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Therapeutic patient education and self-management support for patients with psoriasis – a systematic review

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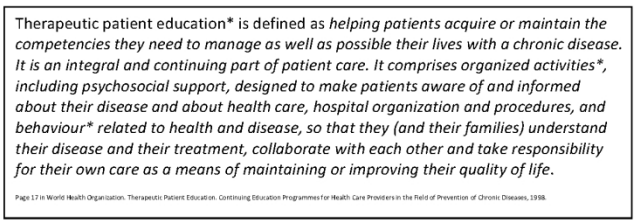

Figure 1: Definition of Therapeutic Patient Education by the WHO

Definition of Therapeutic Patient Education by the WHO

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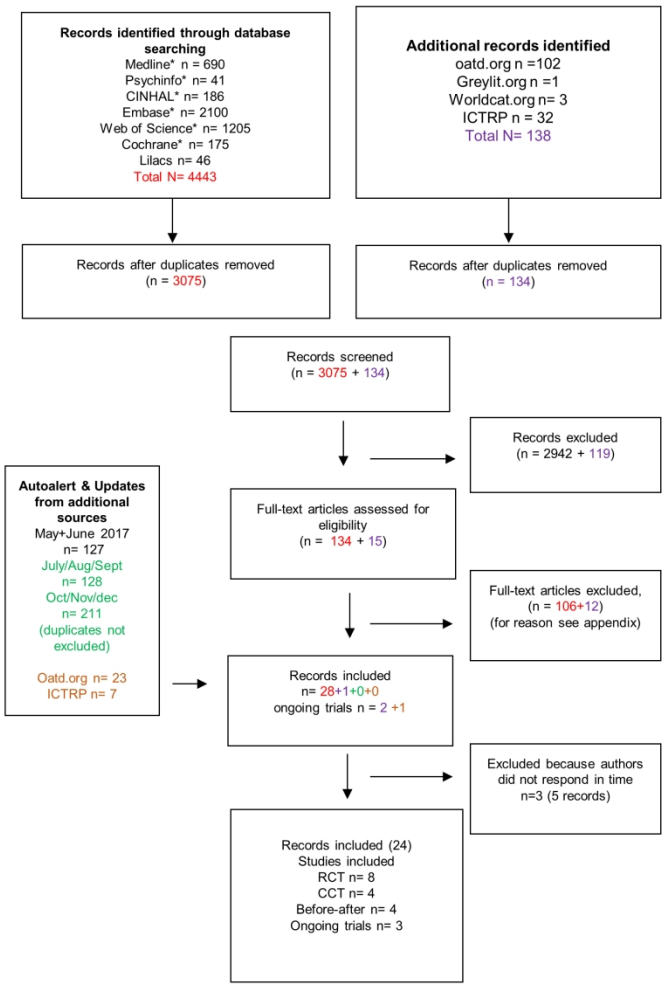

Record selection flow chart

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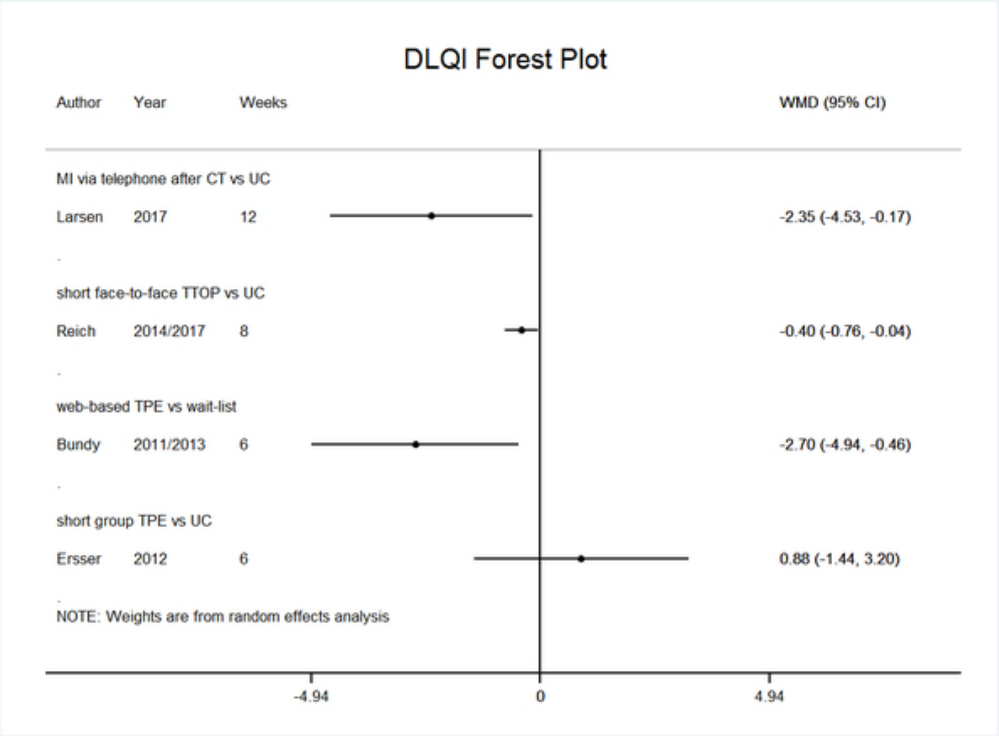

5. Figure 3a: Mean differences for Dermatology Life Quality Index; results per study (mean difference) (pooling was not appropriate due to the different study designs)Legend for Figure 3:CL – confidence IntervalTPE- therapeutic patient education interventionUC – usual careMD – mean difference

25x18mm (600 x 600 DPI)

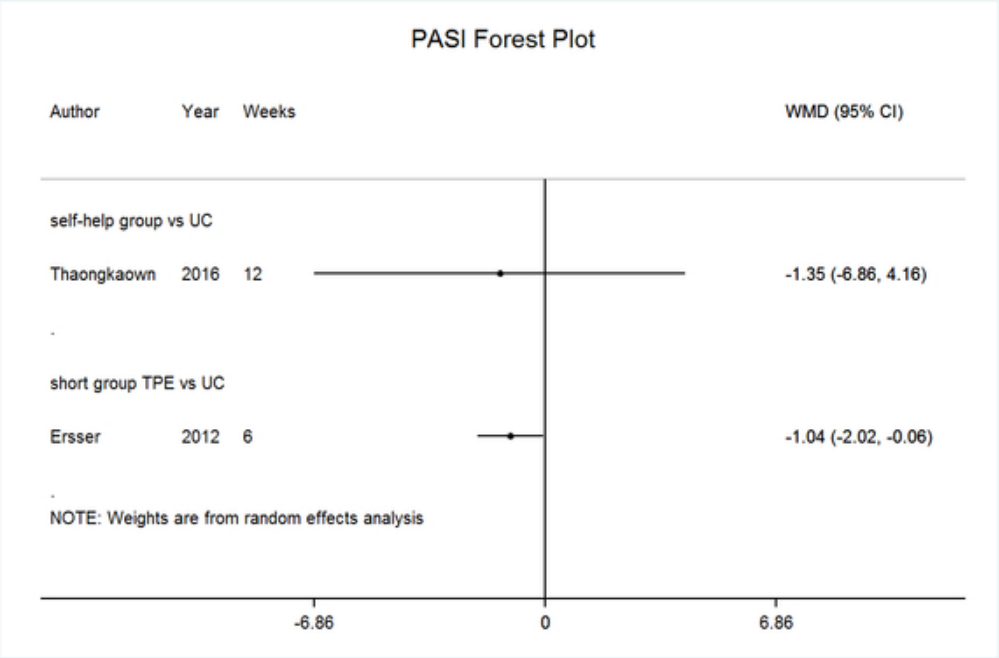

Figure 3b: Mean differences for Psoriasis Area and Severity Index; results per study (mean difference) (pooling was not appropriate due to the different study designs)Legend for Figure 3:CL – confidence IntervalTPE- therapeutic patient education interventionUC – usual careMD – mean difference

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Appendix – Contents:

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1. Data items

We adopted the criteria listed in the Template for Intervention Description and Replication (TIDieR) checklist to describe the intervention [67]. Additionally, we extracted data on: first author, year, country and language of intervention, study design, eligibility criteria, and number of patients included, baseline characteristics, dropout rates, and cost effectiveness. Specific to psoriasis we choose the following outcomes: Psoriasis Areas and Severity Index (PASI) 75%/90% improvement, mean (change) PASI, NAPSI, Dermatology Life Quality Index (DLQI), Short Form-36, withdrawal due to adverse events (AEs) and other, study-specific efficacy outcomes. If none of the pre-specified outcome measure were used, we reported the outcome that was reported to be the primary outcome of the included study as this size of the study should have been large enough to detect a difference if there was one (sample size calculation).

We extracted the mean and standard deviation for continuous outcomes, the proportion of patients achieving a predefined outcome for all dichotomous ones and the time of assessment as well as the number of patients assessed for all outcomes.

2. Search Strategy Medline (EBSCO)

We developed a search strategy and adapted it to seven academic databases: Medline (EBSCO), Psychinfo (EBSCO), CINHAL (EBSCO), Embase (1980-2017 April 04), Web of Science (Indexes=SCI-EXPANDED, SSCI Timespan=1985-2017), CENTRAL (Wiley), Lilacs), three grey literature repositories (oatd.org, greylit.org, worldcat.org) and the International Clinical Trials Registry Platform (ICTRP). Reference lists of included studies were also screened.

Example search strategy Medline (EBSCO)

S14	S13 AND S10
S13	S11 OR S12
S12	MH "Psoriasis"
S11	TI psoria* OR AB psoria*
S10	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9
S9	TI (educat* OR motiv* OR cope OR coping OR self-manag* OR support* OR support OR program* OR intervent* OR instruc*)
S8	AB (educat* OR motiv* OR cope OR coping OR self-manag* OR disease manag* OR healthy lifestyle) N8 (support* OR support OR program* OR intervent* OR instruct*)
S7	AB (nurse N3 educat*)
S6	TI self care OR AB self care
S5	MH “Self Care+” OR MH “Self Help Groups+”
S4	MH "Life Style" OR MH "Health Behavior"
S3	MH “Health Education” OR MH “Patient Education as Topic” OR MH
S2	TI patient education OR AB patient education
S1	TI education* program* OR AB education* program*

3. Table S1: Characteristics of include studies

First Author Year, Study ID country/language	Intervention										
	Intervention	THEORY-BASE	PROCEDURE	WHAT materials were used	WHO delivered it	HOW was it delivered	WHERE was it delivered (& when)	WHEN & HOW OFTEN	TAILORING	inclusion criteria
RCT										
few, short, 1-on-1 sessions										
Larsen 2014, Larsen 2017 (NCT01352780) Norway, Norwegian (data was confirmed/amended by the author)	3-months motivational interviewing (MI) for psoriasis patients after climate therapy (CHT)	motivational interviewing; transtheoretical model of change (TTM)	motivational interviewing: 1st meeting : counsellor let patients describe how psoriasis affects their lives, and their thoughts on lifestyle choices and change - use of "shoe exercise" to reach focus areas for change skin & skin treatment were mandatory topic in each follow-up call, 3 psoriasis-tailored domain (diet, physical activity,stress management) were introduced and the patient could talk about these or suggest others, patients could assess their own stage of change using the TTM, patients receive one motivational mapping session (45–60 min) and six motivational interviewing telephone calls (15-60 min) during the following 12 weeks	workbook for patients with key MI principles and TTM, visual tools, 'bubble sheet', open questions,	MI counsellor (1st author)	1 face to face mapping talk + 6 x telephone	1 x in Gran Canaria, then via telephone	1 x before returning home (45-60mins), then 6 follow-up calls over 12w (mean duration 32.5±12.7 mins)	individually tailored MI, use of TTM model to tailor conversation to stage of change	20-70 yoa, PASI >7.0 patients who had participated in 3w CHT (education was part of CHT)
	UC after CHT (no restriction, considerable variation is to be expected)									

Reich 2017 Reich 2014 EudraCT 2011-001697-26 NCT01587755 France, Germany, Italy, the Netherlands, Spain, UK (I.Zschocke confirmed/amended data)	Topical Treatment Optimisation Programme	based on: literature review, national & international patient organisation focus groups, all items presented to the mixed-expert focus groups, elements from change behaviour theories used,	1-to-1 conversation with dermatologist re: pathophysiology, chronicity, comorbidity, then topical, systemic or photo treatment is discussed and topical advised, study meds introduced, 1-to-1 conversation with nurse -nurse explains correct application, nurse contacts patient on day 7 and day 21 to remind them to apply treatment daily; information material given (contains short information about psoriasis, types and treatment) telephone/email helpdesk, reminders for using treatment	two visit checklist with instructions for a one-to-one conversation between dermatologist or nurse and patient; the 'TTOP Patient Brochure'; helpdesk for patients; treatment reminders, individualized pocket card	dermatologist, and nurse; same staff should manage same persons long-term	face-to-face once by dermatologist, once by nurse, via phone or email twice	ns	2 x face to face, 2 x via telephone/email	pocket card tailored after treatment regime	≥ 18 yoa, mild-to-moderate psoriasis, PGA ≥ 2, BSA <= 10% ; 8w of topical treatment, naïve to cal/BD gel
	standard care									
web-based interventions										
Bundy 2013 Bundy 2011 (abstract) England, English (data confirmed by first author)	web-based psoriasis-tailored CBT program - eTIPs (electronic-Targeted Intervention for Psoriasis)	cognitive - behavioral therapy (CBT)	content: management of low mood, dealing with anxiety, improving self-esteem, and understanding and coping with psoriasis. patients went through reading material, listened to patients, completed short assignments Participants had to complete one module before progressing to others but they were given choice over the order of module completion. http://www.etips.org.uk/cb/	information, instruction and skills practice using multimedia techniques (audio, video and text-based components	online modules , (research team: (clinical) psychologists, dermatologists)	online, patients could choose order in which to complete modules	online (this was a primary care managed sample)	6 modules of CBT plus education; encouraged to complete 1 module per week	tailored	physician - diagnosed mild-to-moderate psoriasis,

	wait list controls (delayed intervention group)									
multiple group sessions										
Bostoen 2012 Bostoen 2011 (abstract) Lambert 2011 NCT01077882 Belgium, Dutch	12-week educational programme	ns	(i) education on the patient's skin disease: definition of the different diseases, basic pathogenetic mechanisms, clinical symptoms, prognosis, and treatment of a given skin disease are carefully explained., (ii) education on a healthy lifestyle incl. Diet (2 sessions) exercise, sleep, smoking, substance use, psychodermatology: information on structural, biological and social functions of skin; specific skin disease problems such as xerosis, itch and scaling are tackled (iii) application of stress-reducing techniques, different types of sport are offered, weekly yoga, mindfulness medication and (iv) feedback (individual after ca. 6 weeks and group session at the end)	a syllabus is offered to patients for all sessions	- 1 x session on education delivered by dermatologist, - 3 x skin care sessions given by nurse and pharmacist, - 12 sessions given by dietician, psychiatrist, philosopher, sport/yoga/mindfulness trainer, 4. in-group and individual feedback 2 x	group session, 1st session individual	Ghent University Hospital	12 weeks; 2h or 3 h sessions, 2 x per week	ns	psoriasis, atopic dermatitis ; ≥18 yoa,
	standard care									

Rothmann 1980 Canada, English (unable to identify contact details)	PERC educational programme	ns	educational programme at day care center (PERC): (i) history taken in regard to coping at home and at work, socially, self-care and knowledge about psoriasis and treatment (ii) nurse identifies functional and educational problems, notes instructions for educational events and resources (iii) nurse presents patients to team, who develop an education plan (iii) educational activities are recorded in chart (iv) after 3 weeks of treatment, patients receive modified plan with questions about programme, reassessment after 6m and 1y	written modified version of functional interview for patients	nurse, then educational team	nurse interviews groups of patients (unclear what happened during the programme)	Dermatology Service at Women's College Hospital, day care	daily programme for 3 weeks	match educational experience to needs and characteristics of patients	16-60 yoa, no serious medical conditions
	Dermatology Service at Women's College Hospital									
Thongkaow (2016-date unclear) Thailand, Thai (no reply from author)	self-help group	Dorothea Orem's Self-Care Theory	group instructions to support, increase and to promote all aspects of self-care,	ns				once every 4 w, for 12 weeks (4 sessions)	ns	ns
	control group		received instructions as per clinical practice guideline for psoriasis					ns		
Short group interventions										

Ersser 2012 England, English (data was confirmed/amended by the author, no access to raw data)	nurse support	Theory and evidence-based rational for each component (eg: group sessions, goal setting etc) informed by Social Learning Theory and the Self-efficacy concept and evidence from an exploratory study on self-management (Ersser et al Brit. J Derm, 2010: 163:1044-9)	(i) structured, nurse-led group learning experience; (ii) supporting written and audiovisual material to provide additional information and a relaxation resource and (iii) Follow-up telephone consultation	(ii) audiovisual material DVD, workbook (iii) nurse utilized script	nurse-led	(i) group of max. 9 participants, (ii) at home (iii) via telephone	8 health centres in England	2 hour (group education) session	tailored through individualized action planning	≥ 18 yoa, mild to moderate plaque psoriasis, use of topical therapies only
	usual care									
Lora 2009 Spa in Trentino, Italy (data was approved by Paolo Gisondi; no access to the raw data)	2-hours educational programme by dermatologist	ns	received information on different aspects of psoriasis including genetics, mechanisms, precipitating factors, course of the disease, preventive measures, co-morbidities, daily care of skin and treatment options	ns	dermatologist (same in both groups)	group session	Comano Spa	1 x	ns	adults, mild to severe chronic plaque psoriasis

	2-hours educational programme by dermatologist with psychologist		Received information on different aspects of psoriasis including genetics, mechanisms, precipitating factors, course of the disease, preventive measures, co-morbidities, daily care of skin and treatment options a psychologist participated in the discussion to manage negative emotions and offer coping strategies. The patients were allowed to ask questions during the presentations, and a discussion targeting their view and experience of psoriasis was also offered in the last 30 min of each session.		dermatologist (same in both groups) + psychologist			1x		
CCT										

Bremer Schulte 1985 Netherlands, PACO project, Dutch questionnaire available in Dutch (unable to identify contact details)	duo formular group therapy	equilibrium model (The interface level on which interactions between institutional health care and self-help/ mutual aid are analysed and elaborated) - decrease illness behaviour, anxiety, stress, isolation (experiential?) - increase awareness, skills in self-care, relaxation (educational?) [Bremer Schulte 1991]	"(1) experiential and somatic aspects of illness and health interact; (2) in the sick person all these aspects are interwoven. Somatic aspects were entered into by information on ointments, radiation, climatotherapy, and diets. Emotional aspects were dealt with by gradually drawing anxiety, depression, and shame into the conversation. Worries about relapses and uncertainties as to what did or did not play a role were given due attention, as were aspects such as shame and shyness, lack of understanding, isolation, sexual relationships, increasing self-care, and mutual aid. In the beginning of the process the patients started to discuss their daily problems with psoriasis, exchanging their experiences and insights.* **Information was given about the nature, probable causes, treatment, and possibilities of coping with the disease, including self-care technics and home treatment of the skin condition.** A specific feature was management through relaxation and respiratory exercises, which were practiced during each session and between the session as a home task by the patients and their partners at home."	DFGT training brochure	physician & patient, both trained together	face-to-face, group sessions with 7 participants each	Limburg University Hospital	1978-1982, 10 2-hour sessions over 3 months	ns	adults, <70 yoa, diagnosis of psoriasis by dermatologist
	wait -list control group									

Fortune 2002 Fortune 2004 English, UK (author confirmed data, SEM are SDs - discrepancies remain, no access to original data)	cognitive-behavioural management programme	biopsychosocial pain management programme was used as model	didactic teaching about medical & biological basis of psoriasis, treatment and its effect, stress reduction techniques, muscle relaxation training, cognitive techniques to teach patient to manage appraisal, misinterpretation, beliefs; homework Session 1: Elucidation of implicit model of psoriasis; treatment rationale; introduction to diathesis-stress model of illness; introduction to CBT. ° Session 2: Education about psoriasis; goal setting; applied relaxation training; introduction to ABC to stress; generation of model-centred goals. ° Session 3: Cognitive therapy (guided discovery and prejudice models); identification of thinking errors; model-centred goals. ° Session 4: Treatment education; problem-solving skills; model-centred goals. ° Session 5: Treatment education; learning challenging skills; assertiveness training; model-centred goals. ° Session 6: Summary and review of programme; relapse prevention; model-centred goals.	ns	medical, psychological, and nursing staff - same staff lead each session	group session (6-8 participants),	psoriasis-speciality clinic, Hope Hospital, Manchester	6 sessions, 2.5h each, over 6 weeks	individualized model-centre red goals for homework	18-70 yoa, confirmed psoriasis diagnosis by dermatologist
	standard care									
Pagliarello 2011 Trento, Italy, Italian (publication in English) (no reply from author)	empowerment-based educational intervention + balneotherapy	ns	2-hour didactic session, overview of cause, course and treatment options for psoriasis given; modifiable risk factors such as smoking, alcohol and obesity discussed, management strategies and coping discussed, physician interaction and health care provider relationship discussed, CALM- care, adherence, lifestyle, motivation	brochure	ns	group workshop	Comano Spa	2 hours, once	ns	> 18 yoa, ability to read and write Italian

	balneotherapy only									
Renzi 2006 (no reply from author) Rome, Italy, Italian	decision -board	based on literature review, decisions board was developed by multi-disciplinary team, then reviewed by patients, then piloted, shared decision making model	use of a specifically designed decisions board during the patient-dermatologist appointment	decision board, A4 printed on both sides, front: topical & phototherapy, back: systematic treatments; side-effects reported in 3 columns - 3 colours for frequency of occurrence, 4th column with other info, for example number of session per week	clinician	face-to-face	dermatology clinic (Istituto Dermopatico dell'Immacolate	once directly after consultation	ns	≥ 18 years, having been to the clinic in the last 3m
	control sample (time period 1)									
before- after-studies										
Burnett 2015 (abstract) Burnett 2016 United States, English (no reply from author)	verbal scripted educational intervention	ns	5-minute educational intervention prepared by the researchers was verbally delivered focus on cardiometabolic comorbidities, risk factors, risk reduction strategies,	printed handout for patient which was read out by the researcher	researcher	face-to-face, verbally	urban academic dermatology clinic	once (5 minutes)	ns	≥ 18 yoa, diagnosed by dermatologist, moderate (3-10%) to severe (>10% BSA) psoriasis

de Korte 2005 England, Ireland, Netherlands, Spain (10 centres) (email does not work/unable to identify other contact)	disease management programme	n/s	Disease management program (3 face-2-face consultations over 2 months); *Consultation I, week 1*: Patient profile (disease & treatment history, disease severity, disease understanding, treatment adherence, daily activity limitations, effects on psychosocial functioning, coping behaviour, needs expectations& motivation)2. Education training & advice (Psoriasis, application techniques, disease management, psychological support&coping), 3. goal setting for coming period, 4. 4. Study materials to take home: Psoriasis, disease management, coping behaviour, *Consultation II, week 5:* 1. Progress check, 2.Education, training and advice, 3. Goal adjustment, if needed, 4. Take-home study materials; *Consultation III, week 9*: 1. Progress check, 2. Education, training and advice, 3. Disease and self-management during follow-up, 4. Healthcare professional remains available by contact phone + optional follow-up	booklets, videotape/CD Rom to take home for patients; booklet with checklists, questions, information for HCP	dermatologist, dermatology nurse	face-to-face, optional phone call	dermatology office, medical centre, hospital or speciality hospital	3 face-to-face consultations over 2-months + optional phone call	tailored to patients' needs	≥ 18 yoa, psoriasis and topical treatment
Tucker 2017 UK, English (author confirmed data)	educational intervention by pharmacists	ns	2nd appointment: PEDESI to check patient knowledge, SAPASI, DLQI	supplementary written information (unclear)	7 community pharmacists	face-to-face	in the pharmacy	one face-to-face, one face-to-face follow-up at 6w (appointment was agreed upon)	yes	≥ 18yoa, mild to moderate psoriasis, prescribed topical treatments

Wahl 2013 Langeland 2013 Norway, Norwegian (author confirmed data)	3-week climate therapy and patient education in Gran Canaria	Theory of salutogenesis (main concept: sense of coherence, SOC)	schedules sun exposure (80h), swimming and moisturizing was encouraged, individual and group education sessions took place as well as guidance and daily training - only some parts were mandatory education sessions were comprised of: information on pathogenesis, manifestations, comorbidities, HRQL, treatment, activity & diet	n/s	dermatologist, nurse, physiotherapist	individual and group sessions	Centre in Gran Canaria	n/s (daily?)	n/s	≥ 20 yoa,

bl – baseline
m- mean
m – month
n – number
n/a – not applicable
ns – not stated
yoa – years of age
w – weeks
grey /not grey cells– for readability purposed, adjacent rows with the same background colour belong to the same study (only for studies with more than 1 study arm)
? - unclear

Table S2: Results of included studies

		Baseline characteristics		Results										
		age	gender	follow-up time	PASI 75	PASI	otherwise primary efficacy outcome	DLQI	medication/treatment adherence			dropouts	dropout due to AE	cost effectiveness	other outcomes/assessments
First Author Year	Patients (n)	m±sd (years)	female (%)	weeks	n/N	mean (change) ±SD; n		mean (change) ±SD; n	Instrument	time	result	n/N	n/N	ICER	
RCT															
few, short, 1-on-1 sessions															
Larsen 2014, Larsen 2017 (NCT01352780) (data was confirmed/amended by the author)	86	46.16± 12.71	41	3w; 3m 6m (after CHT)	n/a		**primary outcome: SAPASI** 3m: 5.15±4.04 n= 72 6m: 6.65±4.40 n=65 [between-group differences 3m: -2.47 (95%CI -3.94 to -1.00) 6m: -2.45 (95%CI -4.33 to -0.56)]	Mean DLQI: 12 w: IG: 6.45 ± 5.5; 72, 26w: 7.67±5.79; 56, ns at 67m (no data)	health risk change assessment (TTM adapted questionnaire)	3m	risk to no risk: 19/72	3months: 14/86* 6months: 21/86*	n/a	ICER when using DLQI was -1779€ (dominant strategy, positive incremental effect MI) but no difference in QALYs gained	self-efficacy VAS, heiQ, BIPQ; PKQ, TTM questionnaire, 15D

	83	46.46± 13.02	47			3m: 7.57±4.59 n=63 6m: 8.70±6.07 n=60	Mean DLQI: 12 w: 8.8 ± 7.18; 63, 26w: 9.27 ± 7.14; 60			risk to no risk:9/62	3months: 20/83* 6months: 23/83*			
Reich 2017 Reich 2014 EudraCT 2011-001697-26 NCT01587755 (I.Zschocke confirmed/amended data)	893	50.9±15.23	43	8; 40; 64; 4-8, 8-16 etc. until 56-64 for consumption of study medication)	n/a	**primary outcome**: response rate PGA 0/1 after 8w: 36.3% (324/893*)	mean change: -2.6±3.7 n= 671	use of medication in g per interval per % of BSA affected (weighted by study personnel) patient-reported number of days Cal/BD gel was applied	8 64	7.0±7.3 n=817 9.5±10.7 n=580 53.5 ± 9.9 n=?	LTF/dropout any reasons: w8: 55 w64:202	ns	na	For IG only: Ranking of importance of TTOP elements w8 & 64: (1) 1-2-1 derma, (2)1-2-1 nurse, (3) information, (4) helpdesk, (5) reminder

	897	51.0±15.4	42			PGA 0/1 after 8w: 31.3% (281/897*)	mean change: -2.2±3.4 n= 816			7.8±9.7 n=807 11.3±15.7 n=563 53.5 ± 10.2 n= ?	LTF/dropout any reasons: w8: 79 w64:208			
web-based interventions														
Bundy 2013 Bundy 2011 (abstract) (data confirmed by first author)	67	45.8±12..6 (n=60)	50	6w and 6m	n/a	primary outcomes HADS (0 to 28): 6w: 6.1±3.5 n= 33 others: SAPASI: 6w: 6.5±8.5 n=35; data for 6m not presented	mean: 6w: 5.0±5.2 n=32 no data for 6m	n/a			26/67 (presumably 6w); no data for 6m		n/a	
	68	44.3±12.8(n=66)	56			HADS: 6w: 8.1±4.4 n=45 SAPASI: 6w : 7.6+±6.1 n=50	mean: 6w: 7.7±4.5, n=44 no data for 6m				15/68(presumably 6w); no data for 6m			
multiple group sessions														

Bostoen 2012 Bostoen 2011 (abstract) Lambert 2011 NCT01077882	15	bl data only for mixed population	3m 6m 9m	na	Reported data (changing baseline values) 3m: mean: 6.8 (CI 4.3-9.3) n= 9 6m: 5.9(CI3.0-8.9) n=8 9m: 7.0 (CI3.8-10.3) n=8	skindex-29	Reported data: (changing baseline values) mean 4.4 (CI 1.3-7.4) mean 4.7 (CI 1.3-8.0) mean 4.0 (CI 0.6-7.4)	patient-assessed, questionnaire on medical consumption	bl 3m 6m 9m	no treatment: 4/15 3/9 2/8 3/8	6/15 (+ 1/15 excluded from analysis)	1/29?	cost in euro/EQ-5D not reported but authors state that it was not significantly different	PDI, BDI, physical activity, Everyday Problem Checklist, medical therapy

	14					Reported data (changing baseline values): 3m: mean: 8.1 (CI 5.8-10.4) n= 13 6m: 7.8(CI 5.2-10.3) n= 13 9m: 7.0(C3.8-1.3) n=13		Reported data (changing baseline values) mean 6.48CI3.6-9.2) 6.9(CI4.1-9.8) 5.8(C I2.9-8.8)			no treatment: 0713 1/13 1/13 1/13	1/14			
Rothmann 1980 Canada, English (unable to identify contact details)	62	media n 40	48	3w 6m 1y	na	**Functional history chart** (coping score 0-4, self-care 0-5; knowledge 0-4); 0 = 'best possible', 13= 'worst possible' 6m coping: 1.3 (n=42) self-care: 1.6 (n=44) knowledge:	na				26/91	na		skin assess ment

						1.3 (n=43) **sum: 4.2 (n=44)**				
	29	media n 41	44			6m coping: 1.8 (n=16) self-care: 1.9 (n=17) knowledge: 2.3 (n=15) **sum: 6.0 (n=17)**				
Thongkaow (2016- date unclear) (no reply from author)	20	45.7±13.0 (n=17)	41	12w	na	(mean+SD) 5.99±5.98 n=17	self-care ability (mean+SD) 109.65±8.98 n=17 (Psoriasis Patient Self-care Ability Questionnaire - unclear)	na		

	20	43.8±11.4 (n=19)	47			(mean+SD) 7.34±10.05 n=19	105.58±8.90 n=19					
Short group interventions												
Ersser 2012 England, English (data was confirmed/amended by the author, no access to raw data)	28	56.86± 12.67	71	6w	na	final mean 1.78±1.62 n=26	na	final mean: 4.58±5.05 n=26		2/28 did not attend group session, 13/28 did not watch the DVD,	na	study questionnaire on usefulness of intervention components
	36	59.03± 13.53	45			final mean 2.82±2.20 n=33		final mean 3.70±3.71 n=33		3/36 excluded due to incomplete information		

Lora 2009 Spa in Trentino, Italy (data was approved by Paolo Gisondi; no access to the raw data)	61	56±16	49	directly 'post-intervention'; 6 m	na	study-specific questionnaire; outcomes reported for each question separately	na	study specific questionnaire on satisfaction after intervention; PASI and SKindex only at baseline
	62	54±15	55					
CCT								
Bremer Schulte 1985 Netherlands, PACO project,	28	not specified		12w	na		na	(1) illness behaviour (IB) &

Dutch questionnaire available in Dutch (unable to identify contact details)	14				14/14?		shame & shyness (SS); (2) interactional skills (IS), problem solving in groups (PSG), deidentification with skin (DS), well-being (WB).

Fortune 2002 Fortune 2004 English, UK (author confirmed data, SEM are SDs - discrepancies remain, no access to original data)	40	42.7±11.6	70	6w 6m	6m: 64%	6w: 6.5±SEM4.1 6m: 6.5±SEM4.1 (ITT n = 40)	IQP, COPE, TAS-20, PSMP, HADS, PLSI, PDI	n/a	na	6w: 10/40 6m: 12/40	ns	na	na
	53	43.1±12.0	65		6m: 23%	6w: 8.4±SEM4.5 (n= 42) 6m: 8.0±SEM4.8 (n=30) ITT n= 53				6w: 11/53 6m: 23/53			

Pagliarello 2011 Trento, Italy, Italian (publication in English) (no reply from author)	87	54.42± 13.57	47	12d	n/a	SAPASI, Skindex-17 and PEER was used to assess different outcomes but results were not reported or only for the entire patient population	ns	
	49	49.67± 12.55	43					
Renzi 2006 (no reply from author) Rome, Italy, Italian	87 outpatients + 84 inpatients	43±13	38	directly after the outpatient visit/ discharge visit		patient attitudes and satisfaction (See table 1) - which information is relevant?	n/a	knowledge (identify 9 of 12 correct statements): mean 4.1 (range 1-8)
	116 outpatients + 115 inpatients	45±15	32					knowledge: mean 3.8 (range 1-7)

before- after-studies													
Burnett 2015 (abstract) Burnett 2016 United States, English (no reply from author)	41 (56 in 2nd public ation)	52 (+U5:A L824-81) 51 (21-83)	46; 46	2-3m	n/a	12-item questionnaire about psoriasis comorbidity awareness and knowledge *[8 of 11 questions were reported to be sign. diff. Comparing bl to 2m - but no adjustment for number of sign. Tests]*					10/56	none	
de Korte 2005 England, Ireland, Netherlands, Spain (10 centres) (email does not work/unable to identify other contact)	330	43.5±14.5	55.6	2m	n/a	**Skindex-29** bl:33.6±16.5 2m: 22.7±16.2 (no primary outcome specified) **disease severity overall** (1-very severe to 7-clear) bl: 3.6±1.4 2m: 5.1±1.2	n/a	4-item questionnaire, 7 -point response scale (high scores mean higher levels of adherence)	bl, 2m	overall adherence: assessed by patients bl:5.5±1.8,n=330 2m: 6.8±0.7, n=288 by HCP bl:4.2±2.3,n=330, 2m: 6.4±1.2, n=288	42/330	n/s	n/a	EQ-5D

Tucker 2017 UK, English (author confirmed data)	47	59±17.01	47	n/a		PEDESI bl:17.78±4.49 6w: 25.17±4.03, n=42 SAPASI bl:11.75±8.14 6w: 7.74±7.55 n=42	bl: 7.14±5.61 n= 47? 6w: 4.14±4.16 n= 42		5/47	n/a
Wahl 2013 Langeland 2013 Norway, Norwegian (author confirmed data)	254	47±12	40	3m (after CT)	n/a	study-specific questionnaire PKQ bl: 24.4±7.1, n= 254 3m:29.3±7.1, n= 211 subscale of HeiQ available	n/a		questionnaire response rate at 3m: 211/254 (drop out 43) no drop out from the programme (Langeland 49/254)	n/a
Note: PASI90, SF-36, NAPSI were never reported										

bl – baseline
m- mean
m – month
n – number
n/a – not applicable
ns – not stated
yoa – years of age
w – weeks
grey /not grey cells– for readability purposed, adjacent rows with the same background colour belong to the same study (only for studies with more than 1 study arm)
? - unclear

4. Risk of bias evaluations

Risk of bias 2.0 tool RCTs	**Randomization process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported result**	**overall**
Larsen 2014, Larsen 2017	low	some concern	some concern	high (SAPASI, HeiQ)	some concern	high
Reich 2017, Reich 2014	low	some concern	some concern	low (PGA), high (DLQI)	some concern	some concern / high
Bundy 2013, Bundy 2011 (abstract)	low	some concern	some concern	high	high	high
Bostoen 2012, Lambert 2011	low	some concern	high	low (PASI), high (DLQI)	high	high
Rothmann 1980	some concern	high	some concern	some concern	low	high
Thongkaow (2016- date unclear)	some concern	high	some concern	some concern	low	high
Ersser 2012	some concern	some concern	some concern	some concerns (PASI), high (DLQI)	some concern	some concern/ high
Lora 2009	some concern	some concern	some concern	high	low	high

ROBINS-I CCTs	**Bias due to Confounding**	**Bias in selection of participants into the study**	**Bias in classification of interventions**	**Bias due to deviations from intended interventions**	**Bias due to missing data**	**Bias in measurement of outcomes**	**Bias in selection of the reported result**	**Overall bias**
Bremer Schulte 1985	moderate	low	NI	NI	serious	moderate	low	serious
Fortune 2002, Fortune 2004	critical	low - moderate	moderate	low	moderate	moderate / high	moderate	moderate
Pagliarello 2011	serious	NI	serious	low	serious	serious	critical	serious
Renzi 2006	moderate	NI	NI	moderate	moderate	moderate	moderate	moderate

NI – no information
ROBINS-I - Risk Of Bias In Non-randomized Studies - of Interventions

NIH tool Before-after studies	1. Was the study question or objective clearly stated?	2. Were eligibility/selection criteria for the study population prespecified and clearly described?	3. Were the participants in the study representative of those who would be eligible for the test/service/intervention in the general or clinical population of interest?	4. Were all eligible participants that met the prespecified entry criteria enrolled?	5. Was the sample size sufficiently large to provide confidence in the findings?	6. Was the test/service/intervention clearly described and delivered consistently across the study population?	7. Were the outcome measures prespecified, clearly defined, valid, reliable, and assessed consistently across all study participants?	8. Were the people assessing the outcomes blinded to the participants' exposures/interventions?	9. Was the loss to follow-up after baseline 20% or less? Were those lost to follow-up accounted for in the analysis?	10. Did the statistical methods examine changes in outcome measures from before to after the intervention? Were statistical tests done that provided p values for the pre-to-post changes?	11. Were outcome measures of interest taken multiple times before the intervention and multiple times after the intervention (i.e., did they use an interrupted time-series design)?	12. If the intervention was conducted at a group level (e.g., a whole hospital, a community, etc.) did the statistical analysis take into account the use of individual-level data to determine effects at the group level?	Quality Rating (Good, Fair, or Poor)
Bonnekoh 2006, Werfel 2006	y	y	ns	ns	n	y	n	n	y	na	n	na	fair
Burnett 2015 (abstract), Burnett 2016	y	y	y	ns	n	y	~~u~~nclear	n	y, y	y	n	na	poor
de Korte 2005	y	y	y	~~u~~nclear	y	y	y	n	y, y	y	n	n/a	good
Tucker 2017	y	y	y	ns	n	n	y	n	y	y	n	n/a	fair
Wahl 2013, Langeland 2013	y	y	y	y	y	y	n	n	y	~~u~~nclear	n	n/a	fair

n- no; na – not applicable; ns – not stated; u –unclear; y - yes

5. List of Included Records

	First Author	Year	Title	Comment
1	J. Bostoen	2012	An educational programme for patients with psoriasis and atopic dermatitis: a prospective randomized controlled trial	
2	J. Bostoen	2012	An educational program for patients with psoriasis and atopic dermatitis: A prospective randomized, controlled trial	additional abstract to Bostoen 2012
3	M. Bremer Schulte	1985	Group therapy of psoriasis. Duo formula group treatment (DFGT) as an example	
4	C. Bundy	2011	Managing psychological morbidity in patients with psoriasis using a novel online treatment programme: the e-TIPs study	additional abstract to Bundy 2013
5	C. Bundy	2013	A novel, web-based, psychological intervention for people with psoriasis: the electronic Targeted Intervention for Psoriasis (eTIPs) study	
6	C. J. Burnett	2015	Psoriasis and cardiometabolic disease: An educational and teaching intervention on cardiometabolic risks	
7	C. J. Burnett	2016	Psoriasis and Cardiometabolic Disease: A Brief, Focused, Educational Intervention on Cardiometabolic Risks	
8	J. de Korte	2005	Quality of care in patients with psoriasis: an initial clinical study of an international disease management programme	
9	S. J. Ersser	2012	A pilot randomized controlled trial to examine the feasibility and efficacy of an educational nursing intervention to improve self-management practices in patients with mild-moderate psoriasis	
10	D. G. Fortune	2004	Targeting cognitive-behaviour therapy to patients' implicit model of psoriasis: Results from a patient preference controlled trial	additional paper to Fortune 2002
11	D. G. Fortune	2002	A cognitive-behavioural symptom management programme as an adjunct in psoriasis therapy	
12	J. Lambert	2011	A novel multidisciplinary educational programme for patients with chronic skin diseases: Ghent pilot project and first results	
13	E. Langeland	2013	Promoting sense of coherence: Salutogenesis among people with psoriasis undergoing patient education in climate therapy	additional paper to Wahl 2013
14	M. H. Larsen	2014	A telephone-based motivational interviewing intervention has positive effects on psoriasis severity and self-management: a randomized controlled trial	
15	M. H. Larsen	2017	Cost-utility Analysis of Supported Self-management with Motivational Interviewing for Patients with Psoriasis	additional paper - Larsen 2014
16	V. Lora	2009	Efficacy of a single educative intervention in patients with chronic plaque psoriasis	

17	C. Pagliarello	2011	Effectiveness of an empowerment-based intervention for psoriasis among patients attending a medical spa	
18	K. Reich	2014	Development of an adherence-enhancing intervention in topical treatment termed the topical treatment optimization program (TTOP)	additional paper - Reich 2017
19	K. Reich	2017	A Topical Treatment Optimisation Programme (TTOP) improves clinical outcome to calcipotriol/betamethasone gel in psoriasis: Results of the 64-week, multinational, randomized, phase IV study in 1790 patients (PSO-TOP)	
20	C. Renzi	2006	Insufficient knowledge among psoriasis patients can represent a barrier to participation in decision-making	
21	A. I. Rothman	1980	An educational program for psoriatic: an evaluation	
22	Thongkaow	2016	The Effectiveness of Participation in Self-Help Group on Self-Care Ability and Disease Severity Among Patients with Psoriasis	
23	R. Tucker	2016	Assessing the impact of community pharmacist led educational advice on knowledge, disease severity and quality of life in patients with mild to moderate psoriasis	
24	A. K. Wahl	2013	Psoriasis Patients' Knowledge about the Disease and Treatments	

List of excluded Records

	First Author	Year	Title	Reasons for exclusion
1	E. A. Abel	1988	Self-care in patients with psoriasis: first international Duo-Formula Group Training Workshop	no (TPE) intervention evaluated
2	E. A. Abel	1990	Psoriasis patient support group and self-care efficacy as an adjunct to day care centre treatment	no (TPE) intervention evaluated
3	M. Abrouk	2016	The Patient's Guide to Psoriasis Treatment. Part 3: Biologic Injectables	material/guide was not evaluated
4	N. Balato	2013	Educational and motivational support service: a pilot study for mobile-phone-based interventions in patients with psoriasis	no active component
5	S. Balica	2011	[Guide for therapeutic education program in psoriasis]	no (TPE) intervention evaluated
6	B. Bohannan	2015	Education is Key to building a better world for people with psoriasis	survey
7	B. Bonnekoh	2006	[Interdisciplinary training program for adults with psoriasis: six months follow-up]	no baseline assessment
8	J. Borrás-Blasco	2013	Educational session as a tool to increase patient satisfaction of switching etanercept from the prefilled syringe to the autoinjection pen	not psoriasis
9	J. Bostoen	2011	Follow-up on the effect of a patient educational programme: Early results of a prospective randomized controlled trial in psoriasis and atopic dermatitis. Conference: 6th International Congress on Psoriasis: From Gene to Clinic London United Kingdom. Conference Start: 20111201 Conference End: 20111203	no additional data
10	V. Boudewyns	2015	Influence of patient medication information format on comprehension and application of medication information: A randomized, controlled experiment	no active component
11	M. Bremer Schulte	1985	Group therapy of psoriasis. Due formula group treatment (DFGT) as an example	duplicate entry
12	M. A. Bremer Schulte	1991	Self-care activating support: therapeutic touch and chronic skin disease	no additional information
13	J. Captain	1997	Continuing education. Psoriasis: what to tell your patients	not available in the German inter-library loan system
14	A. Carlson	2016	Interventions to improve quality of life for patients with psoriasis and psoriatic arthritis	online training for pharmacists (like CME, CPE credits)

15	C. Chambers	2013	Patient satisfaction with a novel, patient-centered model for psoriasis follow-up care: Results from a randomized controlled trial	additional abstract Chambers
16	C. Chambers	2011	Patient-centered online management of psoriasis: A randomized controlled equivalency trial	no educational component, likely same RCT as Chambers 2010
17	C. J. Chambers	2010	Evaluation of clinical outcomes of an online teledermatology model for the management of psoriasis: A randomized controlled trial	abstract only, no outcome data, see abstract Chambers 2011
18	C. J. Chambers	2012	Patient-centered online management of psoriasis: A randomized controlled equivalency trial	no educational component
19	B. Chan	2010	One-year drug retention in individuals enrolled in an etanercept patient support program	abstract only, no Pso data
20	B. C. F. Chan	2010	One-year drug retention in etanercept patient support program enrollees	abstract only, no Pso data
21	A. Chisholm	2016	Evaluation of the IMPACT study practitioner training intervention: Using motivational interviewing to optimize self-management in psoriasis	no relevant outcomes (only impact on practitioners assessed)
22	A. Chisholm	2017	Motivational interviewing-based training enhances clinicians' skills and knowledge in psoriasis: findings from the Pso Well® study	impact of MI training for physicians assessed before-after training, but no evaluation of the impact on outcomes/patients was included
23	M. J. Cork	2011	Patient education about topical treatments	no (TPE) intervention
24	F. Cowdell	2014	A telephone-based motivational interviewing intervention has positive effects on psoriasis severity and self-management: a randomized controlled trial	no (TPE) intervention
25	F. Cowdell	2012	The Person-Centered Dermatology Self-Care Index A Tool to Measure Education and Support Needs of Patients With Long-term Skin Conditions	no (TPE) intervention
26	M. Dahiya	2011	Youtube as a public educational and consulting tool in dermatopathology	no (TPE) intervention

27	V. L. Dowling	2003	A coping skills short-term psychotherapy group for psoriasis patients: Understanding and coping with the psychological and physical effects of psoriasis	qualitative study
28	V. L. Dowling	2014	The psychological impact of Psoriasis: A review of short-term psychotherapy group participation for Psoriasis patients	no (TPE) intervention evaluated
29	S. J. Ersser	2002	What criteria do patients use when judging the effectiveness of psoriasis management?	no (TPE) intervention evaluated
30	B. Farahnik	2016	The Patient's Guide to Psoriasis Treatment. Part 2: PUVA Phototherapy	material/guide was not evaluated
31	E. M. Farber	1985	The office visit and the self-help concept in the treatment of psoriasis	no evaluation of the effectiveness
32	E. M. Farber	1984	Self-help clinic for psoriasis	no evaluation of the effectiveness
33	E. M. Farber	1993	The office visit and the self-help concept in treating the patient with psoriasis: a strategy revisited	no intervention assessed
34	S. R. Feldman	1994	The readability of patient education materials designed for patients with psoriasis	no (TPE) intervention
35	S. R. Feldman	2017	Treatment Adherence Intervention Studies in Dermatology and Guidance on How to Support Adherence	systematic review
36	M. Ferwerda	2016	Measuring the Therapeutic Relationship in Internet-Based Interventions	Pso & RA patients
37	M. Fletcher	2005	Educational website: patient information available on psoriasis	no TPE
38	J. Fruhauf	2012	Pilot study on the acceptance of mobile teledermatology for the home monitoring of high-need patients with psoriasis	no (TPE) intervention
39	J. Frühauf	2010	Pilot study using teledermatology to manage high-need patients with psoriasis	no educational component
40	I. H. Ginsburg	1996	Coping with psoriasis: a guide for counseling patients	no (TPE) intervention
41	D. L. Gist	2015	Impact of a Performance Improvement CME activity on the care and treatment of patients with psoriasis	no interactive component
42	R. M. Goldenhar	2005	The effects of a stress reduction intervention on quality of life in psoriasis patients	no (TPE) intervention

43	C. Gradwell	2000	Teaching patients to cope with psoriasis	not available in the German inter-library loan system
44	C. Gradwell	2002	A randomized controlled trial of nurse follow-up clinics: do they help patients and do they free up consultants' time?	only ~46% of patients had psoriasis
45	J. Kabat-Zinn	2003	Part II: Influence of a mindfulness meditation-based stress reduction intervention on rates of skin clearing in patients with moderate to severe psoriasis undergoing phototherapy (UVB) and photochemo-therapy (PUVA)	no (TPE) intervention
46	J. Kabat-Zinn	1998	Influence of a mindfulness meditation-based stress reduction intervention on rates of skin clearing in patients with moderate to severe psoriasis undergoing phototherapy (UVB) and photochemotherapy (PUVA)	no TPE (mindfulness relaxation tapes during light treatment)
47	F. Karadağ	2010	Psöriyazis hastalarında psikodrama: Stres ve stresle baş etme. = Psychodrama with psoriasis patients: Stress and coping	no educational components
48	M. Kardorff	2006	Evaluation of primary rehabilitation outcome in a neighbourhood rehabilitation program for psoriasis patients. [German]	retrospective data collection
49	M. Kaur	2006	A randomized, double-blind study of a nutritional intervention in the treatment of psoriasis. Abstract P2805. American Academy of Dermatology 64th Annual Meeting March 3-7, 2006	no TPE intervention
50	F. A. Kerdel	2014	Highlights of the Skin Disease Education Foundation 10th Annual Psoriasis Forum INTRODUCATION	no TPE intervention
51	F. A. Kerdel	2015	Highlights of Skin Disease Education Foundation's 11th Annual Psoriasis Forum INTRODUCTION	duplicate entry
52	F. A. Kerdel	2016	Highlights of Skin Disease Education Foundation's 12th Annual Psoriasis Forum INTODUCTION	no TPE study
53	C. Keyworth	2014	Does health message framing affect behavioural intentions in patients with psoriasis? An experimental study	no (TPE) intervention
54	C. Keyworth	2014	Talking to people with psoriasis about cardiovascular disease risk factors: Techniques used in the practitioner-patient consultation	no TPE intervention evaluated
55	C. Keyworth	2014	Health promotion for patients with psoriasis: Examining current signposting in U.K. health centres	no TPE intervention evaluated
56	D. Kiestra	1998	Support by the psoriasis patients' association to psoriasis patients. The visiting card to the outside world. [Dutch]	no TPE intervention

57	H. Kling	2012	Significant effects of patient educative training on psoriasis disease	author did not respond in time
58	H. Kling	2013	Patient training for psoriasis-evaluation of a standardized program	author did not respond in time
59	H. Kling	2014	Significant effects of patient educative training on psoriasis disease	author did not respond in time
60	A. Kotb	2012	Psoriasis day care: Impact on quality of life & patient compliance	no evaluation, abstract only
61	S. C. Laffrey	1996	Social support and health promotion outcomes of adults with psoriasis	no (TPE) intervention
62	E. Langeland	2013	Mental health among people with psoriasis undergoing patient education in climate therapy	no relevant outcome
63	M. H. Larsen	2016	Cost-utility Analysis of Supported Self-management with Motivational Interviewing for Patients with Psoriasis	duplicate entry
64	Q. Liu	2012	Effects of psychological and behavior intervention on the outcome of patients with psoriasis [abstract]	neither contact details nor center, nor author could be identified
65	R. A. Logan	1988	Self help groups for patients with chronic skin diseases	no intervention
66	B. Lombardo	1988	Group support for derm patients	no (TPE) intervention
67	P. R. Magdalena	2012	Psoriasis-where do patients draw information about the disease and how much do they know?, Luszczyca - Skad pacjenci czerpia wiedze na temat choroby i ile wiedza?. [Polish, English]	no intervention evaluated
68	S. Maguire	2012	Treating psoriasis in community practice	no evaluation
69	L. McCormick Howard	2016	National Psoriasis Foundation: a patient-centric approach to improve access to psoriatic disease treatment	case report
70	J. Miniszewska	2011	Coping with the disease as a relation mediator between skin lesion severity and psychological health in psoriatic patients	abstract only, no intervention evaluated
71	N. C. Morrow	1984	Printed information for patients receiving PUVA therapy	no active component
72	P. A. Nelson	2015	The IMPACT Programme in Psoriasis: Phase I - where we are now and future directions	no intervention evaluated

73	P. A. Nelson	2016	Development and evaluation of the IMPACT programme patient resources to increase understanding of psoriasis and its management: a mixed-methods feasibility study	impactpsoriasis.org.uk
74	P. A. Nelson	2014	'In someone's clinic but not in mine'--clinicians' views of supporting lifestyle behaviour change in patients with psoriasis: a qualitative interview study	no (TPE) intervention
75	T. V. Nguyen	2013	Compassionate care: enhancing physician-patient communication and education in dermatology: Part I: Patient-centered communication	no TPE intervention
76	A. M. Oostveen	2013	Development and design of a multidisciplinary training program for outpatient children and adolescents with psoriasis and their parents	children
77	C. Pagliarello	2010	Measuring empowerment in patients with psoriasis: the Psoriasis Empowerment Enquiry in the Routine Practice (PEER) questionnaire	no (TPE) intervention
78	S. N. Pathak	2014	Self-management in patients with psoriasis	no (TPE) intervention
79	F. Petermann	2000	Cognitive-behavioral education program in psoriasis. First evaluation of results. [German]	children
80	K. Radley	2013	Making a difference : Nurse prescribing for patients with psoriasis in the united kingdom	no (TPE) intervention evaluated
81	G. S. Rasmussen	2012	Self-management in daily life with psoriasis: an integrative review of patient needs for structured education	review
82	H. L. Richards	2006	Adherence to treatment in patients with psoriasis	no primary study
83	C. Riddoch	2005	The benefits of switching to nurse-led management of patients with psoriasis	no (TPE) intervention
84	D. T. Rubin	2015	Impact of abbvie's patient support program on resource costs in crohn's disease, ulcerative colitis, rheumatoid arthritis, psoriasis, psoriatic arthritis, and ankylosing spondylitis	no cost data for psoriasis patients reported
85	S. Ryan	2009	Continuing education. Patient education in psoriasis	no (TPE) intervention evaluated
86	S. Scheewe	2001	Long-term efficacy of an inpatient rehabilitation with integrated patient education program for children and adolescents with psoriasis	children

87	G. Schreier	2008	A mobile-phone based teledermatology system to support self-management of patients suffering from psoriasis	no evaluation
88	T. K. Seng	1997	Group therapy: a useful and supportive treatment for psoriasis patients	no baseline assessment
89	J. D. T. d. Silva	2006	Estratégias de coping e níveis de estresse em pacientes portadores de psoríase	no (TPE) intervention
90	M. Skarpathiotakis	2006	Specialized education for patients with psoriasis: a patient survey on its value and effectiveness	no (TPE) intervention /not before and after assessment
91	S. M. Skevington	2006	How does psoriasis affect quality of life? Assessing an Ingram-regimen outpatient programme and validating the WHOQOL-100	no (TPE) intervention
92	G. P. Smith	2015	The readability of patient education materials designed for patients with psoriasis: what have we learned in 20 years?	no active component
93	S. Spillekom-van Koulil	2016	A MULTIDISCIPLINARY TRAINING PROGRAM FOR OUTPATIENT CHILDREN AND ADOLESCENTS WITH PSORIASIS AND THEIR PARENTS: A PILOT STUDY	children, 2nd paper to Van Geel 2016
94	B. Strober	2016	Impact of a patient support program on adherence and healthcare costs in patients with psoriasis and psoriatic arthritis	not prospectively enrolled
95	S. Tabolli	2011	The impact of writing exercises on quality of life in patients with psoriasis undergoing systemic treatments	no (TPE) intervention (additional abstract Tabolli 2012)
96	S. Tabolli	2012	Evaluation of the impact of writing exercises interventions on quality of life in patients with psoriasis undergoing systemic treatments	no TPE intervention evaluated
97	J. Tan	2012	A Patient Decision Aid for Psoriasis Based on Current Clinical Practice Guidelines	no TPE
98	J. Tan	2014	Improved decisional conflict and preparedness for decision making using a patient decision aid for treatment selection in psoriasis: A pilot study	no interactive component
99	L. Tomas-Aragones	2011	Evaluation of a psychological group intervention for patients with moderate and severe psoriasis	no results reported, intervention poorly described; author did not reply
100	M. A. Turner	2015	Progress in developing and implementing stepped-care psychological support for people with psoriasis	no (TPE) intervention

101	S. van Beugen	2015	Body attention, ignorance and awareness scale: assessing relevant concepts for physical and psychological functioning in psoriasis	no (TPE) intervention
102	O. D. Van Cranenburgh	2015	A Web-based, Educational, Quality-of-life Intervention for Patients with a Chronic Skin Disease: Feasibility and Acceptance in Routine Dermatological Practice	internet platform without interactive component, mixed patient population
103	M. J. Van Geel	2016	An outpatient multidisciplinary training programme for children and adolescents with psoriasis and their parents: a pilot study	programme for children
104	J. Van Onselen	2014	Supporting children and young people with psoriasis...Julie Van Onselen, dermatology nurse specialist	not available in the German inter-library loan
105	P. Verrier	1991	Psoriasis: Impact of information and relaxation programs. [French]	study suggested but not conducted
106	A. K. Wahl	2015	Positive changes in self-management and disease severity following climate therapy in people with psoriasis	education as part of climate- therapy
107	A. K. Wahl	2016	Making robust decisions about the impact of health education programs: Psychometric evaluation of the Health Education Impact Questionnaire (heiQ) in diverse patient groups in Norway	validation of norwegian heiQ
108	T. Werfel	2006	[The educational program for the management of psoriasis vulgaris according to the rules of the Task Force on Dermatological Prevention: current status]	no baseline assessment, additional paper - Bonnekoh 2006
109	R. Zachariae	1996	Effects of psychologic intervention on psoriasis: a preliminary report	no active component
110	S. S. Zaghloul	2004	The influence of nurse education clinics as a supplementary technique on compliance in psoriasis	see also FT Zaghloul, no TPE intervention evaluation, only comparison of 2 clinics
111	T. H. Zhu	2016	The Patient's Guide to Psoriasis Treatment. Part 4: Goeckerman Therapy	the online material was not evaluated

Title

Therapeutic patient education and self-management support for patients with psoriasis – a systematic review

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Short title

Psoriasis patient education & self-management

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Abstract

Psoriasis is a chronic inflammatory skin condition. Patient education may be one option to improve adherence and coping. The aim of this systematic review is to identify studies evaluating educational interventions for psoriasis patients. The review was conducted following the methods recommended by Cochrane. We searched seven databases, one trial register and three grey literature repositories. Data screening and extraction was done by two t reviewers independently. The risk of bias 2.0, ROBINS-I, NIH-tool were used. Additionally, the APEASE criteria were applied. We evaluated 16 studies. Two RCTs evaluated patient-practitioner or patient-nurse one-to-one interventions, one RCT assessed a web-based intervention, three RCTs reported group interventions taking place frequently; one RCT reported one-off group sessions. The remaining RCT compared the health care professionals involved. The risk of bias rating ranged from 'some concerns' to 'high'. Three RCTs found an effect. We included 4 CCTs - one had an effect. One of 4 included before-after-studies warrants further investigation. Despite similarities in delivery mode across the interventions, patients eligible and settings in which interventions were delivered differed. Interventions that included an individual (one-to-one) session appear successful. Two interventions seem suitable for adaptation using APEASE: the topical treatment program and motivational interviewing after climate therapy.

Introduction

Psoriasis is a common chronic skin condition with a prevalence of 0.1% to 11% worldwide [1]. Patients experience symptoms such as pruritus, burning and skin lesions that can be painful and disfiguring. They also often experience lower health-related quality of life and stigma, as well as shame and worry [2].

The condition is characterized by frequent flare-ups that require long-term management. Treatment goals revolve around symptom control rather than cure [3]. The majority of patients with psoriasis self-manage their condition in response to fluctuating disease severity [4], which can involve complex topical applications, as well as systemic therapies [4]. Self-management is generally defined as the activities undertaken by individuals to manage the symptoms, treatment, physical and psychosocial consequences and lifestyle changes associated with living with a long-term health condition. Patients can experience barriers to self-management, and treatment adherence in patients with psoriasis remains problematic [5-7]. Patients with conflicting beliefs and higher psychological stress may be less adherent to treatment [8]. Age, sex and disease- and treatment-specific factors can predict adherence [9]. Poor adherence increases health-care costs and compromises patient safety, quality of life and the effectiveness of a health care system [10].

Offering people support and information tailored to their individual needs and circumstances so that they can confidently self-manage their condition therefore remains a key principle of psoriasis care guidelines [4]. Therapeutic patient education is an integral part of comprehensive chronic disease management (see Figure 1). Patients with psoriasis consistently report that they want more information about their condition and how to manage it effectively. A large international survey found that out of 17 support tools, education about treatment options, comorbidities and the disease itself was seen by patients as the most important and key to improving their situation [11].

[insert Figure 1 here]

Patient education has been identified since the 1970s as important, and reviews continue to show that there is an ongoing need for education [12] but that few such interventions exist [13-16]. We aimed to systematically and continuously identify, summarize and evaluate studies that assessed a therapeutic patient education intervention for patients with psoriasis.

Material and methods

The protocol for this living systematic review was registered with PROSPERO (CRD42017060412). When choosing methods we followed the Living systematic reviews (LSR) series [17-19] and recommendations by the Cochrane. We consulted the PRISMA

checklist [20] and AMSTAR II. Every three months we screen for new studies utilizing the same sources and criteria. Updates are then reported on the following website: http://www.spindermatology.org/

We pre-defined the eligibility criteria [21] (Table 1).

[insert Table 1 here]

We searched seven academic and three grey literature databases and one trial registry (see online appendix). Where possible, we activated the autoalert function to receive alerts.

Endnote was used to manage the records. Two reviewers (CD, MZ) independently screened all titles/abstracts and full-texts for eligibility. One reviewer (CD) developed and piloted a data extraction sheet with the research team (PG, AN, JL, LG). We used MS Excel for data extraction purposes (see online appendix). Two reviewers (CD, MZ) extracted the same data independently. Any discrepancies were resolved by discussion, if necessary involving a third researcher (AN). First or last authors were contacted to verify extracted data and obtain missing data.

We used the Cochrane risk of bias tool 2.0 [22]. Assessments were made for the domains: *randomization process, deviations from the intended intervention, missing outcome data, measurement of outcome, and selection of the reported results*. Each domain was rated as 'low', 'some concerns' or 'high' risk of bias. Overall ratings were 'high' if either one domain was rated as 'high risk' or if multiple domains were rated as 'some concerns'. It was 'some concerns' in cases where at least one domain was rated as 'some concerns'.

ROBINS-I was utilized to assess non-randomized-studies [23]. The seven domains are: *bias due to confounding, in selection of participants to the study, in classification of interventions, due to deviations from the intended interventions, due to missing data, in measurement of outcomes, in selection of reported results.*

We used the US National Heart, Blood, and Lung Institute (NIH) Quality Assessment Tool for Before-After (Pre-Post) Studies with No Control Group for any studies of this nature included in our review [24]. However, we modified question number 10 of the tool so that it expected comprehensive statistical reporting rather than p-values alone (see Online Appendix).

We calculated effect measures such as risk ratios (RR) or mean differences (MD) and 95% confidence intervals (CI) using Stata SE 14 (metan command package). For dichotomous outcomes, we chose a conservative approach and used non-responder imputation in studies comparing to usual care. Continuous data was used as reported in the studies. We transformed standard errors into standard deviations.

To avoid multiple testing errors, we focused on a limited number of outcomes (PASI, DLQI, otherwise the primary outcome). A random-effects meta-analysis was planned when more than one comparable study reported the same outcome. We considered I^2 as heterogeneity

statistic [25]. Sequential methods for meta-analysis will be used in the process of updating the review past June 2017 to avoid false positives due to multiple testing [26-28].

Additional evaluation using APEASE

Additionally, we used the APEASE criteria [29] to evaluate whether any of the identified interventions might be suitable for adaptation and further dissemination. We defined and operationalized the APEASE criteria as shown in Table 2. The operationalization of APEASE was discussed among the author team. Two authors (CD, MZ)-evaluated each intervention independently.

[insert Table 2 here]

Results

We searched the academic databases on April 4th 2017, and grey literature repositories and the trial registry on March 20th 2017. The number of hits identified and the record selection process is displayed in Figure 2. We included 16 studies (current status: Dec 2017). Nine authors responded to our queries. Autoalerts are continuously being received and updates reported on http://spindermatology.org/Overview.

[Insert Figure 2 here]

Included studies

We included eight RCTs [30-42], four CCTs [43-47] and four before and after studies [48-53]. The largest study included 1790 patients [30], the smallest 29 patients [34]. The mean ages of the patients were mid-forties to mid-fifties. Disease severity at inclusion differed among the studies. All but one study [40], which was identified via trial registry/grey literature searches, were found through academic databases searches. The characteristics of each intervention evaluated are displayed in Table S1 (online appendix).

Three further RCTs that were only available as abstracts [54-58]were excluded because the authors we contacted did not provide any further details on the studies Three trials are ongoing (NCT02750800 and NCT02205593 and NCT03127462). An overview of the included studies can be found in Table S2 (see online appendix). Where sufficient data was reported, we calculated unadjusted effect measures and confidence intervals for each study (see text and figures 3a, 3b). Meta-analysis was not appropriate because the interventions described in the studies were so heterogeneous in design.

Two RCTs evaluated one-to-one interventions, one of which involved two main consultations [30, 31] and the other of which involved seven motivational interviewing sessions over 12 weeks following climate therapy [32, 33]. Reich [30, 31] developed the Topical Treatment Optimization Programme to improve adherence in patients best treated with calcipotriol/betamethasone. Participants received two face-to-face consultations and an electronic reminder. Very small differences were seen after eight weeks in physician global assessment (RR 1.16, 95 % CI [1.02, 1.32] and DLQI (Figure 3a). In the second of these RCTs, Larsen [32, 33] offered seven sessions of motivational interviewing (MI) via telephone to patients who had participated in a three-week residential climate and heliotherapy program (CHT) in Gran Canaria. Discussions included skin treatment and lifestyle. Compared to usual care, a difference in favour of the intervention in the self-administered PASI (SAPASI) was seen three (MD -2.47, 95 %CI [-3.94, -1.00]) and six months after the intervention (MD -2.45, 95 % CI [-4.33, -0.56]), as well as in the DLQI (Figure 3a).

In another RCT, Bundy assessed an interactive web-based intervention for primary care patients with mild to moderate psoriasis [37, 38]. The program included six modules of cognitive-behavioral therapy (CBT), as well as interactive education activities. After six weeks, small differences were seen in DLQI (Figure 3a) and the Hospital Anxiety and Depression Scale (MD 2.00, 95 % CI [0.25, 3.75]).

[insert Figure 3 here]

a) DLQI

b) PASI

CL – confidence Interval
MD – mean difference
TPE- therapeutic patient education intervention
UC – usual care

Figure 3: Mean differences for a) Dermatology Life Quality Index (DLQI) and b) Psoriasis Area and Severity Index (PASI) for each study (pooling was not appropriate due to the different study designs, intervention content and inclusion criteria)

Three RCTs reported group interventions that took place on several occasions. Bostoen [34-36] evaluated a 12-week comprehensive educational and lifestyle program. Skin care sessions led by nurses, exercise and relaxation sessions were part of the program. There was no difference between the intervention and the control group after three, six or nine months (see Figure 3). Rothman [39] evaluated a three-week educational program. Patients were interviewed by a nurse to identify the precise challenges they faced. The resulting information was used to tailor the educational and functional interventions to each patient.. On the study-specific functional history chart (score 0-13, 13=worst) the intervention group scored a mean of 4.2 (n = 44) whereas the control group had a mean of 6.0 (n = 17, no

statistical test reported). Lastly, Thongkaow [40] compared self-help group instructions, which took place every four weeks, with usual care. Details of the intervention were not well reported. After 12 weeks, no difference in PASI between self-help group and standard clinical care were found (Figure 3b).

Two further RCTs assessed short group interventions. Educational nurse support was evaluated by Ersser [41]. A structured group learning experience and audiovisual learning materials were used. After six weeks, no difference was found in DLQI. For PASI, very small differences were seen (Figure 3). In the other RCT, , Lora [42] assessed whether a two-hour educational session for psoriasis patients delivered by a dermatologist was more effective than an identical one delivered by a dermatologist and a psychologist. Based on a study-specific questionnaire, there was no clear pattern in terms of efficacy after six months.

We included four CCTs. In the first of these, Bremer Schulte [43] developed the 'duo formula' group therapy intervention whereby both the physician and the patient were trained to lead group sessions together. During ten two-hour sessions, emotions regarding psoriasis but also aspects of self-care, treatment options and the disease were discussed. After three months, the means of each 'equilibrium' subscale (reduction of illness behaviour (IB), shame & shyness (SS), interactional skills (IS), problem solving (PSG), deidentification with skin (DS) and well-being (WB)) were significantly different to those measured in the control group for all but the last subscale. Improvements in psoriasis severity were not assessed. In the second CCT, Fortune [44, 45] reported the results of a cognitive behavioral management program that included teaching about medical and biological background of psoriasis. Six group sessions over six consecutive weeks took place. After six weeks, no difference was found between the groups (PASI MD -1.90, 95 % CI [-13.83, 10.03]). In the third CCT, Pagliarello [46] assessed the effectiveness of an empowerment-based educational intervention in addition to balneotherapy versus 12 days of balneotherapy alone. During one two-hour group workshop, psoriasis treatment options and modifiable risk factors were discussed. Before and after 12 days, the SAPASI, Skindex-17 and the PEER instrument were used to assess effects. However, the results were only reported as summary measures for all participants (see online appendix). In the fourth CCT, Renzi [47] conducted a quasi-experiment in which, directly following consultations with their dermatologists, patients were presented with a visual overview of treatment options in the form of a so-called decision board to determine whether this had a positive effect on patient knowledge. Patients' attitudes and satisfaction with the decision-making process did not differ between the groups. Knowledge appears to have increased slightly in the intervention group.

Lastly, we identified a total of four before and after studies. Burnett [48, 49] designed a five-minute educational intervention that focused on possible cardiometabolic comorbidities, risk factors and risk reduction strategies specific to psoriasis. This face-to-face intervention was delivered by Burnett. Patients with moderate to severe psoriasis were eligible to participate. After two to three months, eight of the 11 study-specific questionnaire items were significantly different compared to baseline (online appendix, Table S2). De Korte [53] evaluated a disease management program in 10 medical centers in Europe. Three face-to-face consultations over the period of two months were conducted with patients who received topical treatment. A comprehensive patient profile, disease management, education and goal setting tailored to patients' needs were key parts of the program. The

Skindex-29 decreased and a self-assessed adherence measure increased by the end of the study period (online appendix, Table S2). Tucker [51] report an educational intervention whereby two face-to-face sessions took place in the pharmacy. The pharmacist had received a training package with information on psoriasis. Only patients who used topical treatments were eligible. The DLQI decreased from baseline to six weeks and the person-centered dermatology self-care index PEDESI increased (online appendix, Table S2). Finally, Wahl [50, 52] reported a comprehensive educational intervention as part of a three-week climate therapy in Gran Canaria. Several individual and group sessions took place conducted by dermatologists, nurses and physiotherapists. Authors report that patients' knowledge had improved (online appendix, Table S2).

Study appraisal

Our evaluations - based on self-reported results - were 'high' due to non-blinding [30, 32, 37, 42]47 and additionally due to missing data issues [34, 39], or lack of information [40] in the included RCTs. The risk of bias was subject to "some concerns" in the case of two studies that reported blinded outcome assessments [30, 41] . All other studies reporting blinded outcome assessments received an overall rating of "high'. We rated the risk of bias for the CCTs as being mostly "moderate" to "serious", and one of the four before-after studies was rated as "good" (online appendix).

Additional evaluation using APEASE [29]

While we were able to rate many of the interventions as *affordable, practical* and *acceptable* to patients, only three were effective. Of these three, one was not acceptable to patients, leaving two interventions that might be suitable for further dissemination (see Table 2 above). Further investigations could be made regarding one intervention by de Korte as the quality was evaluated as 'good'.

[Insert Table 3 here]

Discussion

We have been able to include 16 studies in this systematic review that meet our definition of TPE. The included studies differed greatly in terms of the content of the educational component, the delivery mode, the number and frequency of sessions, the type of professional who delivered the intervention, and whether the intervention was combined with another treatment. Furthermore, different patients were eligible for the interventions, such as those suitable for topical treatment [30, 41, 53] or with mild to moderate disease [37], mild to severe [42] or only moderate to severe disease severity [48] or those, who were either in- or outpatients [47]. The interventions were conducted in specific settings

including during or after climate therapy [32, 50], at the pharmacy [51], alongside primary care [37], at a day care facility [39] or at a spa [42, 46].

Only two multi-country interventions were included, all others were site-specific and content varied. The decision board for consultation [47] and the five-minute educational intervention [48] were the briefest interventions, whereas the web-based program was the most solitary (yet flexible) one [37] , whereas the group interventions were the most dynamic ones [34, 39, 40, 43, 44].

The majority of interventions can be classified as complex interventions [59]. The behavioural change techniques that were used in these studies were multi-faceted with 'active ingredients' such as goal setting, feedback and monitoring, instructions and behavioural experiments or exercises, self-belief or social comparison (behaviour change taxonomy, [29]). In the figurative sense this matched the WHO definition of TPE (see Figure 1), but apart from Reich [30], none of the publications described that participants were provided with information concerning how to better navigate the health care system or similar. Being able to navigate the health care system successfully is an important part of patient-centered care.

Furthermore, for health care (systems) to be effective, adherence to long-term treatment is crucial, and self-management is an integral part of the care management cycle - the extent of this being the case varies greatly between systems/countries/regions. A chronic condition like psoriasis has to be managed long-term, sometimes for decades, and yet evidence on very long term TPE is lacking..

Of the interventions with comprehensively reported or calculable positive effects, three controlled studies included at least one individual session either face-to-face [30, 34] or via telephone [32] as well as two of the before-after studies [51, 53]. For many patients, the dermatologist remains the first source of information [60]. Perhaps at least an initial one-to-one session with a health care professional (HCP) is influential. In that respect, there is still the risk that HCP assume a non-adherer does not want to take responsibility [61, 62]. Only two [43, 44] of four [40, 41] studies using group sessions as delivery mode were effective. For the remaining six studies, result or delivery mode were unclear. Better reporting quality is desirable.

Three of five RCTs found small differences in DLQI, but the minimal necessary important difference, which has been defined as a different of four points from baseline [63], was neither seen in these three RCTs nor in the before-after study [51]. Due to non-blinding, our confidence in any patient-reported outcomes is limited.

Four of the eight RCTs/CCTs that used evidence or some sort of behavioural theory to design their intervention found an effect. However, none of them transparently described how the behavioural theory was operationalized. Some aspects seem to be reflected in the type or content of the intervention. Research shows that interventions underpinned by theory tend to work better than those who are not [59].

Implications for practice and research

Based on the APEASE evaluation, two programs – the topical treatment program (TTOP) and the motivational interviewing after climate therapy – appear suitable for real world implementation. Nevertheless, our risk of bias assessments suggest that the results of the studies reporting on these interventions should be treated with caution. However, we chose these programmes nevertheless, because in cases when patient-reported outcomes are measured, such as quality of life, studies will always receive a high risk of bias rating as it "is usually likely to be influenced by the knowledge of the intervention", see Rob 2.0 guidance document [22, p.36]. Hence, we took a pragmatic stance and gave the RoB rating due to non-blinding less weight.

Further inquiries should be made regarding the nurse-led intervention. While it was not found to be effective, modifications were suggested that might lead to improvements. . The same can be said of the web-based intervention, which was effective but suffered from too many drop outs. Generally, to support adaption, implementation and evaluation of an intervention to a new setting, extensive manuals on the development and the execution should be made available.

Regarding further research, one included before-after study [53] was of good methodological quality and the intervention could be investigated further. It may also be worthwhile looking across medical specialties, since many self-management programs exist [64]. Several disease-independent factors such as those depending on the health care context interact in complex ways when it comes to program success and a broader look across disease and public health areas may be valuable before designing interventions.

Limitations

The outcomes reported were heterogeneous, some were study-specific and some instruments not validated. We attempted to minimize reporting bias by choosing the primary outcome of the study if none of the pre-defined outcomes was reported. Although we cannot rule out the possibility of publication bias, we included grey literature repositories in our searches. Lastly, we took a pragmatic stance with APEASE, but we are also the first researchers to transparently describe its use.

Conclusion

There is some setting- and patient-specific evidence that TPE programs can have promising effects, but the internal validity of the studies in question is limited. Based on the results of our review and assessment using the APEASE criteria, we suggest that the topical treatment program (TTOP) [30] and motivational interviewing after climate therapy [32] may be suitable for adaptation to the real world setting.

Conflicts of Interest

Corinna Dressler, Paul Galdas, Lynda Grine, Alexander Nast, Carle Paul and Miriam Zidane declare no conflict of interest.

Jo Lambert has been involved in the design, conduct and publication of one of the eligible studies.

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Tables and Figures for main text

Table 1: modified PICOTS framework (including eligibility criteria)

	Inclusion	Exclusion
Patient	- Psoriasis patients (at least 50% of the study population) - Adults	- Psoriasis Arthritis
Intervention	Any therapeutic patient education intervention, or self-management support intervention with an interactive component and a TPE component (i.e. those with structured education activities that support patient-practitioner communication, self-management, changes in life style or quality of life/psychosocial well-being)	- interventions that only raise awareness, for example, brochures without an interactive component - pharmaceutical trials
Comparison	Another intervention, usual care, waiting list or no intervention, pharmaceutical intervention only	- head-to-head drug trials
Outcome	Relevant parameters included: disease severity, symptom relief, patients self-evaluated global/disease status, medication adherence, quality of life, self-efficacy, illness perception, psychological well-being	-
Time/Setting	The setting is not limited to dermatology practices or specialized clinics; we also consider self-help groups, nurse-instigated interventions, or online tools as long as an interactive component was part of the intervention.	We did not limit the timing.
Study	The study design had to be a randomized controlled trial (RCT), a clinically controlled trial/quasi-experiment (CCT), or a before-after study. The aim here was to give a comprehensive overview of no only what is effective but also non-randomized designs that could be further investigated.	-
Other	-languages: English, German, French and Spanish	- due to funding limitations other languages had to be excluded

Table 2: Definition and operationalization of APEASE criteria

APEASE	Definition [29]	Operationalization	
Affordability	Within an acceptable budget, the intervention can be delivered to, or accessed by all	direct costs for patients, indirect costs for patients	+ = Probably affordable - = probably not affordable ? = no/missing information
Practicability	Can the intervention be delivered as designed through the means intended to the target population?	Number/duration of sessions & staff and/or extra staff training required	- = many/long session and/or special material/intensive training for staff, specialty staff; + = few/short sessions, no/little extra staff and training necessary ? = no/missing information
(cost) Effectiveness	Effect size in a real life situation	study effect sizes and confidence intervals	+ = effective[1] (and cost effective) '-= effective[1] (and cost effective) ? = no/missing information
Acceptability	Is an intervention judged to be appropriate by relevant stakeholders?	patient perspective only – number of drop-outs during the intervention period	++ = < 1/5 + = < 1/ 4 - = < 1/3 -- = > = 1/3 ? =no/ missing information
Safety	Does an intervention have unwanted side effects?	Risk ratio or number of adverse events reported	- = yes/more in intervention group than control group/ + = CI of RR crosses line of no effect, no/few events ? = no/missing information
Equity	Does the intervention increase or decrease disparity / equity between people	Is it tailored to patients needs?	+ = yes - = no ? = no/missing information

1 more weight was given to the patient reported outcome

Table 3: APEASE evaluation

Intervention (Author)	Affordability	Practicability	Effectiveness	Acceptability	Safety	Equity
RCTs						
Larsen*	+	+	+	++	?	+
Reich*	+	+	+	++	?	+
Bundy	+	+	+	- -	?	+
Bostoen	-	-	-	++	?	+
Rothmann	-	-	?	-	?	+
Thongkaow	?	+	-	?	?	?
Ersser	+	+	-	++	?	+
Lora (only head-to-head RCT)	+	+	?	?	?	?
CCTs						
Bremer Schulte	-	-	?	?	?	?
Fortune	+	+	-	+	?	+
Pagliarello	+	+	?	?	?	?
Renzi	+	+	?	n/a	?	?
before-after						
Burnett	+	+	+	++	?	?
De Korte	+	+	+	++	?	+
Tucker	+	+	+	++	?	+
Wahl	-	-	+	++	?	?

*suitable for adaptation and to be included in online dissemination toolbox
grey: due to study design,results to be treated with caution

Figure legends and table headings in main text

Order of Figures and Tables as they appear in the main text

1. Figure 1: Definition of Therapeutic Patient Education by the WHO
2. Table 1: modified PICOTS framework (including eligibility criteria)
3. Table 2: Definition and operationalization of APEASE criteria
4. Figure 2: Record selection flow chart
5. Figure 3a: Mean differences for Dermatology Life Quality Index; results per study (pooling was not appropriate due to the different study designs)

   Legend for Figure 3a:

   CL – confidence Interval
   TPE- therapeutic patient education intervention
   UC – usual care
   MD – mean difference

6. Figure 3b: Mean differences for Psoriasis Area and Severity Index; results per study (pooling was not appropriate due to the different study designs)

   Legend for Figure 3b:

   CL – confidence Interval
   TPE- therapeutic patient education intervention
   UC – usual care
   MD – mean difference

7. Table 3: Results of the APEASE evaluation

   Legend for Table 3 :
   *suitable for adaptation and to be included in online dissemination toolbox
   grey: due to study design,results to be treated with caution