Medicine.

Ersser SJ declared that they have no conflict of interest. SJE works for Bournemouth University as the Head of The Centre for Wellbeing and Long-Term Health and Professor of Nursing & Dermatology Care teaching Dermatology, and is on the Nursing and Midwifery Council register (as a Registered General Nurse and non-medical prescriber).

Heaslip V: none known. Vanessa is a Professor of Nursing and Healthcare Equity at Salford University

Boyle RJ reports income from private practice at several clinics, including eczema management (personal payment). RB has received consulting fees as a Cochrane Senior Editor (personal payment). RB works as a paediatric allergist at Imperial College Healthcare NHS Trust (treating patients with eczema). RB is a Joint Co-ordinating Editor for Cochrane Skin and was not involved in the editorial process for this review.

O'Meara S: none known. Susan works for Kleijnen Systematic Reviews Ltd.

Boyers D: none known. Dwayne is a senior research fellow at the University of Aberdeen.

Roberts A: none known. Amanda is an active member of the Nottingham Support Group for Carers of Children with Eczema.

Scott H: none known. Helen works for Centre of Evidence Based Dermatology at the University of Nottingham.

Van Onselen J reports income from dermatology education projects and consultancy for the NHS, pharmaceutical and patient groups, all received into her business, Dermatology Education Partnership Ltd, of which she is a Director (VAT registered, corporation and personal tax paid; accounts audited). This includes participation in advisory boards regarding childhood atopic eczema and adult eczema management for AbbVie; pharmacist education on eczema management for Morph; an eczema article on prescribing update for Mark Allen Publishing; webinars on eczema management for Thornton & Ross; webinars on eczema management, sponsored by Dermal, for Mark Allen Publishing; educational online modules and eczema articles and a virtual conference presentation for *Nursing in Practice*; and consultancy for the Eczema mindlines project from University of Birmingham. JVO has received a personal payment from AbbVie for a delegate fee for attending an European Academy of Dermatology and Venereology (EADV) virtual meeting. JVO does skin cancer assessment and dermoscopy work one day per week for a private diagnostic company, Check4Cancer Ltd; and works two days per month in an NHS primary care dermatology clinic for SDSmyhealthcare Healthcare Federation, South Birmingham and Solihull Clinical Commissioning Group. Julie has caried out some work for companies (including L'Oreal) over the last three years, including leading a GP lunchtime education session on eczema, a Black Friday Campaign for two days (November 2023), which involved a 'helpline concept', speaking to the public about skin concerns for general advice and on three occasions worked for a Cerave project talking to the public about skin health and sun protection. All these projects had other HCPs involved, and were based around public education and support. This work was carried out in Julie's self employed time. JVO works 0.5 days per week as a nurse advisor on the National Eczema Society helpline and advises/writes public information on eczema for them.

Doney L: none known. Liz is a Senior Information Specialist at Nottinghamshire Healthcare NHS Foundation Trust

Thompson AR reports no specific conflict of interest. AT works as a Professor of Clinical Psychology and Consultant Clinical Psychologist for Cardiff and Vale University Health Board. He is Programme Director for the South Wales Clinical Psychology Programme based at Cardiff University. AT reports receipt of industry funding for presenting at dermatology educational events (UCB UK, Sanofi) and support with collaboration with dermatology research activity (not related to eczema: Pfizer; Incyte).

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Internal sources

- No sources of support provided

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- The National Institute for Health Research (NIHR), UK

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DIFFERENCES BETWEEN PROTOCOL AND REVIEW

The title has been changed from 'Psychological and educational interventions for managing eczema' in the protocol, to 'Educational and psychological interventions for managing atopic dermatitis (eczema)'.

Differences in summary of findings tables as follows: we added group educational interventions versus standard care because these were very frequent in the included trials, we have also assessed risk of bias on these outcomes. The order of the summary of findings tables changed because the final three tables contained no data.

We have distinguished between individual and group face-to-face education interventions in this review, whilst the protocol grouped them together under one face-to-face category.

INDEX TERMS

Medical Subject Headings (MeSH)

Bias; *Dermatitis, Atopic [psychology] [therapy]; Eczema [psychology] [therapy]; *Patient Education as Topic [methods]; *Quality of Life; *Randomized Controlled Trials as Topic

MeSH check words

Adolescent; Adult; Child; Humans