

# Efficacy of Ayurvedic Interventions in the Management of Mukhadushika (Acne Vulgaris): A Systematic Review and Risk of Bias Assessment

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## ABSTRACT

**Title:** "Efficacy of Ayurvedic Interventions in the Management of Mukhadushika (Acne Vulgaris): A Systematic Review and Risk of Bias Assessment".

**Background:** Mukhadushika (Yuvanpidika), correlated with acne vulgaris, is a common dermatological condition, especially in adolescents and young adults. It not only affects physical appearance but also contributes to psychological distress. Ayurveda offers a multidimensional approach to treatment, including Shamana (oral medicines), Shodhana (Panchakarma), Jalaukavacharana (leech therapy), Nasya, and Lepa (external applications).

**Objectives:** The primary objective of this review is to critically evaluate the Ayurvedic interventions used in the management of Mukhadushika, with a focus on therapeutic trends, efficacy, and risk of bias.

**Methods:** Eligibility Criteria: Clinical trial evaluating Ayurvedic treatments for Mukhadushika were included. Studies that focused on Ayurvedic therapies like Shamana, Shodhana, Jalaukavacharana, Nasya, Lepa, or combined therapies were included. Studies without full text or those not related to Ayurveda were excluded. Information Sources: Studies were identified through databases including PubMed, Scopus, Web of science, Google scholar, AYUSH research portal, DHARA, J gate, ARD and UGC CARE, with the last search conducted on 08.10.2025. A total of 6,48,410 records were initially identified from database searches across Pubmed (3), Scopus (95,083), UGC care(69,423), Web of Science(87,644), google scholar (3,86,967), Ayush Research Portal(31), J Gate(9,259) After removing duplicates, 3,12,224 records remained for screening. Following title and abstract screening, 339 records were excluded. A total of 71 full-text articles were assessed for eligibility. Ultimately, 19 studies were included in the qualitative synthesis of this systematic review. Risk of Bias: Risk of bias was assessed on domains adapted from the Cochrane Risk of Bias tool and narrative appraisal suited to Ayurvedic clinical. Synthesis of Results: Descriptive analysis was conducted to present the frequency and proportions of various Ayurvedic interventions. Due to the diverse study designs, no meta-analysis was performed.

**Results:** A total of 19 studies were included, comprising 19 clinical trials. These studies investigated a variety of Ayurvedic interventions. Shamana interventions were the most common (57.8%), followed by Lepa (31.5%) and combined therapies (42.1%).

**Synthesis of Results:** The synthesis revealed that integrated therapies combining systemic and local treatments yielded the best results in treating Mukhadushika. The effectiveness of Shamana therapies, such as oral medications, and external treatments like Lepa, was consistently reported.

## "Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".

**Discussion:** The Ayurvedic management of Mukhadushika is multidimensional, involving both systemic (Shamana, Shodhana) and local (Lepa, Jalaukavacharana, Nasya) approaches. However, limitations include small sample sizes, inconsistent study designs, and variations in intervention protocols. These factors may introduce bias and affect generalizability.

**Interpretation:** Ayurvedic treatments for Mukhadushika, particularly integrated therapies targeting both systemic doshic imbalances and local manifestations, show promising results. However, larger-scale trials with standardized protocols are necessary to confirm findings and improve study quality.

**Funding:** Nil

**Registration:** This systematic review was registered with PROSPERO with the registration number: CRD420250465129.

**Keywords:** Acne vulgaris, Ayurvedic management, Mukhadushika, Herbal formulations, Risk of bias, Systematic review.

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**Conflict of interest:** None

### INTRODUCTION

#### Rationale for the Review

*Mukhadushika* (Acne vulgaris), also known as acne vulgaris, is a chronic dermatological condition predominantly affecting adolescents and young adults. It is characterized by inflammation and infection of the sebaceous glands, resulting in the formation of comedones, pustules, papules, and, in severe cases, cysts. It is considered one of the most common skin conditions globally, with up to 85% of adolescents and 40-50% of young adults experiencing some form of acne at different stages of life. Although acne is often associated with puberty, it can persist into adulthood, significantly affecting individuals' physical appearance, emotional well-being, and overall quality of life. The impact of acne vulgaris is not only limited to its visible symptoms but also includes long-lasting psychological distress, including feelings of embarrassment, anxiety, low self-esteem, and depression.

Despite the high prevalence and psychological impact of acne vulgaris, the condition remains a challenging one to treat. Acne's multifactorial etiology, including hormonal imbalances, overproduction of sebum, bacterial colonization (especially *Propionibacterium acnes*), inflammation, and genetic predisposition, complicates the development of effective treatments. Conventional therapies, such as topical retinoids, antibiotics, and oral isotretinoin, have been the standard treatments for acne vulgaris. While these treatments can be effective, they often come with significant drawbacks, including side effects, antibiotic resistance, and high recurrence rates once the treatment is discontinued. For example, topical

retinoids can cause skin irritation, and isotretinoin has serious side effects, including teratogenicity and liver toxicity. Consequently, many patients seek alternative or complementary treatment options that may offer a safer, more sustainable approach to managing acne without the adverse effects associated with conventional therapies.

[1]

Among the alternative treatment options, Ayurveda, a traditional system of medicine that originated in India, offers a holistic and integrative approach to health. Ayurveda focuses on achieving balance in the body by addressing the root causes of diseases rather than merely treating their symptoms. Ayurvedic treatments for acne vulgaris, or *Mukhadushika*, are based on the concept of *doshas*—biological energies that govern the body's functioning. In Ayurveda, *Mukhadushika* is thought to be caused by the vitiation of the *Pitta dosha*, which is responsible for metabolic processes, heat, and inflammation in the body. When *Pitta* is aggravated, it leads to increased sebum production, causing the characteristic lesions of acne. [2]

The Ayurvedic approach to treating *Mukhadushika* is multifaceted, encompassing both systemic and local treatments aimed at restoring balance to the body. Key Ayurvedic interventions for *Mukhadushika* include *Shamana* (internal or palliative therapies), *Shodhana* (Detoxification or purificatory therapy), *Jalaukavacharana* (Leech therapy), *Nasya* (nasal administration of medicinal oils), and *Lepa* (External application of herbal paste). These therapies work synergistically to cleanse the body, reduce inflammation, control oil production, and promote overall skin health.

## "Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".

The potential benefits of Ayurvedic treatments lie not only in their anti-inflammatory, antibacterial, and antioxidant properties but also in their ability to address the underlying causes of acne, such as hormonal imbalance, digestive issues, and blood toxicity. [3] However, despite the promising traditional use of Ayurvedic therapies for the management of *Mukhadushika*, there is a lack of comprehensive and critically appraised evidence to support their widespread use. Existing studies often focus on individual interventions, such as herbal formulations or Panchakarma (Five purificatory procedures of Ayurveda) treatments, but the findings are scattered and not systematically evaluated. Moreover, the methodological quality of many studies remains unclear, with variations in study design, sample sizes, and outcome measures, making it difficult to draw firm conclusions about the efficacy of Ayurvedic treatments for acne. Furthermore, few studies have assessed the risk of bias or the methodological rigor of the included trials, leading to uncertainty about the reliability of the reported results. [4]

Given the growing interest in complementary and integrative medicine, it is crucial to systematically review and synthesize the available evidence on Ayurvedic interventions for *Mukhadushika*. This review is necessary to bridge the gap between traditional Ayurvedic knowledge and modern clinical practice, providing evidence-based insights into the efficacy and safety of Ayurvedic therapies for acne vulgaris. This systematic review will offer a critical evaluation of Ayurvedic treatments, their clinical outcomes, and their potential to be integrated into mainstream dermatology. Furthermore, it will address the methodological quality of the studies reviewed, assessing the risk of bias and highlighting areas where future research is needed to strengthen the evidence base. [5]

### Objectives of the Review

This systematic review aims to critically evaluate the available clinical evidence on Ayurvedic interventions for the management of *Mukhadushika*. Specifically, the objectives of this review are as follows:

1. To assess the clinical efficacy of various Ayurvedic treatments for *Mukhadushika*, including:
  - *Shamana* such as herbal formulations, oral medications, and supplements.
  - *Shodhana*, including Panchakarma (e.g., *Virechana* (Therapeutic purgation) and *Raktamokshana* (Bloodletting therapy)).

*Jalaukavacharana*, an ancient Ayurvedic procedure for purifying the blood.

*Nasya* involving herbal oils to clear the sinuses and balance *doshas*.

*Lepa*, such as herbal pastes and oils, to reduce inflammation, control sebum production, and improve skin health.

To analyze the results of the reviewed studies and evaluate the effectiveness of these interventions in terms of acne severity, lesion reduction, overall skin improvement, and the rate of recurrence or relapse.

To assess the risk of bias in the included studies, focusing on study design, sample size, inclusion and exclusion criteria, outcome measures, and adverse event reporting. This will help identify potential methodological weaknesses and gaps in the current evidence base.

To provide a comprehensive synthesis of the reported outcomes across studies and identify trends in therapeutic approaches, highlighting the most commonly used interventions, their reported effectiveness, and any challenges in the clinical application of Ayurvedic treatments.

To identify research gaps and provide recommendations for future clinical studies on Ayurvedic interventions for *Mukhadushika*, focusing on areas such as study standardization, long-term follow-up, and rigorous clinical trials with larger sample sizes.

### METHODS

This systematic review was conducted following the PRISMA 2020 guidelines to evaluate the efficacy of Ayurvedic interventions for the management of *Mukhadushika*. The following steps outline the processes followed to ensure the review was comprehensive, systematic, and transparent.

#### Eligibility Criteria

##### Inclusion Criteria:

**Study Design:** Randomized controlled trials (RCTs), non-randomized controlled trials, cohort studies were included.

**Population:** Studies involving adolescents and young adults diagnosed with *Mukhadushika*, aged between 12-40 years, regardless of gender.

**Interventions:** Studies that evaluated Ayurvedic interventions for *Mukhadushika*, including *Shamana*, *Shodhana*, *Nasya*, *Lepa*, and *Jalaukavacharana*.

**Outcomes:** Studies that reported on clinical outcomes such as lesion count, severity of acne, skin improvement, and adverse effects.

# "Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".

## Exclusion Criteria:

- Animal studies, in vitro studies, or studies focusing on non-Ayurvedic treatments.
- Studies that did not involve human participants or lacked full-text availability.
- Studies that did not report clinical efficacy or focused solely on cosmetic treatments.

Studies were grouped based on intervention type: Shamana, Shodhana, Nasya, Lepa, Jalaukavacharana, and Combined therapies.

## Information Sources

The following databases and sources were searched to identify relevant studies:

- PubMed
- Scopus
- Web of science
- UGC CARE
- Google Scholar
- AYUSH research portal
- DHARA
- J GATE
- ARD

The last search was conducted on 08.10.2025 ensuring all relevant studies up to that date were included.

## Search Strategy

A comprehensive search strategy was developed and executed across multiple databases. The following search terms were used:

- "Mukhadushika", "Acne vulgaris", "Mukhadushika" AND "Acne vulgaris", "Ayurvedic treatment for acne", "Ayurvedic Intervention in Acne Vulgaris", "Herbal Remedies for Mukhadushika", "Ayurvedic Acne Management", "Ayurvedic formulation for Acne", "Ayurvedic herbs for Acne Vulgaris", "Clinical efficacy of Ayurvedic Acne treatment", "Ayurvedic skin care for Mukhadushika", "Herbal Acne treatment", "Acne Vulgaris Ayurvedic therapy", "Ayurveda for skin disorder", "Risk of bias in Ayurvedic Acne treatment", "Ayurvedic Acne Vulgaris".

Search Filters:

- Clinical trials.
- Human participants.
- English-language studies.
- No date limitations, but only peer-reviewed publications were included.

## Selection Process

The study selection process was as follows:

- **Initial Screening:** Titles and abstracts were screened independently by two reviewers to identify potentially relevant studies. Disagreements were resolved through discussion.

- **Full-text Assessment:** Full-texts of potentially relevant studies were reviewed for eligibility. Studies were included if they met the inclusion criteria.

**Automation Tools:** The selection process was supported by Rayman (a systematic review software), which helped manage and streamline the selection of studies.

## Data Collection Process

Data extraction was carried out independently by two reviewers using a standardized form. The following data were extracted:

- **Study Characteristics:** Author, year of publication, study design, sample size, and intervention details.
- **Participant Characteristics:** Age, gender, inclusion/exclusion criteria, and severity of acne.
- **Outcome Measures:** Lesion counts, acne severity (using grading scales like GAGS), and any psychological assessments related to acne's impact on quality of life.
- **Adverse Effects:** Any side effects or treatment-related adverse events.

## Data Items

- **Primary Outcomes:**

Reduction in acne lesions (comedones, pustules, papules, cysts).

Severity of acne (measured by grading scales like GAGS).

Rate of recurrence or relapse after treatment.

## Secondary Outcomes:

Skin improvement (e.g., texture, oiliness, pigmentation).

Psychological impact (e.g., quality of life using DLQI).

Adverse effects (any side effects from Ayurvedic treatments).

## Other Variables:

**Participant Characteristics:** Age, gender, acne severity, comorbidities.

**Intervention Characteristics:** Intervention type (e.g., type of herbal formulations, duration, method of administration).

- **Funding Sources:** Funding sources and potential conflicts of interest.

## Study Risk of Bias Assessment

The risk of bias was assessed for each of the 19 included clinical trials using the Cochrane Risk of Bias Tool (RoB 2). Two independent reviewers evaluated the studies across the following domains:

## "Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".

- **Selection bias** (randomization and allocation concealment)
- **Performance bias** (blinding of participants and personnel)
- **Detection bias** (blinding of outcome assessment)
- **Attrition bias** (handling of missing data)
- **Reporting bias** (selective outcome reporting)
- **Other biases** (funding sources, conflicts of interest, or methodological inconsistencies)

### Effect Measures

Due to the diverse study designs, no meta-analysis was performed.

### Synthesis Methods

- **Eligibility for Synthesis:** Studies were grouped based on intervention type (*Shamana, Shodhana, Lepa, etc.*) and outcomes. Studies were only included if they reported data on at least one primary or secondary outcome.
- **Preparation of Data:** Missing summary statistics were imputed where possible. Incomplete data were handled by contacting study authors for clarification.
- **Data Tabulation:** Results from individual studies were tabulated to summarize the intervention characteristics, outcome measures
- **Sensitivity Analyses:** Sensitivity analyses were conducted to assess the robustness of the results by excluding studies with high risk of bias or those that did not meet the inclusion criteria.

### Reporting Bias Assessment

Reporting bias was assessed by visually inspecting funnel plots for outcomes with sufficient data. Studies with missing results or those with selective reporting of outcomes were identified and addressed to minimize bias in the synthesis.

### Certainty Assessment

The GRADE (Grading of Recommendations, Assessment, Development, and Evaluations) system was used to assess the certainty of evidence for each primary outcome. This system evaluates:

- **Risk of bias** across studies.
- **Inconsistency** in results.
- **Indirectness** of evidence.
- **Imprecision** of estimates.

S.N	Title/Topic	Author & Publication Details	Size	Intervention	Key Outcomes	Conclusion
CLINICAL TRIAL						

### Publication bias.

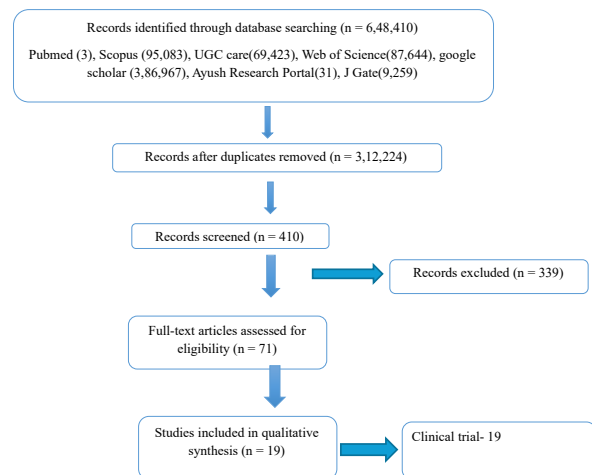
## RESULTS

### Study Selection

A total of 6,48,410 records were initially identified from database searches across Pubmed (3), Scopus (95,083), UGC care(69,423), Web of Science(87,644), google scholar (3,86,967), Ayush Research Portal(31), J Gate(9,259) After removing duplicates, 3,12,224 records remained for screening. Following title and abstract screening, 339 records were excluded. A total of 71 full-text articles were assessed for eligibility. Ultimately, 19 studies were included in the qualitative synthesis of this systematic review.

A flow diagram representing the study selection process is presented in Figure 1.

**Figure 1: PRISMA Flow Diagram**



### Study Characteristics

The included studies comprised:

19 clinical trials evaluating various Ayurvedic interventions.

Details of each study's characteristics, including authors, sample size, interventions, and outcomes, are presented in Table 1.

**Table 1: Included studies (Clinical Trial)**

**"Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".**

1	A Comparative Clinical study of <i>Lakshadi Lepa</i> and <i>Panchanimba Ghana vati</i> (Tablet / solid extract tablet) in <i>Mukhdooshika</i> w.s.r to Acne Vulgaris [6]	Divya Tiwari, Anita Sharma, Sandeep Charak. International Research Journal of Ayurveda & Yoga Vol. 7(4), pp. 1-4, April, 2024	30 patients	Group A – The <i>Lakshadi Lepa</i> and <i>Panchanimba Ghana vati</i> along with <i>Haritaki Churna</i> (Herbal powder) with the <i>Pratimarsha Nasya</i> of <i>kumkumadi tailam</i> (Saffron-based facial oil enhancing complexion). Group B – The ointment UVA Acnovin and Capsule UVA Acnovin along with <i>Haritaki Churna</i> with the <i>Pratimarsha Nasya</i> of <i>kumkumadi tailam</i> .	No statistical significant difference between the groups. But the clinical relief in patient belonging to group A was found better than group B.	In both group, 6.66% and 13.33% patients showed marked relief in group A and B. 60% and 40% of patients showed moderate relief in group A and B. 33.33% and 46.66% patients showed mild relief in group A and B. The more severe patients of <i>Mukhdushika</i> showed a late response.
2	A clinical study to evaluate the efficacy of <i>jalaukavacarana</i> and <i>siddarthakadilepa</i> in the management of <i>mukhadusika</i> w.s.r. to <i>Mukhadushika</i> . [7]	Krishna Kant Pandey, Arun Kumar Tripathi and Alok Kumar Srivastava. International Journal of Herbal Medicine 2017; 5(6): 22-29	15	<i>Jalaukavacaran a</i> (4 sittings on a 7-day interval) along with <i>siddarthakadilepa</i> daily in between 4 sittings of <i>jalaukavacaran a</i>	Significant results in reducing <i>pidika</i> , <i>vedana</i> (Pain), <i>daha</i> (Burning), <i>paka</i> (Inflammation), <i>kandu</i> (Itching), <i>vaivarnyata</i> (Discolouration) and <i>snigdhatata</i> (Oiliness. significant result in reducing count of lesions too. No significant effect was seen on the no. of scar/Grading of scars. 13.33% in	<i>Jalaukavacaran a</i> provides a sustained relief in <i>mukhadusika</i> with minor relapse rate and additional application of <i>lepa</i> must be improving this relapse free relief to more extent.

**"Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".**

					showed relapsed .	
3	A pre and post test study to assess the efficacy of <i>arjunadi lepa</i> in acne scars [8]	Dr.Arunima N S, Dr. Pradeep Kumar K	30	<i>Arjuna tvak+ manjishtha</i> (Indian madder), <i>lepa</i> with honey once in day for 14 days	The overall assessment of the study reveals that 05 (16.66%) patients were said to be clinically stable, 24 (80%) patients had mild improvement, and 01 (3.3%) patients had moderate improvement in acne scars.	<i>Arjunadi lepa</i> on Acne scar has been a safe, cost effective and easy preparation. The treatment duration being 14 days has shown statistically significant results. If the same treatment continued for longer duration we may expect better improvements as scar or wound healing require long period.
4	A Clinico-Pathological Study On <i>Mukhadushika</i> And Its Management By <i>Lodhradi Lepa</i> And <i>Arogyavardhani Vati</i> (Tablet promoting metabolic and liver health) With Special Reference To Acne Vulgaris [9]	Dr. Bishnupriya Lenka, Prof. (Dr.) Pradip Kumar Panda, Dr. Manoranjan sahu. International Research Journal of Ayurveda & Yoga, ICV-70.44-ISRA-1.318, VOL 4, ISSUE 5	30	Group A- <i>Lodhradi Lepa</i> for 30 days and Group B- <i>Lodhradi lepa + Arogyavardhani Vati</i> 250mg twice daily for 30 days	There were 53% and 62.2% of improvement in signs and symptoms in the patients of Group-A and Group-B were observed in this study respectively. The Statistically significant (P0.05).	The study revealed that out of 30 cases taken for study, group B showed better result as compared to group A in overall effect. No side effect was noticed during clinical study.
5	Medicinal Leech For The Treatment Of <i>Mukhadushika</i> W.S.R. To <i>Mukhadushika</i> : A Randomised	Author- Gupta Sudesh1, Sharma Sakshi2*, Prasher Aarushi2, Sharma Kumar Arun2, Manhas Raman	14	Four sittings of <i>Jalaukavachara na</i> on a seven day interval were given.	Intervention was found to be highly significant (p0.05) was found in <i>Srava</i>	The results are satisfactory. <i>Jalaukavachara na</i> is proved to be an effective, time saving, affordable and acceptable

**"Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".**

	Clinical Study [10]	AYUSHDHARA, 2021;8(1):3064-3070				treatment in <i>Mukhadushika</i> without causing any adverse effect.
6	A Comparative Clinical Study On The Cosmetic Approach In <i>Tarunyapidaka</i> Vis-A-Vis Amongst Female Population Through <i>Shodhana</i> And <i>Lepa</i> [11]	Author- Dr. Sharanamma, Dr. Prashanth A.S., Dr. S.G. Chavan Journal of Ayurveda and Integrated Medical Sciences   Sept - Oct 2020   Vol. 5   Issue 5	40	Group A: 20 subjects- <i>Navaka Kashaya</i> followed after classsscial <i>Virechana</i> Group B: 20 subjects- <i>Gopanganadi Kashaya</i> followed after classsscial <i>virechana</i>	Both Ayurvedic formulations, <i>Navaka Kashaya</i> and <i>Gopanganadi Kashaya</i> , were effective in treating <i>Tarunyapidaka (Mukhadushika)</i> , showing significant improvement in symptoms like pain, itching, and skin discoloration.	Both groups in <i>Tarunyapidaka</i> . The overall percentage of improvement provided by <i>Navaka Kashaya</i> with <i>Virechana</i> and <i>Lepachikitsa</i> is 66.83%, while <i>Gopanganadi Kashaya</i> of improvement along with <i>Virechana</i> and <i>Lepa Chikitsa</i> .
7	A clinical study of <i>Kumkumadi Tailam Nasya</i> in <i>Yuvan Pidaka</i> w.s.r. to Acne Vulgaris [12]	Suratna Banerjee, Rashmi R. Journal of Ayurveda and Integrated Medical Sciences   December 2023   Vol. 8   Issue 12	30	<i>Kumkumadi Tailam Marsha Nasya</i> - 6 drops in each nostrils for 7 days	All the patients ended with <i>Samyak Nasya Lakshanas</i> . There is significant reduction in Size, <i>Ghanata</i> , <i>Medata</i> of <i>Pidakas, ruja</i> . Out of 30 patients, 16 patients (53.33%) showed Good response. 14 patients (46.66%) showed Moderate response.	Many patients had <i>Manasika Lakshanas</i> like <i>Krodha, Ayasa, Shoka</i> , which aggravates <i>Vata Dosha</i> . Also sunlight is the main cause for <i>Mukhadooshika</i> . In the study, subjects showed significant result in the Subjective parameters - Shape of <i>Pidakas</i> and <i>Ruja</i> .
8	A clinical study of <i>Sidharthakadi Lepa</i> in management of	Maneesh Kumar, Pramod Kumar Mishra, Brahmanand	40	External application of <i>Sidharthakadi Lepa</i> twice in a	60% relief in <i>pidika and kandu</i> , 47.61% relief in	It can be concluded that <i>Sidharthakadi Lepa</i> may be

**"Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".**

	<i>Yuvanpidika</i> (Acne Vulgaris) [13]	Sharma. Journal of Ayurveda and Integrated Medical Sciences   February 2024   Vol. 9   Issue 2		day with water on the acne (as per need) For 3 months and follow up by 15 days.	<i>Vedana</i> , 57.14% relief in <i>Daha</i> , 45.71% relief in <i>srava</i> . <i>Sidharthakadi Lepa</i> is more effective in <i>Vata</i> and <i>Kapha Prakrithi</i> individuals	used as main therapeutic agent in established cases of Acne vulgaris or as an adjuvant therapy in chronic and complicated cases.
9	A scientific study on <i>rakta dhatu</i> and its related disorder and effect of <i>varnya</i> (Complexion-enhancing) <i>mahakashaya ghanvati</i> and <i>chandra prabha lepa</i> (Herbal paste named "Moon-glow" for skin clarity) in the management of <i>yuvan pidika</i> [14]	Sharma Dinesh Chandra, Chahar Devendra, Singhal Harish Kumar, Meena M.S. International Journal of Ayurveda and Pharma Research, 2014; 2(2): 33-39	30	<i>Varnya Mahakashaya Ghanvati</i> 800 mg twice daily for 60 days while Chandra <i>Prabha lepa</i> was locally applied by making paste with <i>Gulab jala</i> (Rose water).	<i>Varnya Mahakashaya Ghanvati</i> along with Chandra <i>Prabha Lepa</i> shows highly statistically significant result in all the adopted parameters like <i>Pidika</i> numbers, <i>Vedana</i> , <i>Ghanta</i> , <i>Snigdhatta</i> and <i>Raktima</i> (<0.001).	This study shows highly significant result to ameliorate the symptom of <i>Yuvan pidika</i> especially on <i>Vata dosha pidika</i> as well as <i>Kapha dosha pidika</i> . Both these drugs proved their efficacy to manage <i>Yuvan pidika</i> by making homeostasis of <i>Vata</i> , <i>Kapha</i> and <i>Rakta</i> .
10	Effect of Ayurvedic Yog (formulations) - Herbal Antibiotic, Beautiful Skin and Clear Skin lotion - on established cases of some skin disorders Psoriasis, acne and fungal infections [15]	Syed Sadiq Abbas, S. Shabihe Raza Baqri, Agha Parvez Masih, Afroz Zareen Athar, Syed Faiz Mujtaba and Kumar Gaurav Bajpai. Int. Journal of pure and applied researches	16	<i>Neem</i> (Azadirachta indica) leaves, flowers and twigs - 325 mg 2 capsules twice daily with meals, Ayurvedic Yog of - 350 mg 1 capsule twice daily containing <i>Raktchandana</i> (Pterocarpus santalinum), <i>Manjeet</i> (Rubia cordifolia), <i>Neem</i> (Azadirachta	The acne cases were treated for consecutive 8 months and all the symptoms like papules, pustules, nodules, open comedones and closed comedones disappeared slowly in this period.	Skin disorders are multifactorial diseases, skin ectoderm is most sensitive to allergic, immune disturbances, super added infection, painful and chronic disabling features. Hence, a multiple focus broad-spectrum treatment is required and this we felt can be

**"Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".**

				indica), <i>Haldi</i> (Curcuma longa), <i>Tulsi</i> (Ocimum sanctum), <i>Guruchi</i> (Tinospora cordifolia) and lotion containing <i>Neem</i> (Azadirachta indica) extract, eucalyptus oil and olive oil.		covered by our herbals with many natural bioactive, substances.
11	Effect of <i>Shalmalyadilepa</i> and <i>Guduchyadivati</i> in the management of <i>Yauvanapidika</i> [16]	Piyush V. Pampaniya, Darshana H. Pandya. AYU Apr-Jun 2013, Vol 34, Issue 2	50	Group A- <i>Shalmalyadilepa</i> twice a day with milk. Group B patients were administered four tablets (500 mg each) of <i>Guduchyadivati</i> thrice a day with water. along with local application of <i>Shalmalyadilepa</i> .	Total 50% patients had marked improvement in Group B while in Group A it was 13.64%. Moderate improvement was observed in 40.91% in Group B while in Group A, it was 31.82%. Mild improvement was observed in 9.09% of patients in Group B while in Group A, it was 50%. No one patient remain unchanged in Group B while in Group A it was 4.55%	<i>Shalmalyadilepa</i> along with <i>Guduchyadivati</i> (Group B) has shown better effect than only external application of <i>Shalmalyadilepa</i> . As the condition is <i>Yapya</i> , in order to obtain good results, the duration of the therapy may be increased.
12	Effect of <i>Kustumbruadi Lepa</i> in The Management of <i>yuvan pidika</i> [17]	Dr. Swati Rani, Dr. P.C. Mangal. Journal of Emerging Technologies and Innovative	30	<i>Kustumbru</i> , <i>vacha</i> , <i>lodhra</i> ( <i>Symplocos racemosa</i> , astringent bark used for skin	<i>Sotha</i> , <i>Shula</i> , <i>Srava</i> was reduced by 80.39%, 80%, 92.80% respectively.	<i>Kustumbruadi Lepa</i> was found to have very significant effect on all symptoms of <i>yuvanpidika</i>

**"Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".**

		Research, December 2023, Volume 10, Issue 12		tone), <i>kushtha</i> was used for <i>lepa</i> -duration of 45 days	92.30%, 73.13%, 84.61% improvement was observed in <i>Kandu</i> , <i>Vivarnata</i> , <i>Daha</i> respectively. No. and size of <i>pidika</i> was relieved by 84.50%, 80.35% respectively. 81.96 % and 86.70 % improvement were found in area-involved and IGA score of acne severity. Relief in all the symptoms found statistically highly significant (P< 0.001).	due to its properties like <i>Tridosha shamaka</i> (Balancing the three body humors <i>Vata</i> , <i>Pitta</i> , <i>Kapha</i> (Three <i>doshas</i> governing movement, metabolism, and structure), <i>shothahara</i> (Anti-inflammatory), <i>kusthtagana</i> (Anti-skin-disease), <i>shulahara</i> (Pain-relieving), <i>Srotovishodhan a</i> (Cleansing of body channels), <i>Jantughan</i> , <i>Varnya</i> etc.
13	Clinical Study to assess the tolerability and effectiveness of <i>Haridradya Taila</i> (Turmeric-based oil) in Acne and Acne-induced Post-inflammatory Hyperpigmentation. [18]	Bhawna, Nathani S, Bhakuni H, Joshi M S A, Joshi V K. . Kerala Journal of Ayurveda. 2023; 2(3): 01-05.	50	local application of <i>Haridradya Taila</i>	Out of 50 patients 23 patients had (80-100 %) complete relief, 11 patients show moderate (60-80 %) relief, 8 patients show mild (40-60%) relief in inflammatory lesions. Further 20 patients reported (80-100%) complete relief, 23 patients had moderate (60-	<i>Haridradya taila</i> show better results in patients with less oily skin. Better results were observed after washing face before application of oil.

**"Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".**

					80%) relief, 4 patients had mild (40-60%) relief in non-inflammatory lesions.	
14	Clinical trials of ayurvedic formulations in the treatment of acne vulgaris [19]	J.K. Lalla *, S.Y. Nandedkar, M.H. Paranjape, N.B. Talreja. Journal of Ethnopharmacology 78 (2001) 99–102	53	Group I received oral tablets containing active ingredients along with the topical aqueous gel formulation containing active ingredients. Group II received oral tablets containing active ingredients along with the topical cream formulation containing active ingredients. Group III received oral tablets containing active ingredients with placebo topical preparation. Group IV received placebo tablets with placebo topical preparation	In group I (i.e. Tablet+Gel), 31.58% of patients showed 'good to excellent' improvement in lesions, 63.16% showed 'slight to fair' improvement in lesions, 5.26% showed variable response. In group II (i.e. Tablet+Cream) 57.89% showed 'good to excellent', 26.32% showed 'slight to fair' response, 15.79% showed variable response. In group III (i.e. Tablets alone) not a single patient showed 'good to excellent' response', 100% showed 'slight to fair' improvement in lesions. In group IV (i.e. Placebo tablets alone) there was no improvement in the lesions.	(1) that the use of combination of internal and external preparations showed better efficacy than use of internal preparation alone; (2) combination of tablets and cream showed better response than the combination of tablets and gel;
15	A clinical study to evaluate the	Pandey Krishna Kant, Tripathi	15	Patients were given 4 sittings	After every sitting of	<i>Jalaukāvācāran</i> a significantly

**"Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".**

	efficacy of <i>jalaukavacarana</i> in the management of <i>mukhadusikā</i> with special reference to acne vulgaris. [20]	Arun Kumar, Srivastava Alok Kumar. Int. J. Res. Ayurveda Pharm. 9 (1), 2018		of <i>Jalaukāvācāran a</i> on a 7-day interval in between.	<i>Jalaukāvācāran a</i> , there was considerable amount of decrease in grading chief complaint as well as associated symptoms. Associated symptoms <i>Kandū, Dāha, Pāka</i> and <i>Vedanā</i> got maximum effect due the intervention.	reduces the <i>Piḍikā</i> grading. Also <i>Jalaukāvācāran a</i> is highly effective in relieving the associated complaint <i>Kandū, Dāha</i> and <i>Vedanā</i> . However, it is not effective in reducing scars in one-month period. As a conclusion of this study, we can say that <i>Jalaukāvācāran a</i> provides a sustained relief in <i>Mukhadūṣikā</i> with minor relapse rate.
16	Evaluation of combined efficacy of <i>Lodhradi lep</i> with <i>Khadirashtakwath</i> in <i>Mukhdushika</i> [21]	Mayuri Amol Deshpande, Sadhana Kulkarni, Amol Madhav Deshpande. International Journal of Ayurvedic Medicine, Vol 14 (1), 2023; 260-267	30	Group A ( <i>Lodhradilep</i> ) and Group B ( <i>Lodhradi lep</i> with <i>Khadirashtak kwath</i> ).	In group B, shown highly significant result in <i>kandu, Daha, Strava</i> and <i>Vedana</i> .	This helps to conclude that External application along with internal medication gives satisfactory effects in <i>Mukhdushika</i> .
17	Efficacy of <i>shodhana</i> and <i>shamana</i> therapy in <i>mukhadushika</i> [22]	Ekta Sharma, Pankaj Katara, Arun Gupta. Int. J. Res. Ayurveda Pharm. 11 (2), 2020	32	Group A - <i>Shodhana (Vamana and Virechana Chikitsa)</i> ; Group B- <i>Shodhana</i> along with <i>Shamana (Lodhradi lepa</i> and <i>Brihat</i>	In Group A, maximum number of patients i.e. 73% showed significant relief, 20% have moderate improvement, 6.7% of patients showed	<i>Shodhana</i> therapy and Shaman therapy given together have significant effect in the management of Acne Vulgaris as compared to <i>Shodhana</i> therapy alone.

**"Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".**

				<i>Manjisthadi kashaya</i> ).	excellent relief; whereas in Group B, 60% of patients showed excellent relief and significant relief was observed in 40% of the patients.	
18	Study the efficacy of <i>mruttik lepa</i> in <i>mukhadushika</i> wss.r. to acne vulgaris [23]	Pawan kumar, R P Patwardhan, Manish Arora, Bhalsing. Vol 31-02, issue 22	30	<i>Mrutikkalepa</i> for 21 days	Application of <i>mrutika lepa</i> shos beneficial effect in reducing <i>vedana, shotha, srava,</i> and <i>vivarnata</i> . It improves <i>mukhakanti</i> and <i>twak varna</i>	Regular practice of <i>mruttika lepa</i> helps in prevention of <i>mukha dushika</i> .
19	Effectiveness of <i>Mukhaprakshalan</i> by <i>Varun qwath &amp; Jatiphaladi Lepa</i> in <i>Mukhadushika</i> [24]	Prajakta Anil Hagone, Vaishali Kuchewar. International Journal of Ayurvedic Medicine, Vol 11 (3), 563-567	30	<i>Varun quath Mukhaprakshal</i> and <i>Jatiphaladi lepa</i> - twice a day for 15 days	This study shows highly significant result to ameliorate the symptom of <i>Yuvan pidika</i> especially on <i>pidika</i>	This treatment protocol was effective as an anti-inflammatory and improves the blackish discoloration over skin.

**Risk of Bias in Studies**

Risk of bias was assessed for each included clinical trial study, focusing on aspects such as randomization, sample size, intervention description, and outcome reporting. The risk of bias assessment showed that:  
The detailed risk of bias summary for each study and a visual summary of the risk of bias assessments is shown in Figure 2.

**Figure 2: Risk of Bias Summary for clinical trials:**

# "Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".

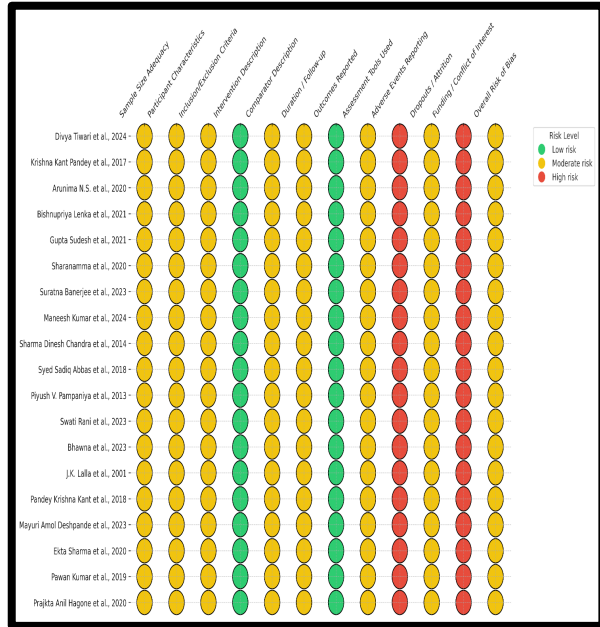
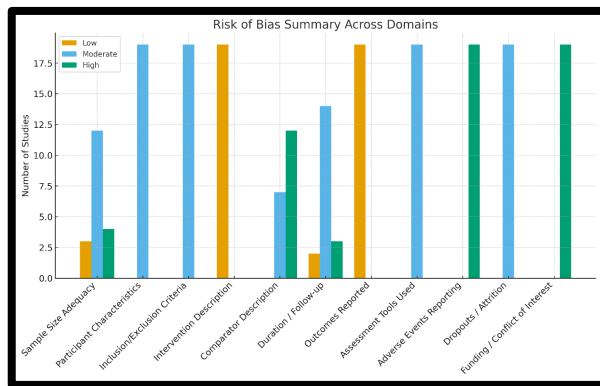


Figure 3: Risk of Assessment plot-



## Results of Included Studies

A total of 19 studies were included in this systematic review. The interventions across studies were heterogeneous, broadly classified into *Shamana*, *Shodhana*, *Raktamokshana*, *Nasya*, and *Lepa*.

### 1. Clinical Trials (n = 19)

- *Shamana*: 11 trials used internal/oral medicines either alone or in combination with local therapies (e.g., *Panchanimba Ghana Vati*, *Arogyavardhini Vati*, *Guduchyadi Vati*, *Varnya Mahakashaya Ghanvati*, *Gandhak Rasayan*, etc.).
- *Shodhana* therapies: 3 trials employed *Shodhana* procedures. *Virechana* was the most common, sometimes followed by *Shamana* medicines or *Lepa*.
- *Jalauka* (leech therapy / *Raktamokshana*): 3 trials reported the use of *Jalaukavacharana* either alone or with *Lepa*.
- *Nasya*: 1 trial used *Kumkumadi Taila Nasya*.

*Lepa*: 6 trials used various *Lepa* formulations as the primary intervention (e.g., *Arjunadi Lepa*, *Lodhradi Lepa*, *Sidharthakadi Lepa*, *Kustumbruadi Lepa*, *Haridradya Taila*, *Mruttika Lepa*).

Combined approach (oral + local): 8 trials adopted combined approaches (internal medicine + local application).

Table 2: Summary of Interventions Across Clinical Trials

Intervention Type	Clinical Trials (n=19)	Overall Trends
<i>Shamana</i>	11 trials (used formulations like <i>Panchanimba Ghana Vati</i> , <i>Arogyavardhini Vati</i> , <i>Guduchyadi Vati</i> , <i>Varnya Mahakashaya Ghanvati</i> , <i>Gandhak Rasayan</i> , etc.)	Oral medicines consistently form a core component across all study designs.
<i>Shodhana</i>	3 trials (mainly <i>Virechana</i> , sometimes followed by <i>Shamana</i> or <i>Lepa</i> )	Considered essential for long-term results; highlighted more in reviews.
<i>Jalauka</i> (Leech Therapy / <i>Raktamokshana</i> )	3 trials (alone or with <i>Lepa</i> )	Higher prominence in case reports and reviews compared to clinical trials.
<i>Nasya</i>	1 trial ( <i>Kumkumadi Taila Nasya</i> )	Less frequently used, but recognized in literature as supportive therapy.
<i>Lepa</i>	6 trials (e.g., <i>Arjunadi</i> , <i>Lodhradi</i> , <i>Sidharthakadi</i> ,	Most widely accepted local therapy across all sources.

## "Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".

	<i>Kustumbruadi, Haridradya Taila, Mruttika Lepa)</i>	
<b>Combined Holistic Approaches</b>	8 trials (oral + local)	Combination approaches are preferred for comprehensive and sustained outcomes

### Results of Syntheses

The synthesis of results from individual studies showed that:

- *Shamana* therapies were the most commonly used, showing consistent effectiveness in reducing lesion count and improving skin texture.
- *Shodhana* therapies such as *Virechana* were reported to have long-term benefits for chronic and relapsing cases.
- *Jalauka* showed sustained relief, particularly in patients with inflammatory lesions.

The risk of bias in these studies varied, with *Shodhana* therapies showing higher methodological rigor compared to *Shamana* and *Lepa* interventions, where *Shodhana* therapies had a moderate risk of bias due to issues with follow-up.

### Results of Statistical Syntheses

Due to the diverse study designs, no meta-analysis was performed.

**Exploration of Heterogeneity-** Due to the diverse study designs, no meta-analysis was performed.

### Sensitivity Analyses

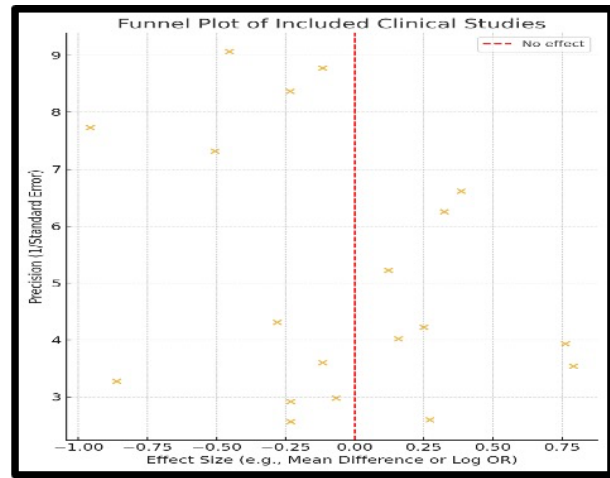
Taken together, no study was judged to be entirely at low risk of bias. Most studies had a moderate risk overall, with small sample size, lack of comparator, limited follow-up, and poor reporting of adverse events being the most frequent concerns.

### Reporting Biases

Outcome	No. of Studies (n)	Certainty of Evidence (GRADE)	Risk of Bias	Inconsistency	Indirectness	Imprecision	Publication Bias	Overall Judgment / Interpretation
Lesion count reduction	15 clinical trials	Moderate	Some concerns due to small sample sizes and	Moderate heterogeneity between	Direct evidence for acne reduction but	Sample sizes insufficient to	Possible selective reporting	Ayurvedic interventions (especially combined <i>Shamana</i> –

Reporting bias was assessed through funnel plots for primary outcomes. The inspection of the funnel plots indicated a slight asymmetry, suggesting potential reporting bias. Studies with negative results or smaller sample sizes were underrepresented.

**Fig 4: Funnel plot of included clinical study**



### Certainty of Evidence

The certainty of evidence was assessed using the GRADE system:

Lesion count reduction: Moderate certainty, downgraded due to small sample sizes, inconsistent results, and lack of long-term follow-up.

Skin improvement: Low certainty, due to high heterogeneity and poor reporting in some studies.

The GRADE assessment for each outcome is summarized in Table 4.

**Table 4: GRADE Summary of Findings for Ayurvedic Interventions in the Management of Mukhadushika**

**"Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".**

			lack of blinding	interventions	variation in diagnostic criteria	ensure precision		<i>Lepa</i> and <i>Shodhana</i> therapies) demonstrate moderate evidence for reducing acne lesion count, but stronger multicentric RCTs are required.
Skin improvement (texture, pigmentation, oiliness)	12 studies	Low	Moderate risk due to subjective assessment methods	High heterogeneity among intervention types	Generally direct evidence	Wide variability in outcome measures	Likely selective publication of positive results	Evidence suggests potential benefit of topical and systemic Ayurvedic therapies on overall skin health, but findings are limited by poor reporting standards.
Recurrence / relapse rate	1 studies	Very Low	High, due to lack of long-term follow-up	Moderate inconsistency	Direct evidence	Few studies with adequate follow-up duration	Unclear	Evidence indicates reduced recurrence with <i>Shodhana</i> and <i>Raktamokshana</i> therapies, though data are sparse and require validation.
Adverse events	1 studies	Very Low	High, due to underreporting	Low inconsistency (few reported events)	Direct	Imprecise (small samples)	High (non-reporting bias likely)	Limited data suggest Ayurvedic treatments are well tolerated, but

**"Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".**

								lack of systematic safety reporting reduces confidence in this finding.
Quality of life improvement	5 studies	Low	Moderate	Moderate	Indirect (few used validated QoL scales)	Imprecise estimates	Possible publication bias	Preliminary evidence suggests improvement in psychosocial outcomes, but further validated studies are needed.

Overall, the certainty of evidence ranged from low to moderate across outcomes. While many studies reported positive results, the confidence in these estimates is reduced by methodological limitations, small sample sizes, and poor reporting of adverse events. Future well-designed, adequately powered, and standardized clinical trials are essential to establish the efficacy and safety of Ayurvedic therapies for *Mukhadushika*.

**Discussion**

**General Interpretation of the Results in the Context of Other Evidence**

The results of this systematic review suggest that *Shamana* therapies are the most commonly used Ayurvedic interventions for *Mukhadushika*, followed by *Shodhana* therapies, particularly *Virechana*, *Jalauka*, and *Lepa*. The synthesis of clinical evidence indicates that *Shamana* therapies consistently show efficacy in reducing acne severity, improving skin texture, and controlling lesion count, which aligns with previous reviews of Ayurvedic treatments for acne.

Moreover, *Shodhana* therapies, such as *Virechana*, have demonstrated potential benefits in managing chronic cases of *Mukhadushika*, consistent with the traditional Ayurvedic view of purifying and balancing the *doshas*. This is corroborated by studies from other research that emphasize the importance of internal detoxification in treating acne (such as the use of *Virechana* for *Pitta dosha*), which aligns with the holistic principles of Ayurveda. Additionally, *Jalauka*, a *Raktamokshana*

procedure, was found to significantly reduce inflammation and lesion count in various studies, supporting findings from clinical trials studies that suggest its potential as a complementary therapy in acne management.

However, the effectiveness of external applications (*Lepa*) for immediate symptom relief, such as reducing pain and swelling, further emphasizes the role of localized therapies in managing the acute symptoms of *Mukhadushika*. The integration of oral treatments with local therapies also reflects a multidimensional approach, consistent with Ayurvedic treatment principles that combine internal and external remedies for optimal therapeutic outcomes.

**Limitations of the Evidence Included in the Review**

While this review has synthesized a large body of evidence, there are several limitations in the included studies that must be considered. First, sample sizes in many studies were small, with several clinical trials involving fewer than 50 participants, which diminishes the statistical power and generalizability of the findings. Additionally, many studies lacked long-term follow-up, which is crucial in evaluating the sustainability of Ayurvedic treatments for *Mukhadushika*. Most studies primarily measured short-term improvements (e.g., reduction in acne lesions or severity) but did not adequately assess long-term outcomes, such as the risk of recurrence after treatment cessation.

## "Efficacy of ayurvedic interventions in the management of mukhadushika (acne vulgaris): a systematic review and risk of bias assessment".

Another limitation was the heterogeneity of interventions across studies. Different formulations of oral medicines, topical applications, and Panchakarma therapies were used in varying dosages, durations, and treatment regimens. The absence of standardized treatment protocols makes it difficult to draw clear conclusions about which specific Ayurvedic treatments are most effective for different types of *Mukhadushika*.

Finally, the reporting of adverse events was inconsistent across studies. While some studies mentioned side effects such as mild irritation or allergic reactions, others did not provide adequate data on the safety profile of Ayurvedic interventions, which is crucial for ensuring the safe application of these treatments in clinical practice.

### Limitations of the Review Processes Used

While this review adhered to the PRISMA 2020 guidelines and used a rigorous methodology, there are several limitations in the review process itself. One limitation was the language restriction; only studies published in English were included, which may have excluded relevant research published in other languages. This could lead to publication bias, as studies from non-English-speaking regions may present different results or treatment approaches that were not considered in this review.

Additionally, although two independent reviewers screened the studies and performed data extraction, subjectivity in interpreting the methodological quality and outcomes of studies may have introduced bias. We attempted to mitigate this by resolving discrepancies through discussion and consulting a third reviewer, but the potential for reviewer bias cannot be entirely ruled out.

Another potential limitation is that we did not conduct a meta-analysis for the outcomes. Despite a significant number of studies, the variability in interventions, sample sizes, and outcome measures made it difficult to conduct meaningful statistical synthesis in certain areas. This may limit the quantitative conclusions that could be drawn from the available evidence.

### Implications of the Results for Practice, Policy, and Future Research

The findings from this review suggest that Ayurvedic interventions offer a promising complementary treatment for *Mukhadushika*, particularly when using combined therapies (oral + local treatments). This highlights the need for clinicians to consider integrative approaches in managing acne vulgaris, combining the strengths of

modern dermatological treatments with Ayurvedic remedies. *Shamana* therapies could be integrated into treatment plans for patients seeking natural or adjunctive therapies for acne.

From a policy perspective, these findings emphasize the need for standardized protocols in Ayurvedic treatments to ensure consistency and comparability across studies. Policy-makers and health professionals should encourage collaborative research that focuses on evaluating the safety, efficacy, and long-term benefits of Ayurvedic treatments for skin conditions like *Mukhadushika*. This could lead to the development of guidelines for integrating Ayurvedic therapies into mainstream dermatological care.

For future research, it is essential to conduct larger, multicenter clinical trials with rigorous randomization, blinding, and long-term follow-up to strengthen the evidence base for Ayurvedic treatments in *Mukhadushika*. Studies should focus on the standardization of treatments and include clear diagnostic criteria for *Mukhadushika* to reduce variability and enhance the generalizability of results. Additionally, research into combination therapies (e.g., internal herbal treatments combined with Panchakarma) could provide insights into the synergistic effects of these therapies.

Lastly, safety and adverse events need to be more comprehensively reported in Ayurvedic clinical trials to ensure that Ayurvedic therapies are not only effective but also safe for widespread use.

### Registration and Protocol

**24a.** The review has been registered in PROSPERO with the registration number: CRD420250465129.

The title of the review is: "EFFICACY OF AYURVEDIC INTERVENTIONS IN THE MANAGEMENT OF *MUKHADUSHIKA* (ACNE VULGARIS): A SYSTEMATIC REVIEW AND RISK OF BIAS ASSESSMENT".

**24b.** The protocol for this review is registered in PROSPERO. It can be accessed at PROSPERO's website using the registration ID: CRD420250465129.

**24c.** No amendments have been made to the registration or protocol at the time of this review's progress.

### Support

**25.** No funding's

### Competing Interests

**26.** The authors declare no competing interests.

**27.** Data provided in supplementary files.

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