Acupuncture Therapies for Psoriasis Vulgaris: A Systematic Review of Randomized Controlled Trials

Meaghan Coyle^a Jingwen Deng^b Anthony Lin Zhang^a Jingjie Yu^b Xinfeng Guo^c
Charlie Changli Xue^{a, b} Chuanjian Lu^b

^aTraditional and Complementary Medicine Research Program, School of Health Sciences and Health Innovations Research Institute (HIRI), RMIT University, Bundoora, Melbourne, VIC, Australia;

^bDepartment of Dermatology, Guangdong Provincial Hospital of Chinese Medicine (Guangdong Provincial Academy of Chinese Medical Sciences), Guangzhou, China;

^cEBM and Clinical Research Service Group, Guangdong Provincial Hospital of Chinese Medicine (Guangdong Provincial Academy of Chinese Medical Sciences), Guangzhou, China

Keywords

Acupuncture · Acupuncture therapy · Psoriasis ·
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Summary

The purpose of this review was to evaluate the efficacy and safety of acupuncture therapies in the treatment of psoriasis vulgaris. Embase, CENTRAL, PubMed, AMED, CINAHL, CNKI, CQVIP, CBM, and Wanfang databases were searched from inception to May 2013 for prospective randomized controlled trials evaluating acupuncture therapies for psoriasis vulgaris. No language limitations were applied. Studies were assessed using the Cochrane risk of bias tool. The primary outcome was Psoriasis Area Severity Index (PASI) score. Six studies (involving 522 participants) met the eligibility criteria for this review, and 5 were included in quantitative analysis. Due to the diversity of interventions, comparators and reported outcomes, meta-analysis was not possible. Results from single studies produced conflicting results for the outcomes PASI reduction, lesion reduction (non-PASI), PASI score, and relapse rate. There is some evidence of benefit of acupuncture therapies for the treatment of psoriasis vulgaris. However, the conclusions are limited by the small number of included trials and conflicting results from single studies. More research is needed to clarify the effect of acupuncture therapies for psoriasis vulgaris.

Schlüsselwörter

Akupunktur · Akupunkturtherapie · Psoriasis ·
Psoriasis vulgaris · Systematische Übersichtsarbeit ·
Randomisierte kontrollierte Studie

Zusammenfassung

Ziel der Übersichtsarbeit war, die Effektivität und Sicherheit von Akupunkturtherapien bei der Behandlung von Schuppenflechte (Psoriasis vulgaris) zu untersuchen. Hierfür wurden die Datenbanken Embase, CENTRAL, PubMed, AMED, CINAHL, CNKI, CQVIP, CBM und Wanfang nach prospektiven randomisierten kontrollierten Studien zur Akupunkturtherapie bei Schuppenflechte für den Zeitraum von Anfang bis Mai 2013 durchsucht. Die Auswahl erfolgte ohne Selektion der Sprache, in der die Studien durchgeführt worden waren. Die Studien wurden mittels des Cochrane-Instruments zur Erfassung des Bias-Risikos ausgewertet. Der primäre Endpunkt war der Psoriasis Area Severity Index (PASI)-Score. Sechs Studien (n = 522 Teilnehmer) erfüllten die Einschlusskriterien für dieses Review, 5 wurden in die quantitative Analyse eingeschlossen. Aufgrund der Vielfalt der Interventionen, der vergleichenden Instanzen und der berichteten Ergebnisse war eine Meta-Analyse nicht möglich. Die Ergebnisse einzelner Studien ergaben teils widersprüchliche Resultate für die PASI-Reduktion, die Reduktion von Verletzungen (nicht-PASI), den PASI-Score sowie die Rückfallquote. Obwohl es einige Belege zum Nutzen von Akupunkturtherapien bei Psoriasis vulgaris gibt, sind die Schlussfolgerungen, die aus unserer Erhebung gezogen werden können, durch die geringe Anzahl der eingeschlossenen Studien sowie die widersprüchlichen Ergebnisse der jeweiligen Untersuchungen beeinträchtigt. Weitere Forschung wird vonnöten sein, um die Wirkung von Akupunkturbehandlungen bei Psoriasis vulgaris zu prüfen.

Meaghan Coyle and Jingwen Deng contributed equally to this paper.

Introduction

Psoriasis vulgaris is a common chronic inflammatory skin disorder, characterized by clearly delineated erythematous plaques which may be painful and pruritic [1]. The etiology and pathogenesis are not fully understood, but are thought to involve a hereditary component and environmental factors which trigger an inflammatory response, leading to hyperproliferation of keratinocytes [1, 2]. The severity of psoriasis can vary over time, although remission is not common.

Worldwide psoriasis prevalence rates range from 0.1 to 3% [3]. Because of the appearance of the skin, psoriasis has a substantial impact on quality of life. Clinical practice guidelines suggest topical therapy, such as topical corticosteroids, vitamin D analogues, and topical retinoids for mild psoriasis [4, 5]. Systemic therapy (retinoic acid, methotrexate, biological agents) is suggested for moderate to severe psoriasis [1]. These treatments may provide short-term improvement, however, most of the therapies have serious adverse effects limiting their long-term use [6, 7].

Acupuncture is part of a broader family of techniques which stimulate acupuncture points to elicit a therapeutic effect [8]. The use of acupuncture can be traced back to more than 2000 years in China [9], and is gaining popularity in the USA and other parts of the Western world [10]. Other related therapies include electroacupuncture (an electrical stimulus applied to acupuncture needles), point application therapy (Chinese herbal medicine paste applied to acupuncture points, also known as acupoint sticking therapy), and bloodletting (puncture of a superficial blood vessel to release a small amount of blood).

Acupuncture directly involves contact with the skin, so it is not surprising that it has been used for the treatment of skin conditions in China for many years [11] with some benefit reported [12]. The use of CAM among patients with psoriasis has been explored in several studies, with a prevalence of 43–69% [13–15]. Although the number of clinical trials using acupuncture to treat psoriasis is increasing, a comprehensive systematic review of acupuncture treatments for psoriasis has not been conducted so far. Thus, the purpose of this review was to determine the current state of evidence on acupuncture therapies for psoriasis vulgaris.

Search Strategy and Selection Criteria

PubMed, Embase, the Cochrane Central Register of Controlled Trials (CENTRAL), Cumulative Index to Nursing and Allied Health Literature (CINAHL), the Allied and Complementary Medicine Database (AMED), China National Knowledge Infrastructure (CNKI), Chongqing VIP Information Company (CQVIP), Chinese BioMedical Literature (CBM), and Wanfang databases were searched from inceptions to May 2013. No language limitations were applied. Free text and MeSH terms, including ‘acupuncture’, ‘acupressure’, ‘acupoint’, ‘electroacupuncture’, ‘moxibustion’, ‘auricular therapy’, ‘psoriasis’, ‘psoriasi*’, and ‘psoriases’ were used.

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants (performance bias)	Blinding of personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Cheng 2011	+	+	-	-	+	+	+	?
Jerner 1997	?	+	+	-	+	+	+	+
Wang 1999	?	?	-	-	?	+	+	+
Wu 2011	+	?	-	-	?	+	+	+
Yin 2009	?	?	-	-	?	+	+	-
Yu 2002	?	?	-	-	?	?	?	+

Fig. 1. Risk of bias of included studies.

Studies were included if they were prospective randomized controlled trials (RCTs) reporting on the primary and secondary outcomes (see below). Eligible studies evaluated acupuncture therapies (either alone or in combination with other Chinese medicine (CM) methods of point stimulation) compared with sham or placebo acupuncture, Western medicine, or no treatment. Articles reporting on erythrodermic psoriasis, psoriatic arthritis, and guttate psoriasis were excluded, as were those combining acupuncture therapies with other forms of CM not involving point stimulation, e.g. Chinese herbal medicine. J.D. and J.Y. independently screened articles for inclusion. Disagreement was resolved by consulting a third author (M.C.). The primary outcome was Psoriasis Area and Severity Index (PASI) score reduction or lesion reduction, and secondary outcomes included PASI score, relapse rate, health-related quality of life, and adverse events.

Data Extraction and Quality Assessment

J.D. and J.Y. extracted the data independently. Data was extracted according to a standard template. We attempted to contact the original authors of the identified studies to obtain any missing data from the publications. Studies were categorized into predefined subgroups according to different PASI scores: either PASI 50 ≥, or PASI 60 ≥. A reduction in lesion severity of 50 % ≥ (PASI 50) is considered to be the minimum indicator of treatment effectiveness in international clinical practice guidelines [5]. However, the Chinese clinical practice guideline for psoriasis suggests PASI 60 as treatment goal [16], hence both levels of PASI reduction were included. We assessed the quality of included studies according to the Cochrane risk of bias domains (fig. 1).

Statistical Analysis

For meta-analysis, we used Review Manager (RevMan) software (version 5.2). Dichotomous data were reported as risk ratio (RR) with 95% confidence intervals (CI), and continuous data were presented as mean difference (MD) and 95% CI. The estimates of the effect of the trials were computed using the random effects model, with intention-to-treat analysis used (where possible). We planned to assess statistical heterogeneity ($I^2 > 50\%$) and publication bias, however as data was not able to be pooled this was not required.

Results

Search Results

The literature search retrieved 456 potentially relevant articles (fig. 2). After removal of duplicates, 268 articles remained. 238 were excluded through screening titles and abstracts, and a further 24 were excluded after review of full text. In the end, 6 studies involving 522 participants met the eligibility criteria for this review [17–22].

Characteristics of Included Studies

Characteristics of included studies are summarized in table 1. One study was conducted in Sweden [18], and the remaining were conducted in China. All RCTs adopted a parallel-group design with 2 arms. The reported studies included 287 males and 237 females, although inconsistency was noted in the study by Yin and Zheng [20] where the total number of males and females ($N = 74$) was greater than the number randomized patients ($N = 72$). Age ranged from 27 [22] to 49 years [17]. One study recruited participants in the progressive stage of psoriasis [21] and 1 in the stable stage [17]. In the remaining studies, psoriasis stage was not specified. The sample size ranged from 54 [18] to 148 [22].

The included interventions were diverse (table 2), comprising bloodletting combined with cupping [17, 20], electroacupuncture [18], point application therapy [22], acupuncture plus moxibustion [19], and point injection (magnetic blood autotransfusion where the patients' blood was drawn, magnetized, and transfused back) [21]. Treatment duration ranged from 4 weeks [21, 22] to 12 weeks [19]. 3 studies included follow-up assessments after treatment had ceased [17, 18, 22].

The average number of points used was 9, although this varied from 1 [22] to 20 [18]. Overall, the most frequently used acupuncture points were Geshu BL17, Pishu BL20 (3 studies each), followed by Quchi LI11, Feishu BL13, Ganshu BL18, Xuechai SP10, and Dazhui GV14 (2 studies each). Geshu BL17 and Pishu BL20 were the acupuncture points most often selected as main points (3 studies each), and Quchi LI11 was the point most often selected as an additional point (an optional point added to a core set of points).

All studies reported on at least 1 of the specified outcomes. One study compared point injection of magnetic blood autotransfusion with intramuscular autotransfusion of non-magnetized blood [21]. The comparator included in the study is neither included in inter-

Fig. 2. Flowchart of trial selection.

nationally accepted clinical practice guidelines [5] nor in routine practice. As such, this study was excluded from quantitative analysis.

Risk of Bias in Included Studies

Assessments of risk of bias for included studies are presented in figure 1. All included trials were randomized. Two studies were assessed as low risk of bias for using appropriate methods for sequence generation [17, 19], and for the remaining 4 there was insufficient information to make a judgment of the level of risk. Allocation concealment was adequate in 2 studies (low risk of bias) [17, 18]. One study was assessed as low risk of bias for adequately blinding participants to group allocation [18], while the remaining were assessed as high risk. All studies were assessed as high risk for blinding of personnel. Due to the nature of the intervention, it was impractical to blind therapists to group allocation. Two studies blinded outcome assessors and were assessed as low risk of bias [17, 18]. The study by Yu [21] was assessed as unclear risk for incomplete outcome data and selective reporting while all other studies were assessed as low risk for these domains. There was insufficient information to assess other forms of bias, such as baseline imbalance or funding source [17]. The study by Yin and Zheng [20] contained reporting inconsistencies and was assessed as high risk for other bias. The remaining 4 studies were assessed as low risk of bias.

Effect of Interventions

Due to the diversity of interventions and comparators as well as differences in outcomes reported, it was not possible to pool results

Table 1. Characteristics of included studies

Publication	Study design; blinding; arms, n	Treatment duration; CM treatments, N; follow-up	Stage; severity; duration of psoriasis	Participants randomized/assessed; dropouts, n	Age (mean (SD) or range)	Gender (m/f)	Intervention	Control
Cheng, 2011 [17]	RCT; A; 2	30d; 6; 3m	I: stable stage; NS; 49.57 (23.09) m C: stable stage; NS; 49.90 (19.78) m	I: 30/30; 0 C: 30/30; 0	I: 49.10 (14.11) C: 41.47 (11.52)	18/12 15/15	bloodletting plus cupping	tazarotene
Jerner et al., 1997 [18]	RCT; P+A; 2	NS; 24; 3m	I: NS; PASI score 10.1 (5.3); 20(12) y C: NS; PASI score 9.1 (2.8); 20 (11) y	I: 35/33; 2 C: 19/19; 0	I: 44 (13) C: 48 (13)	19/16 12/7	electroacupuncture	sham acupuncture
Wang and Chen, 1999 [22]	RCT; NS; 2	4w; continuous; 4–12m	I: NS; NS; 9 d–23 y C: NS; NS; 15 d–30 y	I: 118/118; 9 (follow-up) C: 30/30; 1 (follow-up)	I: 27.5 C: 29	65/53 18/12	point application therapy	halcinonide
Wu and Gu, 2011 [19]	RCT; NS; 2	12w; 42; 0	I: NS; NS; 9.2 (7.4) m C: NS; NS; 8.7 (6.5) m	I: 30/30; 0 C: 30/30; 0	I: 37.4 (11.4) C: 39.3 (10.2)	11/19 13/17	acupuncture plus moxibustion	acitretin
Yin and Zheng, 2009 [20]	RCT; NS; 2	4w; 8; NS	I: progressive stage; NS; 11.6 y (3 m – 44 y) C: progressive stage; NS; 12.2 y (8 m – 46 y)	I: 38/38; 0 C: 34/34; 0	I: 34.4 (22–58) C: 33.8 (19–60); 20/16	22/16	bloodletting plus cupping	acitretin
Yu, 2002 [21]	RCT; NS; 2	NS; 10–20; 0	I: NS; NS; duration 1 – 9 d; 14; duration 10–29 d; 22; duration ≥30 d: 30 C: NS; NS; duration 1–9d; 12; duration 10–29d; 21; duration ≥30 d: 29	I: 66/66; 0 C: 62/62; 0	I: NS; 39/27 C: NS; 35/27		point injection (magnetic blood autoinfusion)	intramuscular injection (non-magnetic blood autoinfusion)

RCT = randomized controlled trial; CM = Chinese medicine; SD = standard deviation; m = male; f = female; I = intervention; C = control; NS = not specified

Blinding: P = participant; R = researcher; A = outcome assessor; U = unclear.

d = day; w = week, m = month.

Table 2. Details of the interventions

Publication	Syndrome differentiation	Chinese medicine principal of treatment	Intervention type	Acupuncture points	Intervention treatment frequency	Control type	Control details	Control treatment frequency
Cheng, 2011 [17]	blood stasis	not specified	bloodletting plus cupping	lance lesion area to draw blood, cupping on these areas	every 5 days for 6 treatments	tazarotene	topical	1 × daily
Jemer et al., 1997 [18]	no	not specified	electroacupuncture	20 body points (not specified)	not specified	sham acupuncture	needles inserted superficially 1 cm away from real point, electro leads attached but no electrical stimulation delivered	not specified
Wang and Chen, 1999 [22]	not specified	smooth meridians, invigorate Qi and blood, remove toxins, harmonize Yin and Yang, Zang and Fu	point application therapy	Chinese medicine applied to Shenjue CV8 (Huang Qi, Dan Shen, Bai Zhi, Qing Dai, Lang Du 8:8:5: 5:1 make into powder, add glycerol and 10% dimethyl sulfoxide to produce paste, apply 2g)	retained for 2 days, 1 × daily	0.1% halcinonide solution	topical	3 × daily
Wu and Gu, 2011 [19]	not specified	remove heat and wind, invigorate the Qi and blood	acupuncture and moxibustion	main points: Feishu BL13, Geshu BL17, Ganshu BL18, Pishu BL20, Shenshu BL23. Additional points: Hegu LI4, Weizhong BL40, Baihui GV20, Quchi LI11, Waiguan TE5, Xuechai SP10, Fengshi GB31	1 × daily	acitretin	20mg, oral	1 × daily
Yin and Zheng, 2009 [20]	blood heat	remove heat and cool blood; invigorate blood and clear wind, stop itching	bloodletting plus cupping	Dazhui GV14, Feishu BL13, Xinsu BL15, Geshu BL17, Ganshu BL18, Pishu BL20	2 × week	acitretin	30mg, oral; 10mg after lesions reduction	1 × daily
Yu, 2002 [21]	yes	not specified	point injection (magnetic blood autoinfusion)	Dazhui GV14; additional points selected from Fengchi GB20, Quchi LI11, Xuechai SP10, Sanyinjiao SP6, Shenmen HT7, Zusanli ST36, Geshu BL17, Pishu BL20	every 5 days for 10–20 treatments	intramuscular injection (non-magnetic blood autoinfusion)	injected into buttock	every 5 days for 10–20 treatments

Table 3. Effects of interventions

Comparison	Outcome	Studies	Randomized/ analyzed, n	Effect estimate (95% CI)
Acupuncture plus moxibustion versus acitretin	PASI 60	Wu and Gu, 2011 [19]	60/60	1.31** (0.87, 1.97)
Point application therapy versus halcinonide	Lesion reduction (50%) Relapse rate (follow-up)	Wang and Chen, 1999 [22]	148/148 148/138	0.90** (0.79, 1.02) 0.58** (0.33, 1.00); 0.55*** (0.32, 0.96)*
Bloodletting plus cupping versus acitretin	PASI 60	Yin and Zheng, 2009 [20]	72/72	1.85** (1.23, 2.78)
Bloodletting plus cupping versus tazarotene	PASI 50 Relapse rate (follow-up) ^a PASI score	Cheng, 2011 [17]	60/60 60/42 60/60	1.47** (1.03, 2.09)* 0.23** (0.05, 0.99)* -0.54**** (-1.01, -0.07)*
Electroacupuncture versus sham acupuncture	PASI score PASI score (follow-up)	Jerner et al, 1997 [18]	54/52 54/52	1.30**** (-0.77, 3.37) 0.70**** (-0.71, 2.11)

*Statistically significant.

RR = risk ratio; *ITT = intent-to-treat; ****MD = mean difference.

^aOnly for those who achieved PASI 50.

from all studies. While 2 studies used acitretin as the comparator and reported on the outcome PASI 60 [19, 20], the interventions used were different and thus did not allow meta-analysis. As such, the effects of interventions below are presented according to comparisons. The results of analyses are included in table 3.

Acupuncture plus Moxibustion versus Acitretin (1 Study)

In 1 study (N = 60), the number of people achieving PASI 60 who received acupuncture plus moxibustion was not less than of those who received acitretin [19].

Point Application Therapy versus Halcinonide (1 Study)

One study (N = 148) found that point application therapy was not inferior to halcinonide in reducing lesion severity by 50%, or in relapse rate [22]. However, when intention-to-treat analysis was performed to account for missing data on relapse rate, the result was in favor of halcinonide.

Bloodletting plus Cupping versus Acitretin (1 Study)

One study (N = 72) found a greater number of people achieving PASI 60 in the bloodletting plus cupping group compared with those who received acitretin [20].

Bloodletting plus Cupping versus Tazarotene (1 Study)

In 60 participants, Cheng [17] found a greater number of people who achieved PASI 50 and a reduction in PASI score. In addition, a reduction in relapse rate at follow-up (for those who achieved PASI 50 at end of treatment) was also observed with bloodletting plus cupping treatment.

Electroacupuncture versus Sham Acupuncture (1 Study)

No benefit of electroacupuncture over sham acupuncture was

found on PASI score at the end of treatment or at follow-up (N = 52) [18].

Adverse Events

Two studies reported on adverse events [17, 19]. Adverse events were dermatological in nature, and all adverse events were reported in participants allocated to the comparator group. Dry skin and skin burn was reported in 1 participant in the study by Cheng [17], while Wu and Gu [19] reported 10 people having dry skin, 7 cases of pruritus, and 6 cases of desquamation. No adverse events were reported among the acupuncture therapies in the included studies.

Discussion

The findings from this review show some promising evidence for acupuncture therapy in psoriasis, with an increasing number of people achieving clinically and statistically significant improvements. Specifically, improvements were observed for bloodletting plus cupping on PASI 50, PASI 60, and actual PASI score. Additionally, lower relapse rates at follow-up were demonstrated. Further, no adverse events were reported in the treatment groups, suggesting that acupuncture and related therapies are well tolerated by participants.

The studies included in this review used a broad range of interventions, which overall reflects the diversity of CM and acupuncture practice. The comparator used also differed amongst studies, with only 2 studies using the same comparator [19, 20]. This, in addition to differences in outcome measures, limited the ability to conduct meta-analyses, and the positive findings from this review were drawn from single studies. Therefore, the results of this review should be interpreted with caution.

The range of interventions demonstrates the diversity in the treatment of psoriasis with acupuncture. However, there appears to be some commonality in the treatment approach and subsequently the acupuncture points stimulated across the studies. Of the 4 studies which reported the acupuncture points used, 3 reported using the points Geshu BL17, and Pishu BL20. The clinical actions of these points are to clear heat, and nourish blood [23]. In CM, heat and blood deficiency are seen as the cause of a variety of skin diseases. The actions of these points are aligned with treatment recommendations in CM clinical practice guidelines for treatment of psoriasis [16].

Only 2 of the 6 studies reported on adverse events [17, 19]. Future research must report on adverse events, including the severity of the events (even if none occurred), and assess the likelihood of relationship with the interventions. Koebner phenomenon (occurrence of psoriatic lesions where previously none existed after skin trauma [24], more commonly prevalent in unstable or flaring periods of psoriasis) was not reported in any of the studies although there are several case reports of Koebner phenomenon after needle acupuncture [25–27] and cupping therapy [28]. Acupuncture and related therapies should be used cautiously during the progressive stage of psoriasis when new lesions are developing, and patients should be advised of the risk of Koebner phenomenon.

None of the included studies reported on health-related quality of life. Psoriasis can have a significant impact on health-related quality of life [29–31]. The study by Gupta et al. [32] estimated depression and suicidal ideation being reported by more than 5% of people with psoriasis. Future research must include an assessment of health-related quality of life, such as the Dermatology Life Quality Index [33] and the Psoriasis Disability Index [34], to add evidence on the use of acupuncture therapies for psoriasis.

The cause of psoriasis still remains unclear – so does the mechanism of acupuncture in treating skin conditions [11]. Several theories have been proposed, including mechanisms involving the hypothalamus-pituitary-adrenal (HPA) axis, the autonomic nervous system, and brain derived neurotrophic factor [12]. Electroacupuncture may result in release of β -endorphin and corticotrophin into the peripheral blood [35] and lead to increased serum cortisol levels [36]. Activation of the hypothalamus and limbic system after acupuncture has been demonstrated on functional magnetic resonance imaging (fMRI) [37]. Further, acupuncture has been shown to decrease pruritic and inflammatory effects of histamine [38, 39]. Thus, more research is needed to explore the possible mechanisms of acupuncture in treating psoriasis.

The methodological quality of the included studies was low to average. Blinding of participants and personnel was assessed as high risk for all but 1 study [18], and only 2 studies reported blinded assessors [17, 18]. Due to the nature of the interventions and comparators used in the included studies, it is challenging to achieve blinding of both participants and personnel when deliver-

ing a manual therapy. Lack of blinding of participants and personnel has been shown to be associated with positive outcomes [40]. Despite the challenges, blinding of subjects and outcome assessors should be carried out to avoid the overestimation of effects observed in clinical trials that are not double-blind [41].

Limitations of the Review

As fewer than 10 studies were included in the review, it was not possible to investigate publication bias. Previous research has shown a possible relationship between countries, culture, and results [42]. Despite not being able to test for it, it is possible that publication bias exists amongst included studies, and the findings of this review should be interpreted accordingly.

As outlined above, the small number of included studies, in addition to small sample sizes, limits the interpretation of these findings. Inconsistencies were seen in the levels of treatment effect on PASI, with studies reporting PASI 95, PASI 70, PASI 60, PASI 50, and PASI 30. To demonstrate treatment effects, greater consistency is needed, in line with internationally accepted treatment goals and minimum lesion reduction level. There is also a need for high quality, scientifically rigorous RCTs of acupuncture therapies which report on relevant clinical outcomes as well as replication of these studies to further build the evidence base for acupuncture therapies for psoriasis.

Conclusions

The results of this systematic review suggest that evidence of acupuncture and related therapies for psoriasis vulgaris is promising. The results showed some benefit in improving PASI and decreasing relapse rate. However, these findings are limited by small sample sizes, the diversity of treatment interventions, and the small number of included studies. Acupuncture and related therapies do appear to be a safe treatment option for the treatment of psoriasis vulgaris, with no adverse events reported. Based on the results of this review, however, there is inadequate robust clinical evidence to establish acupuncture therapy as an effective treatment modality for psoriasis. Further research using scientifically rigorous study design with relevant clinical outcomes is needed.

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