

# INPLASY

## Systematic review and meta-analysis on the safety and efficacy of yoga for asthma.

INPLASY202520013

doi: 10.37766/inplasy2025.2.0013

Received: 4 February 2025

Published: 4 February 2025

Schleiner, A; Zsakany, T; Blic, M; Wilson, T; Anheyer, D; Cramer, H.

### Corresponding author:

Thomas Zsakany

thomas.zsakany@student.uni-tuebingen.de

### Author Affiliation:

Chair of Research in Complementary Medicine, Institute for General Practice and Interprofessional Care, University Hospital Tübingen, Germany.

### ADMINISTRATIVE INFORMATION

**Support** - None.

**Review Stage at time of this submission** - Preliminary searches.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202520013

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 4 February 2025 and was last updated on 4 February 2025.

### INTRODUCTION

**Review question / Objective** Has yoga been effective in reducing asthma symptoms and improving quality of life in individuals with asthma compared to passive and active controls?

**Rationale** Asthma is a chronic respiratory disease affecting around 300 million people worldwide, with 10% experiencing severe or uncontrolled forms associated with higher mortality and reduced quality of life (1). The prevalence has increased significantly since the 1980s, with the highest incidence in Great Britain, New Zealand and Australia (2).

Pharmacological treatments, including anti-inflammatory drugs and bronchodilators are central to asthma management, yet some patients remain symptomatic despite appropriate therapy (3). Yoga and breathing exercises, such as Pranayama, show promise as complementary methods to improve symptom control and quality of life (4,5). However, previous studies have reported

inconsistent results, making it necessary to conduct a systematic review to clarify the overall efficacy and safety of yoga for asthma management.

**Condition being studied** Asthma.

### METHODS

**Search strategy** Medline, PubMed, Cochrane, EMBASE and PsycInfo will be searched to identify relevant randomized controlled trials. BASE will be screened as a source of grey literature. As an example of the literature search strategy for PubMed is: ("Asthma"[Mesh] OR asthm\* [Title/Abstract] AND ("Yoga"[Mesh] OR \*yoga[Title/Abstract] OR yoga\* [Title/Abstract] OR yogi\* [Title/Abstract] OR asana\* [Title/Abstract] OR pranayama [Title/Abstract] OR dhyana [Title/Abstract] OR Surya Namaskar [Title/Abstract]).

The search term will be adapted upon requirements of other databases.

**Participant or population** The target population for this systematic review consists of asthma patients of all ages, with no restrictions on symptom severity. Both adults (18 years and older) and children will be included. No restriction regarding gender or ethnicity are made.

**Intervention** All types of yoga interventions will be included in the meta-analysis, without any limitations on the specific type, duration, frequency, or length of the intervention.

**Comparator** Any usual care, any type of yoga or any active control intervention were eligible as comparators.

**Study designs to be included** Only randomized controlled trials (RCTs) will be included.

**Eligibility criteria** Randomized controlled trials (RCTs), examining the effects of yoga interventions on asthma will be included in this study, with no language restrictions applied. To qualify for inclusion, studies must assess at least one primary outcome: asthma control (using validated instruments, medication frequency, or asthma attack rates), asthma symptoms (evaluated with validated tools), quality of life (measured by validated asthma-specific or generic instruments, with a preference for disease-specific measures), or pulmonary function (assessed through validated methods like spirometry).

**Information sources** The following databases will be searched using the specified search terms: Medline/PubMed, Cochrane, PsycInfo and EMBASE. Additionally, BASE will be screened as a source of grey literature.

**Main outcome(s)** Following meta-analysis focuses on evaluating the effects of yoga on asthma by considering a range of primary outcome measures. These include asthma control, assessed through validated tools that measure symptom frequency, medication use and the number of asthma attacks. Asthma symptoms and quality of life are also key outcomes, with quality of life evaluated using the Asthma Quality of Life Questionnaire (AQLQ). Lung function tests, including FEV1 (Forced Expiratory Volume in one second), FVC (Forced Vital Capacity), FEV1/FVC ratio, and PEF (Peak Expiratory Flow Rate), are integral to this evaluation.

**Additional outcome(s)** In addition to the detailed examination of primary outcomes, the safety of the intervention is evaluated as a secondary outcome measure. This assessment focuses particularly on

the number of patients experiencing serious adverse events (SAE) and adverse events (AE).

**Data management** Zotero is used to manage references and document all steps of the process. Data extraction is conducted using Excel, while statistical analyses are performed with R and R Studio. Screening and data extraction are carried out independently by two reviewers. In cases of disagreement, a third reviewer will be consulted. Any remaining conflicts will be resolved through discussion until consent is reached.

**Quality assessment / Risk of bias analysis** To assess the risk of bias, the Cochrane Risk of Bias Tool 2.0 will be used. The assessment will be conducted by two independent reviewers. In case of disagreement, a third reviewer will be involved in to resolve the differences.

**Strategy of data synthesis** If at least two studies evaluate the same outcome, pooled analyses will be performed. For continuous outcomes, standardized mean differences (SMD) with 95% confidence intervals (CI) will be computed, applying Hedges's correction to account for small sample sizes (6, 7). When standard deviations (SDs) are unavailable, they will be derived from standard errors (SEs), confidence intervals, or t-values. For dichotomous outcomes, odds ratios (OR) with 95% CI will be calculated (6, 7). Efforts will be made to retrieve any missing data directly from the trial authors.

A random-effects model will be employed for continuous outcomes using the inverse variance method and for dichotomous outcomes using the Mantel-Haenszel approach (8). For comparison purposes, in cases where heterogeneity is negligible, fixed-effects model estimates will also be included in forest plots. The Hartung-Knapp correction will be applied to address small-sample issues (9).

Heterogeneity among studies will be assessed using the  $I^2$  and  $\tau^2$  statistics. If substantial heterogeneity is identified, subgroup analyses and meta-regressions will be conducted to investigate its sources, provided that at least 10 studies are available for the respective analyses (6, 7, 8).

**Subgroup analysis** The study will conduct subgroup analyses based on the nature of the yoga intervention employed. These interventions will be categorized into three main types: Pranayama (focused breathing techniques), comprehensive yoga programs (including asanas, pranayama, and meditation), and other yoga-based interventions. In addition to the type of yoga intervention, other potential subgroups for analysis

could include asthma severity (mild, moderate, severe) and duration of yoga practice (short-term vs. long-term interventions).

**Sensitivity analysis** Sensitivity analyses will be performed to compare studies with high vs. low risk of bias, in order to assess the reliability of the significant findings.

**Language restriction** Following languages will be included: English, German, French, Spanish, Romanian.

**Country(ies) involved** Germany.

**Keywords** Yoga, Asthma, Complementary medicine, Systematic review, Meta-analysis.

**Dissemination plans** Results of this systematic review will be published in a peer reviewed journal and at scientific conferences.

#### Contributions of each author

Author 1 - Alina Schleiner - conceiving, designing and coordinating the review, creation of search strategy, study selection, data collection, data management, writing the protocol and review.

Email: [alina.schleiner@med.uni-tuebingen.de](mailto:alina.schleiner@med.uni-tuebingen.de)

Author 2 - Thomas Zsakany - conceiving, designing the review, data collection, data management, writing the protocol and review, creation of search strategy.

Email: [thomas.zsakany@student.uni-tuebingen.de](mailto:thomas.zsakany@student.uni-tuebingen.de)

Author 3 - Mirela Blic - designing the review, data collection, data management, writing the protocol and review.

Email: [mirela-ioana.blic@med.uni-tuebingen.de](mailto:mirela-ioana.blic@med.uni-tuebingen.de)

Author 4 - Tanusha Wilson - Study selection, data management, data collection, writing the review.

Email: [w.tanusha26@gmail.com](mailto:w.tanusha26@gmail.com)

Author 5 - Dennis Anheyer - conceiving, designing and coordinating the review, data management, statistical analysis of data, interpretation of data, writing the protocol and review.

Email: [dennis.anheyer@uni-tuebingen.de](mailto:dennis.anheyer@uni-tuebingen.de)

Author 6 - Holger Cramer - conceiving, designing and coordinating the review, interpretation of data, writing the protocol and review.

Email: [holger.cramer@med.uni-tuebingen.de](mailto:holger.cramer@med.uni-tuebingen.de)

#### References:

(1.) Rogliani, P., Calzetta, L., Matera, M.G. et al. Severe Asthma and Biological Therapy: When, Which, and for Whom. *Pulm Ther* 6, 47–66 (2020). <https://doi.org/10.1007/s41030-019-00109-1>

(2.) Feather A., Randall D., Waterhouse M., et al., 2020, Kumar and Clark's Clinical Medicine,

*Pneumology* page 949 - 953, Elsevier, ISBN Number: 9780702078682

(3.) Sharma S, Hashmi MF, Chakraborty RK. Asthma Medications. 2023 Jun 20. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. PMID: 30285350.

(4.) Cramer H, Posadzki P, Dobos G, Langhorst J. Yoga for asthma: a systematic review and meta-analysis. *Ann Allergy Asthma Immunol*. 2014 Jun;112(6):503-510.e5. doi: 10.1016/j.jana.2014.03.014. Epub 2014 Apr 13. PMID: 24726198.

(5.) Santino TA, Chaves GS, Freitas DA, Fregonezi GA, Mendonca KM. Breathing exercises for adults with asthma. *Cochrane Database Syst Rev*. 2020; 3(3):CD001277

(6.) Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). *Cochrane Handbook for Systematic Reviews of Interventions* version 6.5 (updated August 2024). Cochrane, 2024. Available from <http://www.training.cochrane.org/handbook>.

(7.) Bornstein M, Hedges LV, Higgins JPT, Rothstein HR. *Introduction to Meta-Analysis*, John Wiley & Sons, Ltd. 2009.

(8.) Harrer, M., Cuijpers, P., Furukawa, T., & Ebert, D. (2021). *Doing Meta-Analysis with R: A Hands-On Guide* (1st ed.). Chapman and Hall/CRC. <https://doi.org/10.1201/9781003107347>

(9.) Cornell JE, Mulrow CD, Localio R, Stack CB, Meibohm AR, Guallar E, Goodman SN. Random-effects meta-analysis of inconsistent effects: a time for change. *Ann Intern Med*. 2014 Feb 18;160(4):267-70. doi: 10.7326/M13-2886. PMID: 24727843.