REVIEW

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Interventions to Reduce Skin-related Self-stigma: A Systematic Review

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Self-stigma beliefs are common among people with visible chronic skin diseases and can negatively affect their quality of life and psychosocial well-being. Hence, evidence-based interventions are urgently needed. The objective for this systematic review was to summarize research on available interventions and evaluate their benefits and limitations. Following PRISMA guidelines, an electronic database search of 4 databases (EMBASE, PsycINFO, PubMed, Web of Science) was conducted. Studies were eligible if they (a) investigated interventions to reduce self-stigma in adults with chronic skin disease, (b) were original empirical articles, and (c) were written in English or German. Two independent reviewers conducted the abstract and full text screening, as well as data extraction. The quality of the included studies was evaluated using the Critical Appraisal Skills Programme checklists. The initial search yielded 5,811 abstracts; of which 23 records were eligible. Studies addressed a broad range of skin conditions, and interventions ranged from social skills training, counselling and self-help to psychosocial and behavioural interventions. Overall, interventions had mostly positive effects on self-stigma and related constructs. However, the study quality was heterogeneous, and further efforts to develop, thoroughly evaluate, and implement interventions tackling self-stigma in multiple skin conditions and languages are warranted.

Key words: stigmatization; skin diseases; psoriasis; dermatology; intervention.

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SIGNIFICANCE

This systematic review provides an overview of interventions addressing skin disease-related self-stigma, i.e., negative views about oneself and one's body, and identifies avenues for future research. Specifically, the availability is limited to a few countries and languages, and most programmes were designed for specific skin conditions with a scarcity for inflammatory skin diseases. Moreover, there is a lack of high-quality studies examining their effectiveness. Consequently, there is a need for the development of evidence-based, skin-generic interventions targeting self-stigma in people with skin diseases, which would contribute to improving their psychosocial well-being.

Visible chronic skin diseases affect approximately 19% of the German working population (1) and have a large and long-lasting impact on the lives of affected individuals. Alongside the physical discomfort entailing itch, fatigue, pain, and functional limitations (2–4), many patients experience psychological and social impairments. Specifically, body dissatisfaction, depression, embarrassment, social withdrawal, isolation, and low quality of life (QoL) are commonly reported (5–8) (for reviews see [9, 10]). Untreated, these effects can build up over time and lead to cumulative life-course impairment (CLCI), in the worst case forming irreversible damage and preventing those affected from accomplishing their personal goals (11). Consequently, bio-psychosocial approaches are urgently required to alleviate suffering and help people cope with the impact of their chronic skin disease on daily life.

One major challenge in the context of visible differences such as skin diseases is the experience of stigma, both from others (public stigma) and from the individuals themselves (self-stigma). According to the Stage Model of Self-Stigma (12), self-stigma consists of the progressive stages of awareness, agreement, application, and harm. Especially if affected individuals are aware of a stereotype concerning them, agree with it, and apply it to themselves, negative consequences are likely to ensue.

More specifically, this internalization of stigma frequently leads to low levels of self-efficacy and self-esteem (13–15), which, in turn, motivates people to try to hide their skin disease by camouflaging, not disclosing their disease to others, or even avoiding social situations and intimacy (16–18). First studies indicate that self-stigma is one of the main contributors to low QoL in people with dermatological conditions (19, 20), which is supported by moderate to strong correlations between self-stigma and QoL found in persons with HIV (21), mental illness (22–24), and obesity (25). This debilitating impact of self-stigma on quality of life and well-being emphasizes the importance of developing and disseminating interventions targeting self-stigma in persons with visible chronic skin diseases.

In a systematic review on interventions against public and self-stigma related to dermatological conditions,

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Topp et al. (26) identified 15 studies of mixed quality targeting self-stigma. In light of the World Health Assembly's call on its member states to take action to improve the acceptance of people with psoriasis (27), there has been an increase in scientific attention to both public and self-stigma, and this has likely intensified efforts in exploring novel interventions in recent years. Furthermore, there are only a few psychometrically sound instruments that measure self-stigma (28), and the construct is often intertwined with related constructs such as body image, body dissatisfaction, body shame, self-devaluation, and self-image. Therefore, this systematic review aimed to conduct an updated search specifically for self-stigma interventions with a broader definition of self-stigma to (1) provide a synopsis of existing interventions against self-stigma associated with visible chronic skin diseases, (2) evaluate their benefits and limitations, and (3) gather detailed information that can be used to improve or develop new programmes to reduce self-stigma in persons with visible chronic skin diseases.

MATERIALS AND METHODS

Protocol and registration

Before the formal database search, the protocol was registered in the International Prospective Register of Systematic Reviews (PROSPERO; www.crd.york.ac.uk/prospero, registration number: CRD42021284948). We adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement in conducting and reporting the review (see Appendix S1).

Search strategy and eligibility criteria

The searched databases included PubMed, EMBASE, Web of Science, and PsycINFO, without restriction by publication date. The search categories included *self-stigma*, *skin diseases*, and *interventions*. The category *self-stigma* included related constructs such as self-esteem, self-image, self-devaluation, and body image. The search strings for the 4 databases can be found in Appendix S1. Articles were eligible if they (a) were targeted at persons with a chronic visible skin disease listed in the International Statistical Classification of Diseases and Related Health Problems, 11th Edition (ICD-11); (b) addressed an intervention aiming to reduce patients' self-stigmatization; (c) were written in English or German; (d) were published in a peer-reviewed journal; and (e) if the full text was available.

Preliminary searches were run by JT to establish the need for a systematic review of interventions against self-stigma in this population, and to construct the search and study selection processes. The definitive searches were conducted in October 2021 and re-run before the final analysis in April 2023. Additional records were identified through manual searches of the reference lists of relevant articles and of known relevant reviews. **Fig. 1** shows a flowchart illustrating the article selection process.

First, 2 independent reviewers (all records were screened by JT, the second review was divided between HG/LW/MR) screened titles and abstracts of the 5,811 studies identified in the database search based on a list of specific inclusion and exclusion criteria. At this stage, 5,241 records were excluded because they were not relevant for the topic, were not conducted in a human population with a visible chronic skin disease, were duplicates, or were published in a language other than English or German. Reviewers had a fair agreement for title and abstract screening (Cohen's kappa = 0.30). Discrepancies were resolved through a third reviewer (RS). Subsequently, the full text of studies considered as potentially relevant by at least 1 reviewer was retrieved and further assessed for eligibility by JT and RS. Reviewers had almost perfect agreement for full-text screening (Cohen's kappa = 0.85). Any uncertainty regarding eligibility was resolved through discussion in the team. Another 33 records were excluded at this stage.

Data extraction and synthesis of results

Two independent reviewers (JT, RS) extracted data into a predefined extraction form in Covidence, a systematic review management tool (Veritas Health Innovation, VIC, Melbourne, Australia). Specifically, information on the study design, target population,

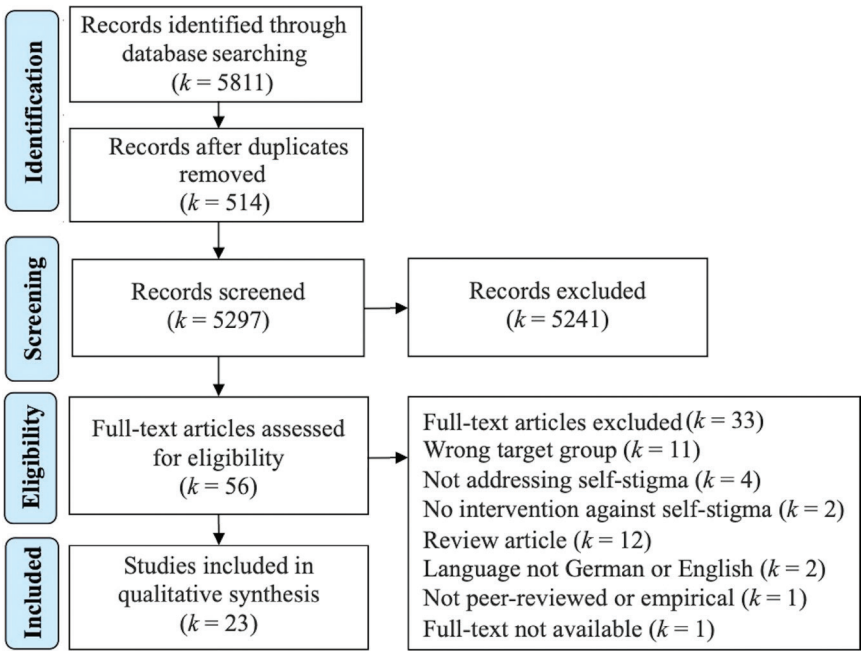

Fig. 1. Flowchart illustrating article selection according to PRISMA guidelines (34).

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sample size and characteristics, intervention (type and setting of intervention, duration of treatment, definition of control group), outcome measures, and reported effects of the intervention were extracted. Discrepancies were resolved through team consensus (JT, RS, CFZS). Final data were synthesized narratively.

Quality assessment and risk of bias within studies

All included studies were peer-reviewed. The first author (JT) assessed the methodological quality of included studies by means of the Critical Appraisal Skills Programme (CASP) checklists (29), which are available for randomized controlled trials, cohort studies, and qualitative studies, among others. For the risk of bias evaluation, quasi-experimental studies were treated as cohort studies. No individual risk of bias assessment was performed for studies that could not be assessed using any of the available CASP tools. The checklist consists of 10, 11, or 12 items for qualitative studies, RCTs, and cohort studies, respectively, which addressed both bias and quality of reporting.

RESULTS

Study characteristics

Characteristics of the 23 included studies are provided in **Table I**. Studies were published between 1996 and 2023; 11 were conducted in industrialized countries (30–33), 7 of which were set in the United Kingdom (34–40), and 12 in low- and middle-income countries (41–52). Study designs included randomized controlled trials (RCTs, k=7) (30, 34, 38, 40, 43, 45, 47), quasi-experimental studies (k=4) (32, 44, 49, 51), cohort studies (k=2) (31, 33), mixed-methods studies (k=3) (37, 48, 52), qualitative studies (k=5) (35, 36, 41, 42, 50), a cross-sectional study (46) and a case report study (39). Sample sizes varied considerably between studies, ranging from 2 to 1,684 participants (*M*=164.56, SD=341.90).

The studies examined the effects of self-stigma interventions in a range of skin conditions: 6 programmes were designed for persons with leprosy (41–43, 46, 48, 50), 3 in persons with burns (45, 49, 51) and 2 in persons with lupus erythematosus (31, 32), while 1 study each addressed alopecia areata (36), atopic dermatitis (39), onychomycosis (33), psoriasis (35), skin cancer (47), ulceration (30), and vitiligo (38). Five studies targeted a range of skin conditions and disfigurements (34, 37, 40, 44, 52).

Intervention characteristics

The studies examined a variety of interventions: 3 studies used cognitive-behavioural therapy (CBT) (34, 38, 39), 4r offered self-help/self-healing (36, 37, 46, 47), 2 administered social skills training (32, 42), and 1 study each investigated counselling (48), educational training (51), creation of a participatory video (50), a patient support group (35), a family-based intervention (52) a body-functionality writing exercise (40), yoga nidra (49), a spiritual care programme (45), and medical treatment (33). Furthermore, 3 studies offered combinations of several of these intervention approaches (31, 43, 44). Two studies evaluated novel treatment approaches at the level of the community or healthcare system, namely the Lindsay Leg Club model of care (30) and an integrated care approach (41), both of which aimed to improve their patients' self-esteem through reducing isolation and facilitating social and peer support. Of the other interventions, most were delivered as group interventions (k=9) (31, 32, 35, 42, 45, 46, 50–52) but also face-to-face (k=3) (38, 39, 49), as a combination of these (k=3) (43, 44, 48), or online (k=4) (34, 36, 37, 40). The number of intervention sessions ranged from 3 to 24 sessions (*M*=9.19, SD=5.33) with an average duration of 75 min (SD=43.59, range: 15–150 min) per session, except for 2 interventions that comprised (occasional) full-day sessions. In the study by Szepietowski and Reich (33), medical treatment with a combination of oral terbinafine and topical amorolfine was administered daily for 6 months.

Effectiveness of interventions

All of the 17 quantitative studies reported improvements in self-stigma and related constructs. Importantly, 7 of these studies did not include a control group and 2 studies did not report the results for the control group, which does not allow to be ruled out that observed changes were due to the passage of time. However, where results of a control group were included (waitlist [32, 47, 49]; treatment as usual [30, 38, 45]), these improvements were comparatively larger in the intervention group. Only one study (48) did not find a significant difference between the counselling group and a waitlist-control group: both groups showed an equally large reduction in internalized stigma as measured with the Sari Stigma Scale (53).

Furthermore, 4 studies reported mixed effects: first, upon participating in an online self-help intervention by Krasuska et al. (37), 2 out of 5 participants experienced decreased levels of shame, while 2 others felt more shame and similar results were found for self-criticism. Second, the online CBT intervention FaceIT by Bessell et al. (34) had no significant effect on body image QoL but did reduce appearance concerns at 6-month follow-up compared with a waitlist control group. The face-to-face version of FaceIT produced slightly larger effects on both body image QoL and appearance concerns, and the latter effect already became apparent at 3-month follow-up, although the authors did not report whether these differences between face-to-face and online delivery of the programme were significant. Third, in comparison with a creative writing exercise, the Expand Your Horizon writing exercise administered by Adkins et al. (40) led to a significant increase in both body appreciation and functionality appreciation from pre- to post-intervention and 1-month follow-up, with medium-to-large effects. However, no effects were found on appearance anxiety or skin-related shame. Lastly, while a patient with eczema receiving face-to-face CBT in the case report by Wittkowski & Richards (39) did not experience an im-

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Table I. Characteristics of included studies

Study characteristics			Participant information and sociodemographics		Intervention			Outcomes	
Study ID	Study design	Country	*n*	Skin diagnosis	Type and setting	Duration and frequency	Control group(s)	Measure(s) and validation	Main finding(s)
Adkins (2022)(40)	RCT	UK	451	Any	Expand your Horizon writing exercise; online	3 sessions of 15 min each, every 2 days	Sham control (creative writing exercise)	Body Appreciation Scale-2; Functionality Appreciation Scale; Appearance Anxiety Index; Skin Shame Scale (all validated)	Significant increase in body appreciation and functionality appreciation in the intervention but not control group from pre- to post-intervention and 1-month follow-up; no effects on appearance anxiety or skin-related shame
Arole (2002) (41)	Qualitative research	India	24	Leprosy	Integrated care approach at healthcare system level		Vertical approach (villages)	2 open-ended questions	In the integrated approach, 85.7% (compared with 60% in the vertical approach) felt that leprosy was like any other disease and 78.6% (compared with 10% in the vertical approach) felt they could discuss their disease in public
Augustine (2012) (42)	Qualitative research	India	5	Leprosy	Social skills training; group intervention	10 full-day sessions over 3 weeks	none	Self-esteem was measured through (1) post-interviews (questions based on Rosenberg's Self-Esteem scale and Bogardus Social Distancing Scale), (2) spontaneous remarks by patients during sessions, and (3) evaluation of the patients' behaviour during practices or tasks at home	Improved self-perceptions, increase in confidence and hope
Bessell (2012) (34)	RCT	UK	83	Range of disfigurements	CBT; online	8 sessions, 1x/week	(1) standard CBT-based face-to-face delivery, (2) no intervention	Body Image Quality of Life Inventory, Derriford Appearance Scale-24 (both validated)	Compared with the no intervention control group, FaceIT online had no effect on body image QoL but significantly reduced appearance concerns at 6-month follow-up (face-to-face intervention: significant increase in body image QoL at 6-month follow-up & significant reduction in appearance concerns 3- & 6-month follow-up)
Burr (1996) (35)	Qualitative research	UK	14	Psoriasis	Patient support group; group intervention	1x/month; however, instead of attending meetings every month, members are using the support of the group when they feel they need it	None	Questionnaire not further specified	Support group meetings are described to be essential to the psychological well-being of individuals with skin complaints
Dadun (2017) (43)	RCT	Indonesia	237	Leprosy	CBT; counselling; socioeconomic development (to improve people's financial situation), "Contact"; single face-to-face; group intervention; contact events	5 sessions	(1) 'Contact – Counselling' (8 sub-districts), (2) 'Counselling – SED' (7 sub-districts), (3) 'SED – Contact' (7 sub-districts) and (iv) 'Control' areas (8 sub-districts).	Stigma Assessment Reduction Impact (SARI) scale (newly adapted for population and/or language)	Significant reduction of internalized stigma, disclosure concerns and anticipated stigma in the intervention areas from pre- to post-test; however, results of the control area were not reported.
Dellar (2022) (44)	NRES	Ethiopia	251	Leprosy, podoconiosis, lymphatic filariasis	Counselling; self-help; care package (health education, equipment; community workshops; single face-to-face; group intervention	Over 12 months	none	Adapted Internalized Stigma of Mental Illness Scale (newly adapted for population and/or language)	Significant decrease in internalized stigma from baseline to 3- and 12-month follow-up
Edwards (2009) (30)	RCT	Australia	67	Ulceration	Lindsay Leg Club model of care, emphasizing socialization and peer support; community setting	24 sessions, 1x/week	Traditional community nursing model consisting of individual home visits by a registered nurse	Rosenberg's Self Esteem Scale (validated)	Significant increase in self-esteem in intervention group compared with control group
Heidari (2023) (45)	RCT	Iran	60	Burns	Spiritual care programme; group intervention	8 sessions of 1 h each over the course of 2 weeks	Routine Care	Beck's Self-Concept Test (validated)	Significant improvement in body image (BSCT) in the intervention but not the control group from baseline to post-test and 3-month follow-up

(Continued)

Table I. (*continued*)

Study characteristics			Participant information and sociodemographics		Intervention			Outcomes	
Study ID	Study design	Country	*n*	Skin diagnosis	Type and setting	Duration and frequency	Control group(s)	Measure(s) and validation	Main finding(s)
Iliffe (2019) (36)	Qualitative research	UK	12	Alopecia areata	Self-help; online (Facebook peer support group)		None		Participants describe the forum as valuable for coping, normalization of the condition, and sharing experiences, which appears to help in reducing shame and stigma
Jay (2021) (46)	Cross-sectional study	Nepal	98	Leprosy	Self-help; group intervention		None	Stigma Assessment Reduction Impact scale (validated)	Access to multiple groups significantly predicted less internalized stigma (self-help group identification was indirectly linked to decreased stigma)
Jolly (2014)(31)	Cohort study	United States	15	Lupus erythematosus	CBT; education, cosmetic training, mindfulness; group intervention	10 sessions of 120 min each, 1x/week	Usual care	Body Image in Lupus Scale (validated)	Improved body image at post-intervention and 2nd follow-up (14 weeks post-intervention)
Krasuska (2018) (37)	Mixed methods	UK	5	HS; vitiligo; rosacea	Self-help; online	Self-paced but at least 1x/week	None	Overt Aggression Scale, Forms of Self-Criticising/Attacking and Self-Reassuring Scale (all validated)	Evidence was mixed. Two participants report decreased shame after the intervention, while 2 others experienced increased shame; similarly, only 2 participants experienced lower self-criticism after the intervention
Latifi (2020) (47)	RCT	Iran	34	Skin cancer	Self-healing training	12 sessions of 90 min each	No intervention	Body Image Concern Inventory (validated)	Significant decrease in body image concern in intervention group compared with control group
Lusli (2016) (48)	Mixed methods	Indonesia	124	Leprosy	Counselling; single face-to-face; group intervention; family counselling	5 sessions of 30–60 min each	No intervention	Stigma Assessment Reduction Impact scale (validation status unclear)	SSS total reduced from 21.55 to 12.00 (p-value <0.001) in the intervention group, which is a significantly larger reduction compared with the control group Internalized stigma,: mean difference: -3-43 (0.51), <0.001
Ng (2007) (32)	NRES	Hong Kong	76	Lupus erythematosus	Psychosocial group training	6 sessions of 2.5 h each, 1x/week	No intervention	Rosenberg Self-Esteem Scale (validated)	Significant increase in self-esteem in intervention group compared with control group
Ozdemir (2019) (49)	NRES	Turkey	110	Burns	Yoga nidra; single face-to-face	12 sessions of 30 min each, 3x/week	No intervention	Rosenberg Self-Esteem Scale, Body Image Scale (both newly adapted for population and/or language)	Significant increase in self-esteem in the experimental group compared with the control group
Papadopoulos (1999) (38)	Randomized controlled trial	UK	16	Vitiligo	CBT; single face-to-face	8 sessions of 1 h each, 1x/week	Treatment as usual	Rosenberg Self-Esteem Scale, Situational Inventory of Body Image Dysphoria, Body Image Automatic Thoughts Questionnaire (all validated)	Significant improvement in self-esteem, body image dysphoria, and body image automatic thoughts in intervention group compared with control group
Peters (2016) (50)	Qualitative research	Indonesia	12	Leprosy	Participatory video; group intervention	12 & 22 sessions, between 1 hand a full day	None		Participants reported having a good time, a greater sense of togetherness, increased self-esteem, individual agency, and willingness to take action in the community
Seyedoshohadaee (2019) (51)	NRES	Iran	130	Burns	Educational training; group intervention	3 sessions of 2 h each	None	Satisfaction with Appearance Scale(validated)	Significant decrease in body image dissatisfaction from pre- to post-test
Szepietowski (2008) (33)	Prospective (baseline and after treatment)	Poland	1684	Onychomycosis	Medical treatment: combined therapy with terbinafine and amorolfine	6 months	None	Six-Item Stigmatisation Scale(validated)	Significant reduction of stigmatisation (p<0.001) to about 40% of the baseline level; the mean stigmatisation level after the completion of the study was 2.1±2.6 points (range 0–14 points) vs 5.7±3.8 points (range 0–17 points) before treatment. The comparison of answers to individual questions before and after the treatment revealed that in every item, 55–67% reduction of the baseline scoring was observed. The difference for every comparison was highly significant (p<0.001)
Van't Noordende (2021) (52)	Mixedmethods	Ethiopia	275	Leprosy, podoconiosis; lymphatic filariasis	Family-based intervention: self-management of disabilities, awareness raising, socioeconomic empowerment; group intervention	8 monthly sessions	None	Stigma Assessment Reduction Impact scale (newly adapted for population and/or language)	Significant reduction in stigma (including internalized stigma) from baseline to follow-up
Wittkowski (2007) (39)	Case report	UK	2	Dermatitis/eczema	CBT; single face-to-face	8 sessions of 1 h each, 1x/week or 1x/2 weeks	None	Rosenberg Self-Esteem Scale (validated), VAS (author-created items)	No effect on self-esteem; decrease in perceived stigma (VAS scale, not validated)

CBT: cognitive behavioural therapy; HS: hidradenitis suppurativa; NRES: non-randomized experimental study; QoL: quality of life; VAS: Visual Analogue Scale.

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provement in self-esteem, a decrease in self-stigma was noted. Given that most studies did not report effect sizes, their effectiveness cannot be formally compared.

In all 5 qualitative studies, participants reported positive effects of the respective interventions: an integrated care approach implemented in several Indian communities helped people with leprosy feel their illness was like any other disease and they could discuss it in public, and more so compared with patients being treated in communities with the traditional care approach (41). Furthermore, patients with leprosy had improved self-perceptions and increased confidence and hope after taking part in group social skills training (42) and increased self-esteem, agency, and sense of togetherness upon creating a participatory video (50). Similarly, patient support groups, both in person (35) and online (36), were valued by patients with psoriasis and alopecia areata, respectively. Specifically, the investigation of an online platform by Illife and Thompson (36) showed that patients perceived it to be helpful in normalizing the condition and reducing stigma and shame. Again, apart from the study by Arole et al. (41), none of these studies had a control group, and their qualitative nature limits the conclusions that can be drawn concerning self-stigma and related constructs.

Other benefits and limitations of the different interventions are presented in **Table II**. In addition to their effectiveness, we evaluated programmes on duration, cost, accessibility, and promoting opportunity for social connection and support. Some programmes were particularly short (≤6 hours) and easy to implement in users' daily lives (40, 51), while others took more than 15 hours to complete, with some lasting several half- or even full days. Such intensive programmes may be beneficial in specific situations (e.g., if participants' journey is too long to be made repeatedly for shorter but more frequent sessions) but are not feasible for many potential users. Furthermore, programmes that were able to keep costs at a minimum for patients and insurance providers were viewed more favourably (34–37, 40, 46, 49, 52). In addition, some programmes were independent of location or local healthcare infrastructure and particularly accessible: they did not require healthcare professionals to deliver the intervention but adopted a train-the-trainer approach instead (49), or relied on self-help (37) and online approaches (34, 36, 40), which may make them advantageous for patients living in remote locations or those with otherwise low mobility. At the same time, a disadvantage is that online interventions require a degree of technical ability and might not be the preferred medium for all. Importantly, all of these factors contribute to the scalability of these interventions: some of the low-cost, easily accessible solutions likely have the greatest potential to be adapted for other languages and cultures, and implemented in new settings. Notably, we consider it an additional benefit that some programmes facilitated exchange among patients (30–32, 35, 36, 42, 44–46, 48), which many patients highly value (54), or succeeded in tackling public stigma in addition to self-stigma (41, 43, 44).

Risk of bias assessment

The study designs and quality were heterogeneous (see **Table III**). Overall, in many studies, reporting of methodology was unclear or poor. More specifically, some RCTs

Table II. Benefits and limitations of studied intervention programmes

	Benefits					Limitations			
Study ID	Short duration	Low/no cost	Independent of location	Connects patients	Reduction of social stigma	Long duration	Expensive	Requires technical capacities	Other
Adkins (2022) (40)	X	X	X					X	
Arole (2002) (41)					X				– Change at healthcare level difficult to implement
Augustine (2012) (42)				X		X			
Bessell (2012) (34)		X	X					X	
Burr (1996) (35)		X		X					
Dadun (2017) (43)					X		For implementation		+ Combines different approaches, intervenes at different levels
Dellar (2022) (44)	X			X	X				
Edwards (2009) (30)				X					
Heidari (2023) (45)				X					
Iliffe (2019) (36)		X	X	X				X	
Jay (2021) (46)		X		X					
Jolly (2014) (31)				X		X			
Krasuska (2018) (37)		X	X						
Latifi (2020) (47)									
Lusli (2016) (48)				X		X			+ Combines different approaches, intervenes at different levels
Ng (2007) (32)				X		X			
Ozdemir (2019) (49)		X	X						
Papadopoulos (1999) (38)									
Peters (2016) (50)						X			
Seyedoshohadaee (2019) (51)									
Szepietowski (2008) (33)						X			+ Treats physical symptoms of onychomycosis
Van't Noordende (2021) (52)									+ Improves self-care of illness
Wittkowski (2007) (39)									

Table III. Methodological quality of included studies

CASP template		CASP01	CASP02	CASP03	CASP04	CASP05	CASP06	CASP07	CASP08	CASP09	CASP10	CASP11	CASP12*
RCT	Adkins 2022	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Not applicable
	Bessell 2012	Good/fulfilled	Good/fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Unclear/partially fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Not applicable
	Dadun 2017	Good/fulfilled	Unclear/partially fulfilled	Unclear/partially fulfilled	Poor/not fulfilled	Unclear/partially fulfilled	Unclear/partially fulfilled	Unclear/partially fulfilled	Good/fulfilled	Unclear/partially fulfilled	Poor/not fulfilled	Poor/not fulfilled	Not applicable
	Edwards 2009	Good/fulfilled	Good/fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Good/fulfilled	Poor/not fulfilled	Poor/not fulfilled	Unclear/partially fulfilled	Poor/not fulfilled	Poor/not fulfilled	Not applicable
	Heidari 2023	Good/fulfilled	Good/fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Unclear/partially fulfilled	Unclear/partially fulfilled	Poor/not fulfilled	Unclear/partially fulfilled	Poor/not fulfilled	Poor/not fulfilled	Not applicable
	Latifi 2020	Good/fulfilled	Unclear/partially fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Good/fulfilled	Poor/not fulfilled	Poor/not fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Not applicable
	Papadopoulos 1999	Good/fulfilled	Unclear/partially fulfilled	Good/fulfilled	Unclear/partially fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Poor/not fulfilled	Unclear/partially fulfilled	Good/fulfilled	Good/fulfilled	Not applicable
Cohort	Dellar 2022	Good/fulfilled	Good/fulfilled	Unclear/partially fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Unclear/partially fulfilled
	Jolly 2014	Good/fulfilled	Unclear/partially fulfilled	Unclear/partially fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Good/fulfilled	Unclear/partially fulfilled	Good/fulfilled	Unclear/partially fulfilled	Good/fulfilled	Unclear/partially fulfilled
	Lusli 2016	Good/fulfilled	Good/fulfilled	Unclear/partially fulfilled	Good/fulfilled	Unclear/partially fulfilled	Unclear/partially fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Unclear/partially fulfilled
	Ng 2007	Good/fulfilled	Poor/not fulfilled	Unclear/partially fulfilled	Good/fulfilled	Poor/not fulfilled	Poor/not fulfilled	Good/fulfilled	Poor/not fulfilled	Unclear/partially fulfilled	Poor/not fulfilled	Unclear/partially fulfilled	Unclear/partially fulfilled
	Ozdemir 2019	Good/fulfilled	Good/fulfilled	Unclear/partially fulfilled	Good/fulfilled	Unclear/partially fulfilled	Poor/not fulfilled	Good/fulfilled	Poor/not fulfilled	Unclear/partially fulfilled	Poor/not fulfilled	Unclear/partially fulfilled	Unclear/partially fulfilled
	Seyedoshohadaee 2019	Good/fulfilled	Good/fulfilled	Unclear/partially fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Unclear/partially fulfilled	Unclear/partially fulfilled	Unclear/partially fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled
	Szepietowski 2008	Good/fulfilled	Good/fulfilled	Unclear/partially fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Good/fulfilled	Unclear/partially fulfilled	Unclear/partially fulfilled
Qualitative research	Arole 2002	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Unclear/partially fulfilled	Good/fulfilled	Unclear/partially fulfilled	Poor/not fulfilled	Poor/not fulfilled	Poor/not fulfilled	Poor/not fulfilled	Not applicable	Not applicable
	Augustine 2012	Good/fulfilled	Poor/not fulfilled	Poor/not fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Poor/not fulfilled	Not applicable	Not applicable
	Burr 1996	Good/fulfilled	Good/fulfilled	Poor/not fulfilled	Poor/not fulfilled	Poor/not fulfilled	Poor/not fulfilled	Poor/not fulfilled	Poor/not fulfilled	Poor/not fulfilled	Poor/not fulfilled	Not applicable	Not applicable
	Iliffe 2019	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Unclear/partially fulfilled	Unclear/partially fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Not applicable	Not applicable
	Peters 2016	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Poor/not fulfilled	Not applicable	Not applicable
	Van't Noordende 2021	Good/fulfilled	Good/fulfilled	Unclear/partially fulfilled	Unclear/partially fulfilled	Good/fulfilled	Unclear/partially fulfilled	Good/fulfilled	Poor/not fulfilled	Good/fulfilled	Good/fulfilled	Not applicable	Not applicable
None	Jay 2021	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Krasuska 2018	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Wittkowski 2007	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

*For cohort studies only.

Good/fulfilled Unclear/partially fulfilled Poor/not fulfilled Not applicable

lacked a description of the randomization procedure, and blinding was mostly not possible. Many cohort studies did not adequately consider confounding factors and reported short-term or incomplete follow-up. Most qualitative studies did not consider the relationship between researcher and participants and data analysis was poorly described. Additionally, irrespective of the study design, results often lacked confidence intervals and effect sizes or were not thoroughly presented. For 3 studies, none of the available CASP templates was applicable so the quality of these studies could not be formally assessed.

The generalizability of findings to our target population is limited for most studies but this may differ depending on the goal and target population and needs to be considered by the reader on a case-to-case basis.

DISCUSSION

This systematic review aimed to identify self-stigma reduction interventions for individuals with a visible chronic skin disease and to evaluate their effectiveness and limitations. Twenty-three studies assessing such interventions were retrieved, the majority of which reported positive effects on self-stigma and related variables. In this updated literature search, we identified 15 new studies that had not been reported by Topp et al. (26). This reflects the increased attention to self-stigma (9 new publications since 2019) but also the refined definition of self-stigma used in the present review. However, mirroring the findings by Topp et al. (26), heterogeneity in study designs and poor study quality did not allow for a formal analysis of their effectiveness.

It is striking that programmes are available for only a few countries, mostly located in Southeast Asia and Europe. Moreover, self-stigma interventions for persons with leprosy are comparatively well researched, whereas there is a clear lack of evidence-based interventions for non-communicable skin conditions. Cultural differences and disease-specific characteristics limit the transferability of these programmes to other contexts, i.e., other countries, cultures, and skin diseases. Nevertheless, these studies provide relevant information for the development of new interventions in terms of content and structure: CBT approaches have been very thoroughly tested, and most face-to-face interventions consisted of 8–10 sessions with a duration of 1–1.5 hours per session. So far, only a few online programmes are available.

The interventions and their effects identified in this review are comparable to those found to be effective against self-stigma in other health domains. For persons with HIV, Ma et al. (55) concluded that psychotherapy interventions, narrative interventions, and community participation interventions are particularly helpful, while psychoeducation produced mixed effects. Paralleling the interventions against leprosy-related self-stigma, Pantelic et al. (56) found social empowerment, economic strengthening, and CBT to be most effective in HIV. Similarly, CBT has positive effects on mental illness-related (57, 58) and weight self-stigma (59).

Importantly, other approaches that have not yet been examined in relation to self-stigma in dermatology were shown to be effective in reducing weight self-stigma: first, Acceptance and Commitment Therapy (ACT) led to significantly larger reductions in self-stigma compared with a waitlist control group (60–62). Second, initial promising evidence exists for self-compassion interventions targeting weight self-stigma (63–65). Also, a combined intervention consisting of acceptance, self-compassion,

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and mindfulness approaches delivered in a group format was shown to reduce weight self-stigma, self-criticism, and shame in women with overweight and obesity with changes being maintained at 3-month follow-up (66). These approaches may hold promise in the context of dermatological self-stigma and warrant investigation.

Overall, the quality of studies included in the present review ranged from moderate to poor. Ten studies were based on samples of 50 participants or fewer and the majority of quantitative studies included fewer than 100 patients, raising concerns about the power of the reported analyses. RCTs were almost exclusively used for CBT-based interventions. Consequently, the evidence for other approaches is weak. Furthermore, in some of the included studies, measurement instruments assessing self-stigma and related constructs were used that were not yet validated in the studied population and/or language. Additional caution needs to be paid when interpreting the study results, as most studies did not include a control group or a follow-up, so it is unclear whether the positive effects can be attributed to the intervention rather than time effects or other confounding factors and whether they are stable over longer periods.

Limitations

Due to the poor study quality and heterogeneous study designs, a meta-analytic approach was not possible, hence this systematic review is limited to a narrative synthesis. Second, the literature search was limited to work published in English or German and may, consequently, have overlooked relevant publications in other languages. Third, the assessment of study quality was conducted using CASP templates. As these are available for a selected few study designs, the quality of 3 studies could not be assessed in this review. Lastly, it was not possible to adequately assess publication bias and reporting bias, due to the heterogeneity in study designs and due to the lack of preregistrations and publication of study protocols.

Future directions

Two key directions for research need to be pointed out. First, thoroughly conducted and well-powered randomized-controlled trials assessing the effectiveness of existing interventions against self-stigma are urgently needed. Only RCTs can provide reliable evidence on the effects that can be attributed to the intervention. In addition, these studies should include follow-up assessments to determine whether potential positive effects persist over time. Second, evidence-based interventions need to be developed or adapted into different languages, for different cultures and different skin conditions. For example, patients with hidradenitis suppurativa (HS), which has a tremendous psychosocial impact on patients and often evokes feelings of shame and a negative body image, might benefit greatly from a self-stigma reduction intervention. Consequently, disease-specific programmes that target the particular needs and challenges of HS and other skin conditions that have not been addressed in this context would be valuable tools in the psychodermatological support for those affected. Importantly, skin-generic interventions that are designed to be inclusive for a broad range of skin diseases or visible differences in general could prove to be even more cost-effective. Researchers and clinicians aiming to design such interventions may build on the existing interventions presented here but may also take inspiration from the mental health and weight-related self-stigma literature. Specifically, the current evidence for reducing skin disease-related self-stigma is most robust for traditional CBT; however, third-wave CBT approaches including ACT, mindfulness, or self-compassion interventions also show considerable promise.

Based on the results of this review, a high frequency of sessions (≥ 1 session/week) of moderate length (1–1.5 h) is well supported. While more intensive interventions, such as half- or full-day sessions, may be beneficial in certain situations, their scalability remains challenging. Importantly, as supported by findings from another systematic review (67), the length and number of sessions do not appear to be critical predictors of intervention success. Therefore, emphasis should be placed on the quality of the content and its feasibility. To enhance the implementation and scalability of future self-stigma interventions, it is recommended that these interventions be skin-generic and utilize online platforms or a train-the-trainer model.

It needs to be noted that it should not be the sole responsibility of persons with a visible difference to tackle and cope with (self-)stigma. Hence, interventions to reduce stigma in the general public and particularly in certain groups who are in frequent contact with dermatology patients, such as medical staff and teachers, are central in alleviating the burden of living with a visible chronic skin disease. Therefore, research into and implementation of anti-stigma programmes need to be driven forward. Nevertheless, psychosocial interventions for patients offer a more immediate improvement in quality of life and well-being.

Conclusion

This review identified multiple interventions aiming to reduce self-stigma in people with chronic skin diseases, all of which were shown to have at least some positive effects on self-stigma and related constructs. Importantly, availability is limited to a few countries, languages, and skin conditions. Moreover, as many interventions were evaluated in studies of suboptimal quality, results regarding their effectiveness need to be interpreted with caution. In conclusion, efforts to develop, evaluate, and implement interventions tackling skin disease-related self-stigma are needed in order to improve patients' psychosocial well-being.

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