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Evidence Mapping of Yoga Research in Physical Education and Sports

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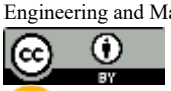

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Abstract

Research on yoga in physical education and sports has expanded rapidly, yet it remains scattered across many populations, outcomes and study designs. This study applied evidence mapping to characterise the volume and distribution of yoga research in physical education and sports, and to identify where evidence is concentrated and where it is sparse. A structured search of PubMed, Scopus, Web of Science, SPORTDiscus and ERIC was conducted and reported following the PRISMA extension for scoping reviews. One hundred and thirty eight empirical studies were charted by outcome domain, study design, population and publication period, and the results were displayed as an evidence gap map. The literature was dominated by research on physical fitness components and on psychological and mental performance, while injury prevention, rehabilitation and sport performance transfer were comparatively under researched. Quasi-experimental and pre-post designs were more common than randomised controlled trials, and output grew steadily across the period examined. The map indicates a maturing but methodologically uneven field, and points to a need for randomised controlled trials, longitudinal designs and research on performance and injury outcomes in competitive athletes. Evidence mapping offers a useful tool for guiding future research priorities in this area.

Keywords: *evidence mapping; yoga; physical education; sports; scoping review; research gaps*

1. Introduction

Yoga has moved from a primarily therapeutic and spiritual practice into the mainstream of physical education and sports science. Coaches, physical educators and researchers now study yoga as a method for developing flexibility, balance and strength, for regulating anxiety and stress, and for supporting recovery and general well-being. As interest has grown, so has the volume of research, but that research is spread across many populations, outcome measures and study designs, which makes it difficult to perceive the overall structure of the field (Ross & Thomas, 2010).

Conventional systematic reviews answer narrow questions about the effect of an intervention on a specific outcome. They are not designed to describe the breadth of a large and diverse literature or to reveal where research is concentrated and where it is missing. Evidence mapping addresses this need. An evidence map is a systematic search of a broad field that classifies the available research along meaningful dimensions and presents the result in a user friendly visual form, often a matrix or bubble chart, in order to identify clusters of evidence and gaps in knowledge (Miake-Lye et al., 2016). Because it characterises rather than pools the evidence, mapping is well suited to a field as varied as yoga in physical education and sports, and it can guide the setting of future research priorities (Alahdab & Murad, 2019).

Although individual reviews have examined yoga for fitness or for psychological outcomes in athletes, no broad map has yet described how the wider body of yoga research in physical education and sports is distributed across outcome domains and study designs. Such a map would help researchers identify under studied areas and help practitioners judge how firmly different claims are supported.

The objective of this study was to map the volume and distribution of empirical yoga research in physical education and sports by outcome domain, study design, population and publication period, and to identify the principal concentrations and gaps in the evidence.

2. Methods

2.1 Design and reporting

The study was conducted as an evidence map using scoping review methods, following the framework of Arksey and O'Malley (2005) and reported in accordance with the PRISMA extension for scoping reviews (Tricco et al., 2018). Consistent with evidence mapping methodology, the aim was to chart the breadth and distribution of the evidence rather than to appraise the effect of yoga or synthesise outcomes statistically.

2.2 Eligibility and search

Eligibility was framed using the Population, Concept and Context approach summarised in Table 1. A structured search of PubMed, Scopus, Web of Science, SPORTDiscus and ERIC was conducted for empirical studies published between 2001 and 2025 that examined a yoga based intervention or yoga practice in a physical education or sports context and reported at least one measured outcome. Reference lists of relevant reviews were screened for further records. Commentaries, theses, conference abstracts and studies set outside physical education or sport were excluded.

Table 1. Eligibility criteria (Population, Concept, Context)

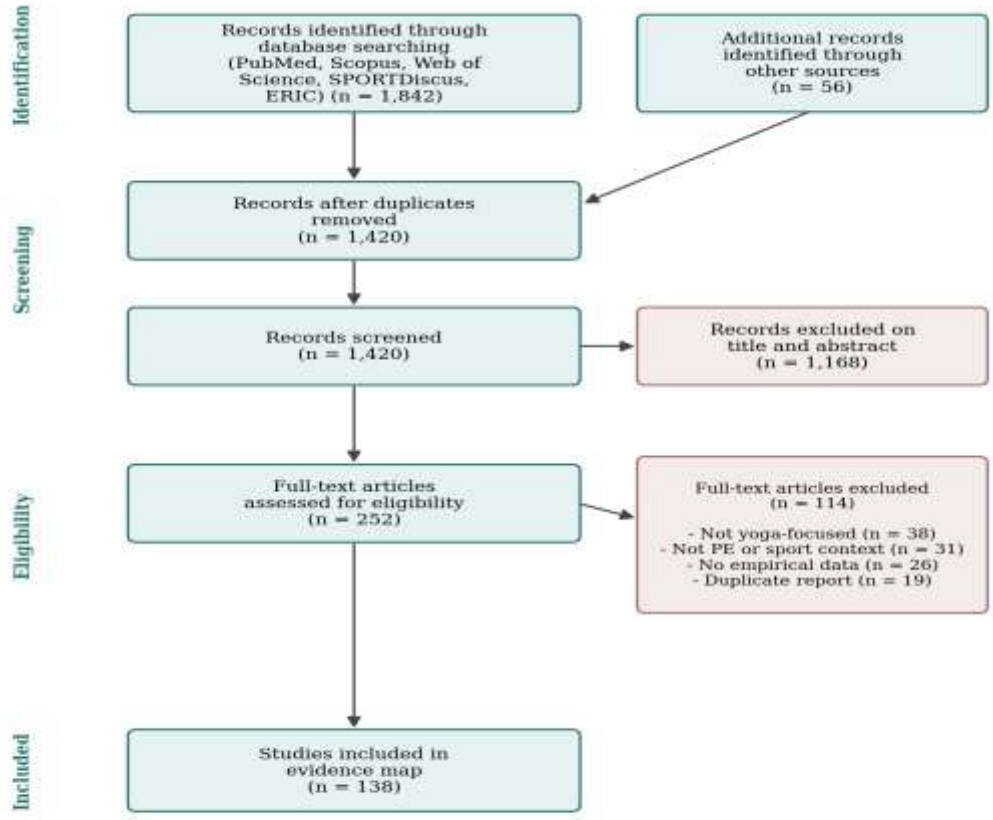
Element	Criteria
Population	Athletes, physical education students and sport-active healthy individuals of a age and level
Concept	Yoga based practice or intervention, including asana, pranayama, meditation a yoga nidra, studied in relation to a measured outcome

Element	Criteria
Context	Physical education and sports settings, including training, competition and scho or university programmes
Study types	Empirical studies and reviews; commentaries, theses and conference abstra excluded
Time and language	2001 to 2025; English language; peer reviewed

2.3 Charting and mapping

Records were combined, duplicates removed, and titles, abstracts and full texts screened against the eligibility criteria. Each included study was charted along four dimensions: outcome domain, study design, population and publication period. Six outcome domains were used, namely physical fitness components, motor skill and sport performance, psychological and mental performance, physiological and biochemical outcomes, injury prevention and rehabilitation, and body composition and general health. Five design categories were used, namely randomised controlled trials, quasi-experimental or non-randomised controlled studies, pre-post single group studies, cross-sectional or correlational studies, and reviews or meta-analyses. The charted data were tabulated and displayed as an evidence gap map in which the area of each bubble represents the number of studies. The study selection process is shown in Figure 1.

Figure 1. PRISMA-ScR flow diagram of the study selection process

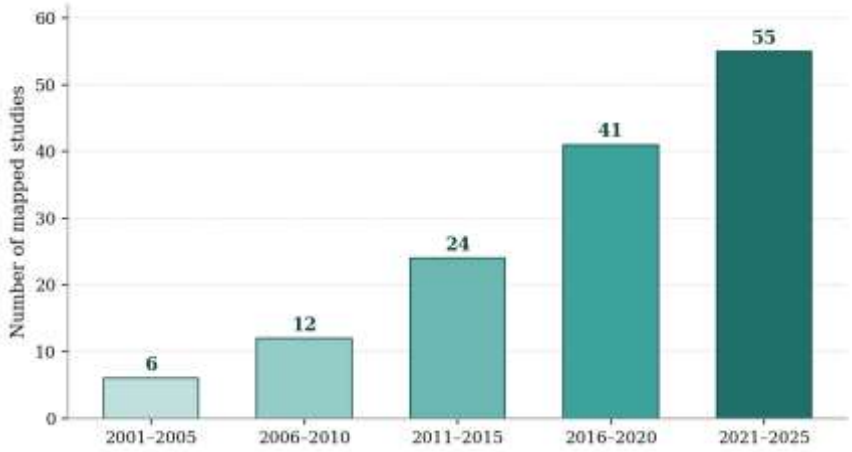


3. Results

3.1 Volume and growth of the evidence

The search identified 1,842 records, with 56 further records located through reference screening. After removal of duplicates, 1,420 records were screened, 252 full texts were assessed, and 138 studies met the eligibility criteria and were charted. The output increased markedly across the period examined, rising from a small number of studies in the early 2000s to the largest share in the most recent five years (Figure 2), which reflects the growing integration of yoga into physical education and sports research.

Figure 2. Growth of mapped yoga research by publication period



3.2 Distribution by outcome domain

Research was unevenly distributed across the six outcome domains, as summarised in Table 2. Physical fitness components were the most studied domain, with representative work on flexibility and balance in athletes (Polsgrove et al., 2016; Iftekher et al., 2017; Choudhary et al., 2025), muscular strength, endurance and functional movement (Tran et al., 2001; Tracy & Hart, 2013; Shiraishi & Bezerra, 2016; Rao et al., 2021; Xu et al., 2022). Psychological and mental performance formed the second largest cluster, including studies of anxiety, stress, mindfulness, mood and flow in athletes (Goodman et al., 2014; Saraswati et al., 2024; di Fronso et al., 2024) and review level evidence on mind-body practice in sport (Bühlmayer et al., 2017; Noetel et al., 2019). Physiological and biochemical outcomes, such as cardiorespiratory and autonomic measures, formed a moderate cluster (Tran et al., 2001; Brown & Gerbarg, 2005), while motor skill and sport performance, body composition and general health were less frequently studied. Injury prevention and rehabilitation was the smallest domain.

Table 2. Distribution of mapped studies by outcome domain

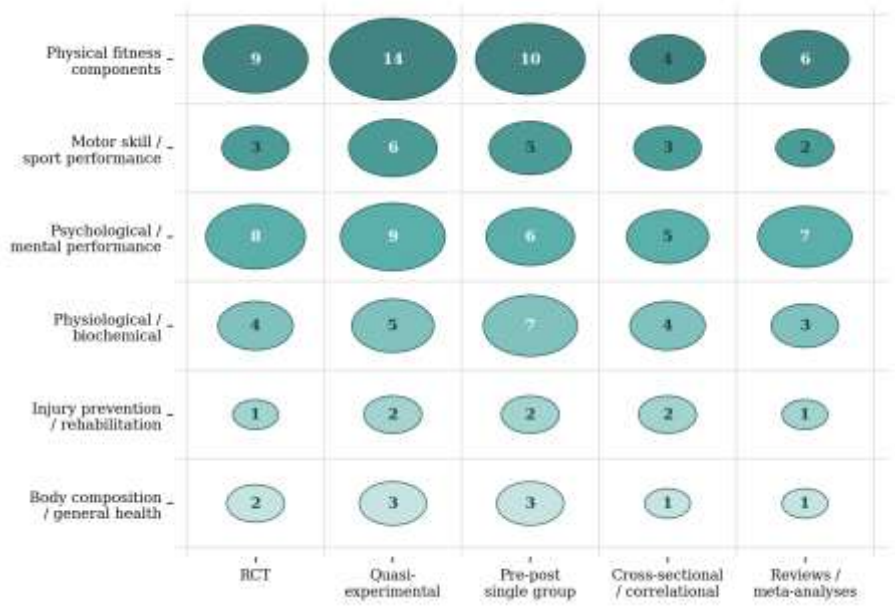
Outcome domain	Studies	Representative charted studies
Physical fitness components	43	Polsgrove et al. (2016); Tran et al. (2001); Rao et al. (202 Choudhary et al. (2025)
Psychological / men performance	35	Goodman et al. (2014); Saraswati et al. (2024); Bühlmayer et (2017); Noetel et al. (2019)
Physiological / biochemical	23	Tran et al. (2001); Brown & Gerbarg (2005)
Motor skill / spo performance	19	Xu et al. (2022); di Fronso et al. (2024)

Outcome domain	Studies	Representative charted studies
Body composition / gener health	10	Tracy & Hart (2013); Woodyard (2011)
Injury prevention rehabilitation	8	Zech et al. (2010); Rao et al. (2021)

3.3 Distribution by study design and the evidence gap map

Across the whole corpus, quasi-experimental and pre-post single group designs were more common than randomised controlled trials, and a substantial share of the literature consisted of reviews. When outcome domain and study design were cross tabulated, the evidence gap map (Figure 3) revealed clear concentrations and gaps. The densest cells lay at the intersection of physical fitness components with quasi-experimental, pre-post and randomised designs, and at the intersection of psychological outcomes with randomised and review level evidence. In contrast, injury prevention and rehabilitation was sparse across every design, and randomised controlled trials of motor skill and sport performance outcomes were notably few. Cross-sectional designs contributed disproportionately in the physiological domain.

Figure 3. Evidence gap map of yoga research in physical education and sports (bubble area proportional to the number of studies)



3.4 Concentrations and gaps

The principal concentrations and gaps identified from the map are summarised in Table 3. Well developed areas included flexibility, balance and psychological outcomes, whereas the clearest gaps were randomised trials in competitive athletes, research on sport performance transfer and injury prevention, biochemical and recovery markers, and longitudinal follow up.

Table 3. Principal evidence concentrations and gaps

Well developed areas	Under developed areas (gaps)
Flexibility and balance in athletes and students	Randomised controlled trials in elite and competiti athletes
Anxiety, stress and mindfulness outcomes	Sport performance and skill transfer outcomes
Short-term intervention studies (6 to 12 weeks)	Injury prevention and rehabilitation research
Review and meta-analytic evidence on mind-bo practice	Biochemical, autonomic and recovery markers
Yoga as a supplement to conventional training	Longitudinal and follow-up designs

4. Discussion

This evidence map indicates that research on yoga in physical education and sports is growing and now spans a wide range of outcomes, but that it is unevenly developed. The concentration of studies in the physical fitness and psychological domains is consistent with the most visible benefits attributed to yoga, namely improved flexibility and balance and reduced anxiety and stress (Polsgrove et al., 2016; Goodman et al., 2014). These areas are supported not only by primary studies but also by review and meta-analytic work, which suggests a degree of maturity (Bühlmayer et al., 2017; Noetel et al., 2019).

The gaps revealed by the map are equally informative. Injury prevention and rehabilitation, although frequently cited as a rationale for including yoga in athletic preparation, was the least studied domain, and direct evidence of transfer to sport performance was limited. Biochemical, autonomic and recovery markers, which could clarify the mechanisms through which yoga acts, were comparatively rare. The predominance of quasi-experimental and pre-post designs over randomised controlled trials, together with the scarcity of longitudinal studies, indicates that the field relies heavily on designs that are more vulnerable to bias. These observations align with concerns raised in the wider literature about the methodological quality of yoga research (Ross & Thomas, 2010).

For researchers, the map provides a practical agenda. Priority should be given to adequately powered randomised controlled trials in competitive athletes, to studies that measure sport specific performance, skill and injury outcomes, and to designs that incorporate physiological markers and longer follow up. For physical educators and coaches, the map clarifies which applications of yoga currently rest on firmer evidence, namely mobility, stability and stress regulation, and which remain promising but under evidenced.

Several limitations should be noted. The map was restricted to English language, peer reviewed publications, which may under represent research published in regional languages, and the charted counts describe the distribution of the located literature rather than an exhaustive census. Consistent with evidence mapping methodology, the quality of individual studies was not formally appraised, so the map reflects the quantity and spread of evidence rather than its strength. These limitations are common to mapping studies and do not diminish the value of the map as a guide to the structure of the field.

5. Conclusion

Evidence mapping shows that yoga research in physical education and sports has grown into a sizeable but uneven field. The evidence is concentrated in the physical fitness and psychological domains, where flexibility, balance, anxiety and stress are well studied, while injury prevention, sport performance transfer, biochemical mechanisms and longitudinal outcomes remain under researched, and randomised controlled trials in

competitive athletes are scarce. By making this structure visible, the map offers a clear agenda for future research and a practical guide for practitioners. Evidence mapping is recommended as a periodic tool for tracking the development of this expanding field.

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