

Acupuncture combined with moxibustion therapy for acne vulgaris among adolescents: A randomized controlled trial

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ABSTRACT

Objective: To assess the efficacy of acupuncture combined with moxibustion compared to standard medical treatments for alleviating symptoms of moderate to severe acne vulgaris in adolescents.

Methods: One hundred adolescents with moderate to severe acne vulgaris randomly assigned to the control group received conventional medications, and the experimental group received acupuncture with moxibustion therapies three times weekly. Both groups received interventions for four weeks. The main outcome was assessed by grading and counting inflammatory lesions, and the secondary outcomes were assessed by the Skindex-16 scale in both groups before and after the intervention period.

Results: Both groups demonstrated significant improvement following treatment ($p < 0.001$). The experimental group showed significantly greater improvement in outcomes in the Skindex-16 emotional and total scores ($p < 0.001$), as well as functional scores ($p = 0.001$), while no significant differences were observed between the groups in symptom scores ($p = 0.079$) or lesion counts ($p = 0.239$). The percentage of improvement showed greater reductions across all measured outcomes in the experimental group, with statistically significant differences observed in most domains.

Conclusion: Acupuncture and moxibustion effectively improve both skin lesions and psychosocial well-being in adolescents with acne vulgaris.

1. Introduction

Acne vulgaris (AV) is the eighth most common disease globally, with 85% of adolescents being affected by the condition, with the disease tending to begin during puberty and continue up to adulthood (Zhu et al., 2025). AV forms as a result of overproduction of sebum, desquamation of the follicular lining, and sebum and keratin blocking the pilosebaceous duct. This closed space promotes the development of *Propionibacterium acnes*, which increases in numbers and produces enzymes that hydrolyze fatty acids. The by-products that are oxidized fatty acids may be utilized to build plugs that block sebum discharge. As soon

as the hair follicles are blocked, it allows the intrusion of neutrophils and causes inflammation (Mosea et al., 2025). The sequelae of acne, such as scarring and post-inflammatory dyspigmentation, have a negative impact on mental health by promoting feelings of anxiety, rejection, and isolation; in severe cases, it leads to depression (Natsuaki and Yates, 2021).

AV imposes a substantial economic burden on healthcare systems and society. The increasing cost of dermatologic agents, as well as the cost-sharing of patients with high-deductible health plans, has made cost-effective treatment of the disease important. Failure to take into consideration the financial toxicity of the treatment may result in poor

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treatment compliance and outcome. (De La Garza et al., 2025; Yew et al., 2024). Pharmacological treatment modalities include topical antimicrobial therapy, retinoids, and keratolytic, which can lead to systemic absorption or may cause skin irritation, photosensitivity, and bacterial resistance (Abubakar and Abduljalal, 2024). These economic considerations, coupled with the limitations of conventional therapies, underscore the urgent need for cost-effective alternative treatments, including herbal medicine and acupuncture.

Traditional Chinese medicine (TCM) uses acupuncture as an adjunct treatment for various skin disorders, as it can modulate neuro-immune responses, inhibit inflammation locally, and enhance microcirculation (Li et al., 2021). Acupuncture as a treatment for AV is gaining popularity, particularly among youths who prefer effective treatments with fewer side effects. It involves needling specific acupoints to regulate the functions of viscera and meridians (Taha et al., 2025). Inserting needles into specific acupoints such as ST44, LI11, and SP10 helps reduce excess heat and dampness, restoring Yin-Yang internal balance. Acupoints LU7 and KD6 are also used to regulate the Ren meridian, regulate body fluids, and nourish. Local acupoints on the face increase facial blood circulation, reduce fine lines on the skin, tighten skin pores, and promote collagen production for a smooth skin tone. Acupoints such as LU7 and PC6 also have a beneficial effect on stress relief and calmness (Mansu, 2019).

Moxibustion is a form of traditional herb-based therapy that originates from TCM, in which dried leaves (moxa) are burned on or near acupuncture points with the intent of stimulating those points. This kind of therapy holds a certain safety, effectiveness, and reliability perception among patients and healthcare providers (Matos et al., 2021). Moxibustion is often combined with acupuncture to achieve better therapeutic effects. Combining acupuncture with moxibustion may promote tissue repair more rapidly, have fewer side effects, and require fewer antibiotics for patients with AV (Wang and Wang, 2024; Yang et al., 2025).

While the effectiveness of using acupuncture in the management of AV has been proven (Huang et al., 2025), the application of moxibustion therapy in conjunction with acupuncture may provide a synergistic therapeutic effect. The primary mechanism of action of acupuncture in the management of AV is the regulation of the neuroimmune system, the inhibition of pro-inflammatory cytokines such as interleukin-6 and TNF- α , and the control of sebum secretion (Chun-Yan et al., 2021). Moxibustion therapy, on the other hand, increases the microcirculation of the acupoints, facilitates the removal of inflammatory by-products, and promotes tissue regeneration (Wang and Su, 2024). The application of both forms of therapy may provide a therapeutic effect on the local inflammatory lesions as well as the hormonal and nervous system imbalances that cause AV in adolescents, which emphasizes the management of the manifestations and the root cause of the disease (Wang and Wang, 2024). Adolescents, in particular, may benefit from this approach because they are subject to treatment fatigue, skin sensitivity to topical agents, and concerns about the safety of oral medications when used for long periods of time. A treatment that offers greater efficacy with fewer side effects is particularly important in this group.

Given the rising incidence of acne in adolescents (Zhu et al., 2025) and the limited efficacy of conventional treatment—including skin irritation, antibiotic resistance, and systemic side effects—there is a growing need for safer, effective therapeutic alternatives. Acupuncture has been proven to be beneficial for managing AV (Zhou et al., 2021; Mansu et al., 2018; Mansu, 2019; Huang et al., 2025). Our study provides a novel technique by applying a moxa stick (1 cun) to tonify Gu Qi on ST36 and tonify yin on KD6. We also introduce a dual-plane acupoint approach that combines local and systemic points for addressing acne vulgaris's root causes. This study employs both objective measures (grading and counting inflammatory lesions) and patient-reported outcomes (Skindex-16) for a thorough efficacy assessment. According to the complementary therapeutic mechanisms described above, we hypothesize that a combination of acupuncture and moxibustion would lead to

better therapeutic outcomes. Therefore, the objective of our study was to assess the efficacy of acupuncture combined with moxibustion compared to standard medical treatments for alleviating symptoms of moderate to severe AV in adolescents.

2. Methodology

2.1. Research design and ethical considerations

The study was a randomized controlled trial approved by the Research Ethics Committee of the Faculty of Physical Therapy, MTI University, Egypt, No: REC/2111/MTI.PT/2501281. The trial was prospectively registered in the Pan African Clinical Trials Registry (PACTR202506767916321) and conducted at the outpatient clinic of the Faculty of Physical Therapy, MTI University, from April 2025 to the end of October 2025. All participants were provided with clear and comprehensible information regarding the trial. Furthermore, written informed consent was obtained from the parent or guardian of each study participant.

2.2. Sample size calculation

We calculated the sample size for this RCT from a prior pilot study. Assuming a moderate effect size ($d = 0.6$) and according to the power analysis by G*Power 3.1.9.4, it was found that 82 participants were required to detect the difference between two groups at the predefined effect size with 85% power at a two-tailed alpha of 0.05. Considering potential dropouts, the recruitment of 100 adolescents with AV was intended. The final sample consisted of 50 for each group.

2.3. Participant selection

This study included 100 adolescents aged 12 to 18 years who were referred to the dermatology department with moderate to severe AV according to the Global Acne Grading System (GAGS) score (Doshi et al., 1997) and an age-appropriate normal body mass index. Exclusion criteria included any medical history of systemic or skin diseases that may interfere with acne vulgaris; any diseases affecting the eyes, hair, nails, and other skin conditions; receiving treatment for any other skin problem; or a history of acne treatment within four weeks of enrollment (Appendix A). Subjects were randomly allocated into either a control medical group or an experimental acupuncture group through a computer-generated randomization sequence. Allocation concealment was achieved through the use of sequentially numbered, sealed, and opaque envelopes prepared by an independent researcher not involved in the recruitment and assessment of patients. Each envelope was opened after the participant was enrolled.

The control group received regular oral and topical medications as directed by the dermatologist, while the intervention group received acupuncture therapy together with moxibustion therapies conducted three times every week. Both groups were subjected to the therapy for a period of four consecutive weeks based on established protocols from prior studies (Chen and Du, 2023). (Fig. 1)

2.4. Assessment methods

The main outcome was assessed by grading and counting inflammatory lesions (papules and pustules), and the secondary outcomes were assessed skin-related quality of life by the Skindex-16 scale in both groups. Assessments were conducted for both groups before and after the intervention period.

For the grading and counting of inflammatory lesions, patients were positioned comfortably with their face oriented toward a light source directed at the therapist. The face is divided into five sections, not including the nose, and then papules and pustules are counted as target lesions in each section (Lucky et al., 1996). All face lesions are then

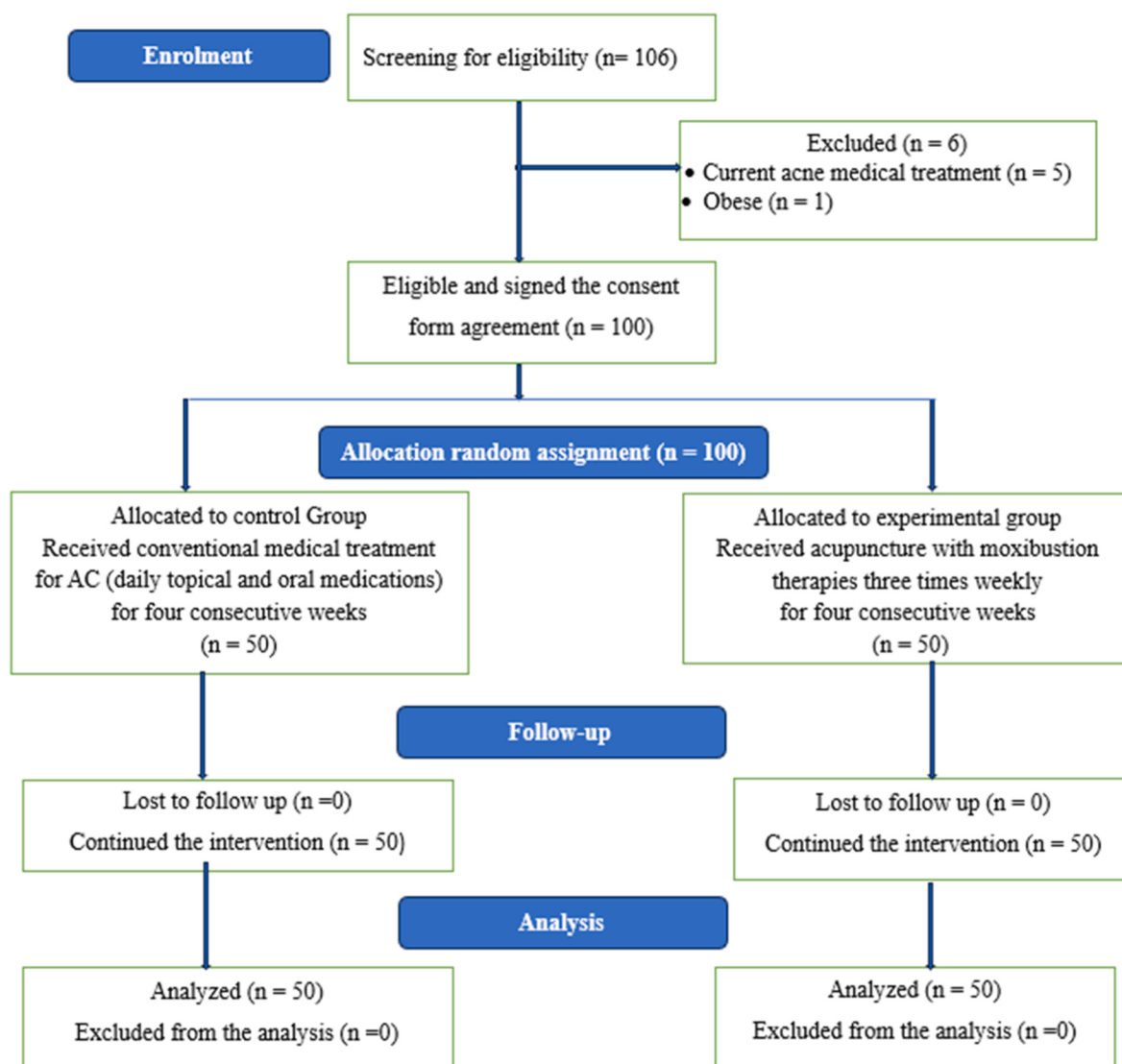


Fig. 1. A flow chart of participants throughout the study.

counted out in tabular form, thereby making the process the most accurate way of counting. This technique is easy and yields numerical values for follow-up measurements before and after sessions in both groups. It allows for an objective measure of the efficacy of treatment by comparing lesion counts before and after the intervention (Bae et al., 2024).

Skindex-16 is a straightforward, reliable, and consistent tool to assess skin-related quality of life (Shields et al., 2024). The measurement was done in a comfortable, quiet room. The patients were instructed to relax while answering 16 questions, each graded from zero to six, where zero means no significant impact on quality of life and six represents a major burden. The questions are divided into three sections: the first section assesses skin condition up to a maximum of 24, the second assesses emotional changes up to a maximum of 42, and the third assesses social and physical functioning up to a maximum of 30. The overall Skindex-16 score is zero to 100%, from good to poor quality of life (Chren et al., 2001; Secrest et al., 2020).

2.5. Intervention protocol

The control group was given a fixed combination of topical benzoyl peroxide (Akneroxid gel 50 mg/g) and topical isotretinoin (adapalene gel 0.1% 30 gm) applied once daily in the evening to the affected area, as

well as a once-daily oral dose of doxycycline (Vibramycin 100 mg) for 4 weeks. Patients are instructed to use a moisturizer to minimize irritation and a sunscreen during the day due to the photosensitizing effects of the treatment. Treatment was according to the American guidelines for the treatment of AV (Barbieri et al., 2024).

The experimental acupuncture group received acupuncture treatment, attending three times a week over four weeks, totaling 12 visits. Each visit was meant to target acupoints that affect sebaceous gland secretion and skin inflammation. Concurrently, moxibustion therapy at complementary points was administered to ensure the maximum overall therapeutic effects. The acupoint prescription was selected based on established principles for treating acne vulgaris by acupuncture at selected acupoints along the Lung and Spleen meridians. Some acupoints are supplemented by moxibustion, which enhances the therapeutic effects by soothing the Qi flow through the meridians and eliminating dampness. Points such as LI11 (Quchi) and ST44 (Neiting) were included to clear heat and resolve dampness, while LI20 (Yingxiang), ST2 (Sibai), and SI18 (Quanliao) are frequently selected for their local effect on facial lesions. Systemic support was provided by ST36 (Zusanli) and SP10 (Xuehai) to tonify qi and invigorate blood (Kim and Kim, 2012; Liu, 2015). Table 1 provides the name, location, function, and technique of manipulation for each acupoint. Moxibustion was applied indirectly over the needle to selected acupoints connected with

Table 1

Acupoints chosen based on the prevailing TCM syndrome.

Acupoint	Location	Primary Actions	Needling
ST 2 (Sibái)	Below pupil, in infraorbital foramen.	Local disorders; Clears Damp-Heat (LV/GB).	Perp., 0.2–0.3 cun.
ST 6 (Jiáche)	Anterior/superior to mandibular angle.	Local disorders; Disperses Wind.	Perp. 0.3–0.5 cun or subcut. 0.5–1.0 cun.
GB 14 (Yángbái)	1.0 cun directly above pupil.	Local forehead disorders.	Subcut. 0.3–0.5 cun.
LI 20 (Yíngxiāng)	Nasolabial groove, lateral to ala nasi.	Opens nose; Local disorders.	Perp./Oblique, 0.3–0.5 cun.
LU 7 (Lièquē)	1.5 cun above wrist crease, over styloid process.	Luo Point; Master of Ren; calm shen	Oblique upward, 0.3–0.5 cun.
PC 6 (Nèiguan)	2 cun above wrist, between tendons.	Calms Shen, regulates Heart, harmonizes Stomach.	Perp., 0.5–1.0 cun.
ST 36 (Zúsānlǐ)	3 cun below ST 35, lateral to tibia.	Major tonifier (Qi/Blood); Strengthens Spleen/Stomach.	Perp., 1.0–2.0 cun. Moxa Indicated.
LI 11 (Qūchí)	Lateral end of elbow crease.	Clears Heat, cools Blood, dispels Wind.	Perp., 1.0–1.5 cun.
SI 18 (Quánliáo)	Below outer canthus, on lower zygomatic border.	Local facial disorders.	Perp. 0.3–0.5 cun or subcut. 0.5–1.0 cun.
ST 44 (Nèitíng)	Dorsum of foot, proximal to 2nd/3rd toe web.	Ying-Spring Point; Clears Stomach Heat.	Perp./Oblique, 0.5–0.8 cun.
SP 10 (Xuèhǎi)	2 cun above medial patella.	Cools & invigorates Blood; Regulates menstruation.	Perp., 1.0–1.5 cun.
KD 6 (Zhàohǎi)	Depression below medial malleolus.	Nourishes Yin; Master of Yin Qiao Vessel.	Perp., 0.3–0.5 cun. Moxa Indicated.

Perp., Perpendicular; Subcut., Subcutaneous; LV/GB, Liver/Gallbladder.

acne cure, such as ST36, in the last 5 min of a 25-min acupuncture session. Treatment with acupuncture was administered by a licensed and experienced acupuncturist using disposable stainless-steel needles, 1*0.25 cun for points on the face and 3*0.25 cun for points on the body, and a 1 cun moxa stick over the needles at selected acupoints (Mansu et al., 2018). (Fig. 2)

Patients in both groups were advised as follows: drink lots of water during the day and consume vegetables, use sunscreen on the skin, avoid eating spicy and fatty hot food, junk food, etc.; do not be constipated and stressed to maintain hormonal balance, and never press acne filled with pus in your hands. During the study, all participants were monitored and asked if they received any other treatment.

2.6. Statistical analysis

All statistical analyses were done using the statistical software SPSS version 21.0. Normality of continuous data was assessed by Kolmogorov-Smirnov and Shapiro-Wilk tests. Normal data were analyzed with parametric statistics, whereas non-normal data were tested with non-parametric statistics. Comparisons of baseline demographic and clinical characteristics among groups were made using independent samples *t*-test for continuous data and Chi-squared (and Fisher exact test for categorical data). Changes within groups were compared using paired samples *t*-test, and differences among groups were compared using independent samples *t*-test with Levene's test for

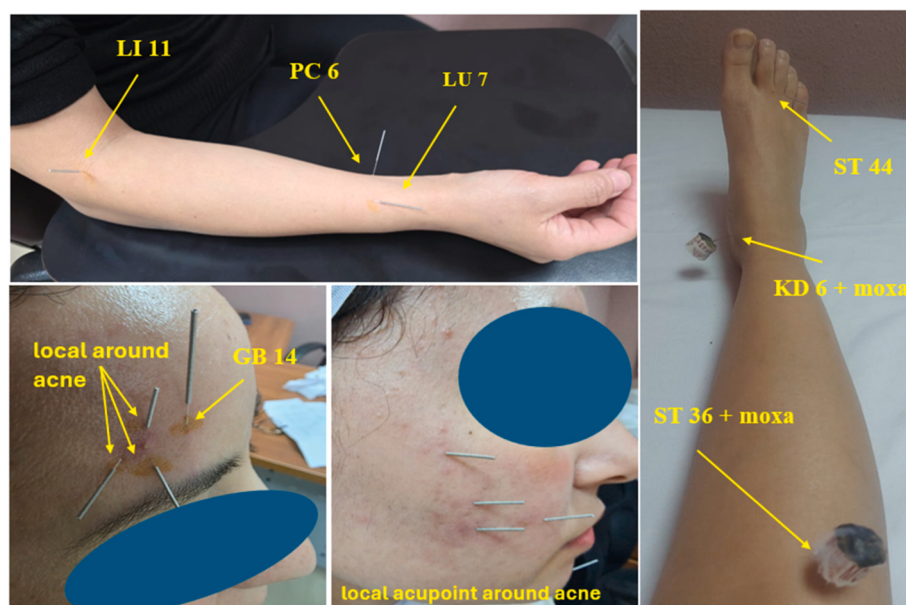
unequal variance. Significance levels were fixed at $p \leq 0.05$ for all analyses, and results were expressed as Mean $\pm$ Standard Deviation.

Table 2

Baseline demographic and clinical characteristics of the both groups.

Variable	Control (n = 50)	Experimental (n = 50)	p-value
Age (years)	14.06 $\pm$ 0.25	14.05 $\pm$ 0.22	0.768
Weight (kg)	50.92 $\pm$ 1.81	50.85 $\pm$ 1.65	0.845
Height (cm)	158.46 $\pm$ 2.32	158.40 $\pm$ 2.09	0.903
BMI (kg/m ²)	20.26 $\pm$ 0.16	20.25 $\pm$ 0.15	0.697
GAGS Score	30.48 $\pm$ 5.37	28.70 $\pm$ 5.73	0.112
Gender: Male n (%)	25 (50.0%)	24 (48.0%)	0.841
Female n (%)	25 (50.0%)	26 (52.0%)	
AV severity: Moderate n (%)	25 (50.0%)	25 (50.0%)	1.000
Severe n (%)	25 (50.0%)	25 (50.0%)	

Continuous variables are expressed as mean $\pm$ standard deviation and analyzed using independent *t*-tests. Categorical variables are analyzed using chi-square tests, either by count or percentage. GAGS = Global Acne Grading System; BMI = body mass index. AV severity refers to acne vulgaris (AV) severity based on GAGS score: moderate (19–30), severe (31–38).

**Fig. 2.** Acupoint location.

3. Result

The main characteristics of the groups prior to the treatment are shown in Table 2, with no significant differences noted between the control and experimental groups regarding the variables of age, weight, height, BMI, GAGS scores, gender ratios, and severity of acne (all p -values > 0.05).

Table 3 presents the comparative analysis of clinical outcomes before and after treatment in the control and experimental groups. At baseline, there were no significant differences between groups in lesion counts or Skindex-16 subscales, including symptoms, emotional, functional, and overall total scores (all $p > 0.05$). This confirms that the two groups were well matched prior to the intervention. After the treatment, there were improvements noticed in both groups; however, the results showed significantly higher values in the experimental group for emotional, functional, and total Skindex-16 scores with high significant values for the difference between the groups ($p < 0.001$ for both emotional and total scores; $p = 0.001$ for functional). However, the values for the difference in the symptoms score and the total number of lesions showed non-significant results, which were not significant ($p = 0.079$ and $p = 0.239$, respectively). Overall, the results showed that the values for the experimental treatment were high in the alleviation of the psychosocial effect caused by acne.

Table 4 summarizes within-group pre–post changes in clinical outcomes. Pre- and post-changes within the control and experimental groups were statistically significant for all measures, at $p < 0.001$. The improvement was always greater in the experimental group than in the control group, especially for Skindex-16 domains.

Table 5 presents the between-group percentage improvements. The experimental group had significantly greater reductions on all outcomes, with the largest differences being in emotional and total Skindex-16 scores.

4. Discussion

Statistically significant improvements ($p < 0.001$) in all clinical variables were noted for both groups, with a greater improvement observed in the experimental group. Statistically significant differences in psychosocial variables were noted between groups for emotional scores and total Skindex-16 scores ($p < 0.001$) and functional scores ($p = 0.001$); however, symptom and lesion scores did not achieve statistical significance between groups. The improvements observed in the experimental group were not only statistically significant but also

clinically significant, with a 61.5% mean reduction in Skindex-16 total scores – a magnitude that exceeds published MID thresholds and was perceived as meaningful by patients (Mori et al., 2019). These data indicate that the experimental treatment significantly reduced the psychosocial burden of acne.

AV has a severe psychological and physical impact on adolescents; previous studies demonstrated that acne severity is a significant predictor of psychological disability and diminished quality of life (Elradi et al., 2025; Wojdal et al., 2025). Conventional medical treatments for AV are effective; however, adverse effects such as skin irritation and dryness hinder patient adherence (Cîrstea et al., 2024). Researchers discuss how there is a constant need for research on personalized treatments for AV, taking into consideration its psychological impact on adolescents (Jaiswal et al., 2024). Acupuncture has been found to be effective in treating adult acne (Huang et al., 2025). So, the aim of this study was to study the combined effects of acupuncture and moxibustion therapy in treating AV in adolescents in terms of improved circulation and immune response for better physiological and psychological gains. Mechanistically, the combined effect of acupuncture and moxibustion might affect the local immune response, promote microcirculation, and assist in healing, among other factors that would be applicable in the management of AV in adolescents (Wang and Su, 2024).

Formerly, there has been supportive evidence that the use of the multipoint acupuncture technique, involving both local facial points such as ST2, and LI20, as well as distal systemic points such as LI11, ST44, SP10, PC6, and ST36, may provide an adjunct form of comprehensive treatment in the management of AV in adolescents. This may address both the local cutaneous manifestation of the condition as well as the systemic imbalances that are normally always present in the pathophysiology of any AV (Cao et al., 2020). Several physiological lines link the proposed mechanisms. Along dermatological lines, local inserting points such as LI 11 and ST 44 can suppress the expression of pro-inflammatory cytokines, leading to suppressed inflammation (Zijlstra et al., 2013). Along hormonal, immunological, and more metabolic lines, influence is indirectly made along ST 36 and SP 10, proposed to control metabolic as well as ‘blood’ functions, which might have a differing effect on sebum gland secreting capacities. Along neurologic lines and psychosocial lines, entry points such as PC 6 and LU 7 do have a role in relieving Shen stresses and calming the mind under stress, a known contributing factor in exacerbations in acne, via autonomic nervous pathway suppression/activation (Lee et al., 2018).

However, acne has been shown to greatly influence the self-esteem and confidence levels of adolescents and has widespread effects on the overall life of an individual, potentially leading to anxiety and depression. As such, there is a need for an effective treatment strategy that not only targets the pharmacological perspective but also takes into consideration the physical and psychosocial attributes. Acupuncture has been observed to not only influence acne physically but also have an indirect effect on the same by stimulating the PC 6 and LU 7, thereby having an effect on the individual's psychoneuroimmunology and providing relief from anxiety and improving emotional well-being. Moreover, this technique can particularly help in improving the clarity and appearance of the skin by acting as a therapeutic ritual and increasing an individual's overall self-esteem and body image. Moreover, as opposed to pharmacologic therapy, this technique has been observed to be well-tolerated with no risks and potentially has more benefits in terms of anxiety and emotional well-being (Cao et al., 2020).

The integration of moxibustion, specifically at points indicated for its use such as ST 36 and KD 6, could theoretically augment the therapeutic framework for adolescent acne by enhancing systemic regulation. Moxibustion, the application of heat from burning mugwort, is proposed to strengthen the body's defensive Qi and Yang, which in biomedical terms may translate to improved local circulation, enhanced immune modulation, and a more pronounced anti-inflammatory effect compared to needling alone (Mao, 2022). For instance, applying moxa to ST 36, a major tonifying point, may amplify its role in strengthening

Table 3
Comparison of outcomes before and after treatment in both groups.

Outcome	Control (n = 50) Mean $\pm$ SD	Experimental (n = 50) Mean $\pm$ SD	p-value
Pre-treatment			
Total lesions	25.52 $\pm$ 10.07	25.10 $\pm$ 9.27	0.829
Skindex-16	15.22 $\pm$ 4.52	16.58 $\pm$ 5.64	0.187
Symptoms			
Skindex-16	39.36 $\pm$ 4.56	39.32 $\pm$ 1.71	0.954
Emotional			
Skindex-16	23.56 $\pm$ 2.94	22.70 $\pm$ 4.00	0.223
Functional			
Skindex-16 Total	78.14 $\pm$ 7.26	78.60 $\pm$ 7.93	0.763
Post-treatment			
Total lesions	18.84 $\pm$ 7.03	17.26 $\pm$ 6.29	0.239
Skindex-16	10.56 $\pm$ 5.19	8.96 $\pm$ 3.70	0.079
Symptoms			
Skindex-16	25.60 $\pm$ 7.91	16.92 $\pm$ 3.81	<0.001
Emotional			
Skindex-16	8.14 $\pm$ 6.36	4.36 $\pm$ 4.05	0.001
Functional			
Skindex-16 Total	44.30 $\pm$ 13.68	30.24 $\pm$ 9.07	<0.001

Values are presented as mean $\pm$ standard deviation. Independent samples t-tests were applied for between-group comparisons.

Table 4Within-group pre–post changes in clinical outcomes (paired *t*-test results).

Outcome	Group	Mean Difference (Pre–Post)	95% CI of Difference	<i>t</i> (df)	<i>p</i> -value
Total Lesions	Control	6.68	5.74 to 7.62	14.27 (49)	<0.001
	Experimental	7.84	6.88 to 8.80	16.39 (49)	<0.001
Skindex-16 Symptoms	Control	4.66	3.78 to 5.54	10.63 (49)	<0.001
	Experimental	7.62	6.67 to 8.57	16.15 (49)	<0.001
Skindex-16 Emotional	Control	13.76	11.55 to 15.97	12.53 (49)	<0.001
	Experimental	22.40	21.20 to 23.60	37.38 (49)	<0.001
Skindex-16 Functional	Control	15.42	13.39 to 17.45	15.26 (49)	<0.001
	Experimental	18.34	16.85 to 19.83	24.81 (49)	<0.001
Skindex-16 Total	Control	33.84	30.28 to 37.40	19.12 (49)	<0.001
	Experimental	48.36	45.92 to 50.80	39.89 (49)	<0.001

Values represent mean differences (pre-treatment minus post-treatment). Paired samples *t*-test were applied for within-group comparisons.**Table 5**

Comparison of percentage improvement between control and experimental groups.

Outcome	Control (n = 50) Mean % ± SD	Experimental (n = 50) Mean % ± SD	Mean Difference (Exp–Ctro)	95% CI of Difference	<i>t</i> (df)	<i>p</i> -value
Total lesions improvement	–26.17 ± 7.98	–31.23 ± 9.93	–5.06	–8.63 to –1.49	3.05 (98)	0.003
Skindex-16 Symptoms	–30.63 ± 24.69	–45.97 ± 16.61	–15.34	–23.69 to –6.99	3.09 (98)	0.003
Skindex-16 Emotional	–34.95 ± 20.86	–56.97 ± 10.01	–22.02	–28.51 to –15.52	9.08 (98)	<0.001
Skindex-16 Functional	–65.44 ± 28.30	–80.79 ± 17.95	–15.35	–24.75 to –5.94	3.37 (98)	0.001
Skindex-16 Total	–43.32 ± 16.92	–61.53 ± 10.80	–18.21	–23.85 to –12.58	7.51 (98)	<0.001

Values are expressed as mean percentage change (%) ± SD. Percentage change was calculated as ((pre-treatment – post-treatment)/pre-treatment × 100. Negative values indicate improvement (reduction).

Spleen/stomach function, potentially leading to more robust metabolic and immune regulation relevant to acne pathogenesis. The thermal stimulation is also known to induce a stronger local anti-inflammatory response and promote tissue healing through heat-shock protein activation and modulation of cytokine release (Zijlstra et al., 2013). Furthermore, the deep warmth generated by moxibustion may contribute to a pronounced calming and anxiolytic effect during treatment, synergizing with the neuropsychological benefits of points like PC 6 to address the psychosocial dimensions of acne (Lee et al., 2018).

This randomized controlled trial establishes strong evidence that the combination of acupuncture and moxibustion in a multimodal treatment method is an effective procedure in the treatment of AV in adolescents. There was clear improvement recorded within the domains of both physical effects and psychosocial effects, which surpassed conventional treatments based on the improvement scores recorded using the Skindex-16 scale. Even though both treatments were equally effective in reducing physical effects and lesion counts, the overall psychosocial effects generated from both treatments have high value. This apart, it helps deal with anxiety, self-esteem, and poor quality of life associated with acne in adolescents, which generally goes untreated with conventional treatments, and hence it's an improvement in dealing with acne cases (Cao et al., 2020).

5. Strengths of the study

This study has various strengths. First, it is a new practice to use a moxa stick (1 cun) at ST36 for tonifying Gu Qi and at KD6 for tonifying yin. Second, a dual-plane acupoint method was used that combines local points with systemic ones to solve the main reasons behind acne vulgaris. Finally, this study had randomization and validated outcome measures that included both objective assessments (grading and counting inflammatory lesions) as well as patient-reported outcomes (Skindex-16). Therefore, treatment efficacy can be assessed more thoroughly. Besides, there was no loss to follow-up.

6. Study limitations

In view of the nature of the intervention, it was not possible to blind

both the participants and the practitioners. However, blinded outcome assessment and data analysis were performed to avoid bias. The control group received medical treatment according to established guidelines and did not undergo a sham procedure for acupuncture to avoid the placebo response, which might have affected quality-of-life measures. Some populations were excluded from the study, for instance, participants outside the age range of 12–18 years or those outside the normal range of BMI for their age, as well as those with other skin or systemic conditions. Another limitation of this study is that there was no tolerability testing carried out. While there were no withdrawals from the treatments or any severe side effects noted, there was no tolerance analysis carried out, which makes it impossible to fully assess and compare the tolerability of these interventions.

7. Conclusion

This study highlights the benefits of combining acupuncture and moxibustion for treating adolescents with AV, addressing both skin issues and related psychosocial impairment complications. While this method may not surpass traditional medical treatments in skin improvement, it significantly enhances emotional well-being and quality of life. The findings indicate that these techniques can effectively support adolescents facing psychological challenges from acne or side effects from standard medications.

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None.

CRediT authorship contribution statement

Siham M. Fahmy: Conceptualization, Methodology, Project administration, Visualization, Writing – original draft. **Reham M. Abdelrahim:** Formal analysis, Investigation, Methodology, Project administration, Visualization, Writing – original draft. **Ahmed M. Tawfik:** Formal analysis, Investigation, Methodology, Writing – review & editing. **Marian M. Shafeek:** Conceptualization, Investigation, Project administration, Writing – review & editing.

Declaration of competing interest

All authors have nothing to declare.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jbmt.2026.07.027>.

Data availability

The data supporting this study are available from the corresponding author upon reasonable request.

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