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INPLASY

# Remotely delivered yoga interventions for low back pain: a systematic review and meta-analysis

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**ADMINISTRATIVE INFORMATION**

**Support -** None.

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

**Conflicts of interest -** None declared.

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**Amendments -** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 8 May 2026 and was last updated on 8 May 2026.

## INTRODUCTION

**Review question / Objective** Primary review question:
What is the effect of remotely delivered yoga interventions on pain intensity and back-related disability in individuals with low back pain compared to passive and active controls?
Secondary review question:
Does the mode of yoga delivery influence pain intensity and back-related disability outcomes in individuals with low back pain, including comparisons between remotely delivered and in-person yoga interventions and between different remote delivery formats (e.g., synchronous versus asynchronous interventions)?

**Rationale** Pain-related conditions, including low back pain, are among the leading contributors to years lived with disability worldwide, with projections indicating that their burden will continue to rise (1-3). A growing body of research suggests that yoga can be an effective approach for managing pain across various conditions, particularly low back pain (4-8). At the same time, healthcare delivery has undergone rapid transformation with the expansion of telehealth. In this context, remotely delivered yoga interventions, provided either synchronously via videoconferencing or asynchronously through prerecorded videos, mobile applications, or other digital platforms, have emerged as an extension of traditional in-person programs (9). A recent scoping review conducted by our group (manuscript submitted) indicates that research on remote yoga for pain management is increasing, marked by methodological heterogeneity and a widening range of clinical applications. Overall, the available evidence suggests that such interventions are feasible, well accepted, and associated with a low risk of adverse events across different populations. However, despite this growing body of research, the effectiveness of remotely delivered yoga specifically for low back pain has not yet been synthesized, highlighting the need for a systematic review to provide more precise effect estimates and inform clinical and research practice.

**Condition being studied** The study will focus on low back pain, irrespective of pain cause, duration or intensity.

## METHODS

**Search strategy** Relevant terms and keywords were identified based on a preliminary literature search and previous work and subsequently adapted to meet the specific requirements and indexing systems of each database. The search string that will be used for Medline is shown below:

1. exp Yoga/ or yoga*.tw. or yogi*.tw. or asana*.tw. or pranayama.tw. or dhyana.tw.
2. exp Telemedicine/ or exp Telerehabilitation/ or exp Internet-Based Intervention/ or (telemedicine or telehealth).tw. or (mobile adj2 health).tw. or (digital adj2 health).tw. or ehealth.tw. or remote*.tw. or online.tw. or virtual.tw. or record*.tw. or (mobile adj2 app*).tw. or smartphone*.tw. or video*.tw.
3. exp Pain/ or exp Pain Management/ or exp Low Back Pain/ or exp Radiculopathy/ or exp Sciatica/ or pain.tw. or painful.tw. or backache*.tw or "radicul* pain".tw or "lumb* pain".tw
4. 1 AND 2 AND 3.

**Participant or population** Adults (≥18 years) with low back pain, irrespective of pain cause, intensity or duration. No gender or ethnicity restrictions will be applied. If a study includes mixed populations, eligible participants will be included in the review as long as data for this subgroup is available.

**Intervention** Any type of remotely delivered yoga intervention will be included in the review, including interventions conducted via any digital or telecommunication platform, in either synchronous or asynchronous formats. Hybrid interventions that combine in-person and remote delivery will be excluded. Limited direct contact with participants, such as brief introductory or setup sessions, will be acceptable, as long as the intervention is primarily delivered remotely. No restriction regarding yoga style, duration or frequency of the intervention will be applied. Studies will be included if yoga is the primary intervention. Studies combining yoga and other active components, including education, as part of a multi-modal program will not. Studies that refer to mindfulness-based interventions, including MBSR, will be excluded.

**Comparator** Comparator intervention may include any passive controls (e.g. no treatment, wait-list, usual care) or active non-yoga interventions as well as alternative yoga delivery formats. Alternative yoga delivery format comparisons include studies comparing remotely delivered yoga with in-person yoga, as well as studies comparing remote yoga delivery modalities (e.g. synchronous vs. asynchronous interventions). Because these comparisons address distinct research questions, they will be synthesized separately from effectiveness comparisons involving non-yoga comparators.

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

**Eligibility criteria** Inclusion:
- Adults (≥18 years)
- low back pain, irrespective of pain cause, intensity or duration
- remotely delivered yoga interventions in either synchronous or asynchronous formats
- RCT

Exclusion:
- Hybrid in-person and remote interventions
- Studies combining yoga and other active components, including education, as part of a multi-modal program
- Studies that refer to mindfulness-based interventions, including MBSR.

**Information sources** The following databases will be searched to identify relevant references: Medline/PubMed, Cochrane Library (both accessed via the OVID research platform), Embase, PsycINFO, CINAHL (all three accessed via EBSCOhost) and BASE (grey literature).

**Main outcome(s)** The following outcomes will be chosen as co-primary outcomes: pain intensity (e.g., as measured by visual analogue scales or the Brief-Pain Inventory) and back-specific disability (e.g., as measured by the Oswestry Disability Index or Roland-Morris Disability Questionnaire). Outcome data will be evaluated across three follow-up periods: short-term (less than 3 months after randomization), intermediate-term (3 to 12 months after randomization), and long-term (more than 12 months after randomization).

**Additional outcome(s)** Secondary outcomes will include health-related quality of life (e.g., Short Form 36) and adverse events.

**Data management** Following the search all identified citations will be collated and uploaded into TERA tool (10) and duplicates removed. Data will be extracted using Microsoft Excel, and statistical analyses will be performed in R and R Studio. Selection of sources of evidence will be performed in two stages by two independent

reviewers starting with titles and abstracts, followed by full texts. Reasons for exclusion at full text will be recorded and reported. Any disagreements between the reviewers at each stage of the selection process will be resolved through discussion, or with an additional reviewer.

**Quality assessment / Risk of bias analysis** The Cochrane risk of bias tool 2.0 will be used to perform the risk of bias analysis. The risk of bias for all included studies will be assessed by two authors independently. Disagreements between the reviewers will be resolved through discussion, or with an additional reviewer.

**Strategy of data synthesis** Pooled analyses are performed when at least two studies are available for a given outcome. For continuous outcomes, standardized mean differences (SMD) with 95% confidence intervals (CI) are calculated. When standard deviations are not available, they are calculated from standard errors, CI, or t values. For dichotomous outcomes, odds ratios (OR) are calculated with 95% CI (11,12). Hedges correction is utilized for small study samples (11,12). In the absence of data, an attempt is made to obtain the missing data from the authors. Random-effects models are calculated using the inverse variance method for continuous outcomes and the Mantel-Haenszel method for dichotomous outcomes (13), with between-study variance estimated using the restricted maximum likelihood (REML) estimator. Statistical heterogeneity between studies is examined using the $I^2$ statistic, $\tau^2$, and Cochran's Q test. Where appropriate, 95% prediction intervals are reported to reflect the expected dispersion of true effects across settings, and the robustness of findings is assessed using Hartung-Knapp-Sidik-Jonkman adjusted confidence intervals (14). Where sufficient studies are available, separate meta-analyses will be conducted according to comparator type, including passive controls, active controls, and delivery-modality comparisons (e.g., remotely delivered versus in-person yoga and synchronous versus asynchronous remote yoga interventions). If statistical heterogeneity is detected and at least 10 studies are included in the respective meta-analysis, subgroup analyses and meta-regressions are also performed to investigate possible reasons for heterogeneity (11-13). Publication bias will also be evaluated through funnel plots and Egger's test when at least 10 studies are available.

**Subgroup analysis** Given than enough studies are available, subgroup analyses will be performed based on pain duration (acute vs. chronic) and type of pain (specific vs. non-specific).

**Sensitivity analysis** Sensitivity analyses will be conducted for studies with high versus low risk of bias to test the robustness of significant results.

**Language restriction** None.

**Country(ies) involved** Germany.

**Keywords** yoga; low back pain; online; virtual; tele-yoga; telehealth; digital health; mobile health; eHealth.

**Dissemination plans** The review will be published in a peer reviewed scientific journal. Results of this review will be presented at scientific congresses.

**Contributions of each author**

Author 1 - Mirela-Ioana Bilc - MBI: conceptualization, design and coordination, creation of search strategy, study selection, data collection, data management, interpretation of data, writing - original draft of the registration and review.
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