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Influence Of Yoga And Exercise On Muscle Flexibility, Quality Of Life And Functional Outcomes In Sedentary Adults: A Narrative Review

*Ruchika Pal[1], Mohit Faujdar [2], Aditi Singh[3]

*Corresponding and first author-

Author List:

1 Associate Professor, Department of Physiotherapy, Jagannath University. Jaipur, Rajasthan, India

2 BPT Final year, Department of Physiotherapy, Jagannath University, Jaipur, Rajasthan, India

3 Professor, Department of Physiotherapy, Jagannath University, Jaipur, Rajasthan, India,

Abstract

Sedentary lifestyle has emerged as a major public health concern globally, contributing to musculoskeletal dysfunction, decreased flexibility, impaired functional performance, and reduced quality of life (QOL). Non-pharmacological interventions such as yoga and conventional exercise have gained increasing attention for improving physical and psychological well-being. The present narrative review aims to evaluate the influence of yoga and exercise on muscle flexibility, QOL, and functional outcomes in sedentary adults. Literature was searched through PubMed, Google Scholar, Scopus, and related databases for studies published between 2010 and 2025. Evidence suggests that both yoga and exercise significantly improve flexibility, muscular function, balance, mobility, and health-related QOL. Yoga demonstrates additional benefits through mindfulness, breathing regulation, stress reduction, and holistic wellness. Conventional exercise is particularly effective in improving strength, endurance, and cardiovascular fitness. Recent Scopus-indexed studies indicate that integrated yoga-based interventions may provide superior outcomes in physical and mental health compared to isolated exercise programs. Despite promising evidence, methodological heterogeneity, small sample sizes, and variability in intervention protocols remain major limitations across studies. Future large-scale randomized controlled trials with standardized outcome measures are recommended. Integration of yoga into physiotherapy and rehabilitation programs may offer a comprehensive strategy for improving health outcomes in sedentary Adults.

Keywords: Yoga, Exercise, Flexibility, Quality of Life, Functional Outcome, Sedentary Lifestyle, Physiotherapy.

1. Introduction

Sedentary lifestyle is characterized by prolonged sitting, reduced physical activity, and low energy expenditure. Rapid urbanization, technological advancements, and occupational changes have significantly increased sedentary behaviour across all age groups. According to the World Health Organization, physical inactivity is among the leading risk factors for global mortality and is strongly associated with obesity, cardiovascular disease, musculoskeletal disorders, diabetes, and mental health conditions. [1]

Sedentary individuals frequently experience reduced muscle flexibility, decreased joint mobility, poor postural alignment, muscular imbalance, and diminished physical function. Prolonged inactivity leads to adaptive shortening of muscles, especially hamstrings, hip flexors, and lumbar extensors, resulting in restricted movement patterns and increased injury risk. [2] Stretching and mobility deficits also contribute to reduced efficiency in activities of daily living (ADLs). Recent evidence demonstrates that reduced flexibility negatively influences gait, balance, proprioception, and neuromuscular coordination. [3]

Quality of life (QOL) is a multidimensional construct involving physical health, psychological state, emotional stability, independence, social participation, and overall well-being. Sedentary behaviour adversely affects QOL through increased fatigue, stress, depression, anxiety, sleep disturbances, and reduced self-esteem. [4] Consequently, there is growing interest in non-pharmacological interventions capable of improving both physical and mental health outcomes.

Conventional exercise programs, including aerobic training, resistance exercises, flexibility exercises, and functional training, have been widely recommended to improve physical fitness and prevent chronic disease. Exercise improves muscular strength, endurance, cardiovascular fitness, flexibility, and metabolic health. Studies consistently report that structured exercise programs enhance mobility, physical function, and independence in sedentary populations. [5] However, adherence to exercise programs remains a challenge due to lack of motivation, fatigue, and psychological barriers.

Yoga is an ancient mind-body practice originating in India that combines physical postures (asanas), breathing techniques (pranayama), relaxation, and meditation. Unlike conventional exercise, yoga integrates physical movement with mental awareness and emotional regulation. Growing evidence indicates that yoga positively influences flexibility, muscular strength, balance, posture, autonomic function, and psychological well-being. [6] Yoga has also been associated with reduced stress hormones, improved sleep quality, enhanced parasympathetic activity, and better emotional resilience. [7]

Recent Scopus-indexed systematic reviews and meta-analyses suggest that yoga significantly improves lower-body flexibility, balance, muscular strength, and health-related QOL in sedentary and aging populations. [8] Furthermore, yoga-based interventions have demonstrated beneficial effects in chronic disease management, mental health, osteoarthritis, and rehabilitation settings. [9]

Although both yoga and exercise independently improve health outcomes, there remains limited literature critically analysing their combined and comparative influence on flexibility, QOL, and functional outcomes in sedentary adults. Therefore, the purpose of this narrative review is to evaluate current evidence regarding yoga and exercise interventions and their implications for physiotherapy and rehabilitation practice.

2. Methodology

This narrative review was conducted to evaluate the influence of yoga and exercise on muscle flexibility, quality of life (QOL), and functional outcomes in sedentary adults. The review aimed to summarize and critically analyse the currently available evidence from published literature related to physiotherapy, rehabilitation, and mind-body interventions.

The methodology of this review followed a structured approach involving literature identification, screening, selection, and synthesis of relevant studies. Electronic databases including PubMed, Google Scholar, Scopus, MEDLINE, and Web of Science were searched to identify relevant articles published between 2010 and 2025. [10]

The selected time frame was chosen to include recent advancements and updated evidence regarding yoga and exercise interventions in sedentary populations.

Studies included randomized controlled trials (RCTs), systematic reviews, meta-analyses, cohort studies, observational studies, and narrative reviews assessing the effects of yoga and/or exercise on flexibility, QOL, balance, mobility, posture, muscular strength, and functional performance in sedentary adults. Both male and female participants aged 18 years and above were considered.

Only articles published in English language were included in this review. Studies involving athletes, paediatric populations, neurological disorders, acute traumatic injuries, or highly active individuals were excluded to maintain homogeneity of sedentary adult populations. Studies lacking relevant outcome measures or insufficient methodological details were also excluded. [11]

The primary outcomes analysed in this review included: Muscle flexibility, Joint mobility, Quality of life (QOL),Functional outcomes ,Balance and posture, Physical performance.

Secondary outcomes included psychological well-being, stress reduction, sleep quality, and overall physical fitness.

The selected articles were critically evaluated based on study design, sample size, intervention duration, outcome measures, and clinical relevance. Emphasis was placed on evidence from Scopus-indexed and PubMed-indexed journals to ensure scientific validity and quality of evidence. [12]

Due to heterogeneity in intervention protocols, yoga styles, exercise programs, and outcome assessment tools, a narrative synthesis approach was adopted instead of quantitative meta-analysis. The findings were organized into thematic categories including flexibility, QOL, functional outcomes, and comparative effects of yoga and exercise.

A comprehensive literature search was performed using electronic databases including PubMed, Google Scholar, Scopus, MEDLINE, and Web of Science. The search was conducted between January 2025 and April 2026. Keywords and Medical Subject Headings (MeSH) terms were used individually and in combination to retrieve relevant studies. [13]

The literature search was conducted using electronic databases including PubMed, Google Scholar, Scopus, MEDLINE, and Web of Science. Various keywords and Medical Subject Headings (MeSH) terms related to the review topic were used to identify relevant studies. The primary search terms included “Yoga,” “Exercise,” “Sedentary lifestyle,” “Sedentary adults,” “Muscle flexibility,” “Range of motion,” “Quality of life,” “Functional outcome,” “Physical activity,” “Mind-body exercise,” “Physiotherapy rehabilitation,” “Balance,” “Mobility,” and “Posture.” To refine the search process and improve retrieval of relevant articles, Boolean operators such as “AND” and “OR” were applied in different combinations. Examples of search strategies included “Yoga AND flexibility in sedentary adults,” “Exercise AND quality of life,” “Yoga OR exercise AND functional outcomes,” and “Sedentary lifestyle AND physiotherapy rehabilitation.” Additional manual searching of reference lists from

selected articles and review papers was also performed to identify relevant studies that were not captured during the initial database search. [13] [14]

The final selection of studies was based on relevance to the review objectives, methodological quality, and availability of full-text articles. Priority was given to peer-reviewed studies indexed in PubMed and Scopus databases.

Studies included in this narrative review involved sedentary or physically inactive adults aged 18 years and above. Research articles assessing the effects of yoga and/or exercise interventions on outcomes such as muscle flexibility, quality of life (QOL), mobility, balance, posture, and physical function were considered eligible for inclusion. Randomized controlled trials, systematic reviews, meta-analyses, observational studies, and comparative studies published in peer-reviewed journals were included to ensure comprehensive evaluation of the available evidence. [15] Studies focusing on physiotherapy rehabilitation and mind-body interventions related to sedentary lifestyles were also considered relevant for this review. [16]

Studies were excluded if they involved paediatric populations, athletic or highly physically active individuals, or participants with conditions unrelated to sedentary behaviour. Non-English publications were excluded due to language limitations. Additionally, case reports lacking standardized outcome measures, conference abstracts without full-text availability, and studies with insufficient methodological details were excluded to maintain the quality and reliability of evidence included in the review. [17]

Results:

A comprehensive search of electronic databases including PubMed, Google Scholar, Scopus, MEDLINE, and Web of Science identified relevant studies evaluating the effects of yoga and exercise on muscle flexibility, quality of life (QOL), mobility, balance, and functional outcomes in sedentary adults. After screening titles, abstracts, and full-text articles based on the inclusion and exclusion criteria, studies with appropriate methodological quality and relevant outcome measures were included in this narrative review. [18]

The selected studies consisted of randomized controlled trials, systematic reviews, meta-analyses, and observational studies published between 2010 and 2025. Most studies reported significant improvements in flexibility, muscular strength, posture, balance, physical function, and QOL following yoga and exercise interventions. Yoga-based interventions demonstrated additional psychological benefits, including stress reduction, improved emotional well-being, and better sleep quality. Conventional exercise interventions primarily improved strength, endurance, cardiovascular fitness, and functional independence. [19]

The duration of interventions across studies ranged from 4 weeks to 12 months, with session frequencies varying between 2 and 6 sessions per week. Outcome measures commonly used included Sit-and-Reach Test, SF-36 Quality of Life Questionnaire, Berg Balance Scale, Functional Reach Test, Range of Motion (ROM), Timed Up and Go (TUG) Test, and posture assessment scales. [20]

Author & Year	Study Design	Population	Intervention	Outcome Measures	Major Findings
Tran et al., 2001[4]	Experimental study	Sedentary adults including both males and females with low physical activity levels	Structured yoga program including asanas, breathing exercises, and relaxation techniques	Muscle flexibility, balance, muscular endurance, physical fitness	Significant improvements were observed in flexibility, balance, joint mobility, and muscular endurance. Yoga improved postural stability and overall physical fitness in sedentary individuals.
Cowen & Adams, 2010[5]	Observational study	Healthy sedentary adults with minimal exercise experience	Yoga sessions involving stretching, postural training, breathing control, and relaxation	Physical fitness, flexibility, psychological well-being, stress perception, posture	Yoga improved flexibility, posture, muscular control, and emotional well-being. Participants also experienced reduced stress and improved mental relaxation.
Ross & Thomas, 2010[6]	Review study	Adults from healthy and sedentary populations	Comparison of yoga-based practices and conventional exercise programs	Quality of life, physical fitness, mental health, cardiovascular fitness, flexibility	Both yoga and exercise improved physical health, but yoga demonstrated greater benefits in stress reduction, emotional regulation, and

					mind-body wellness.
Cramer et al., 2013[7]	Systematic review	Adults from clinical and non-clinical populations	Different yoga styles including Hatha yoga and integrated yoga therapy	Health-related quality of life, stress, anxiety, depression, physical function	Yoga significantly improved quality of life, emotional stability, stress reduction, and physical functioning across multiple populations.
Behm et al., 2016[2]	Review study	Adults and physically inactive individuals	Static stretching, dynamic stretching, flexibility exercises, and resistance training	Range of motion, muscle flexibility, neuromuscular performance, movement efficiency	Stretching interventions significantly improved flexibility and ROM, reduced muscular stiffness, and enhanced postural control and movement efficiency.
Sivaramakrishnan et al., 2019[8]	Systematic review and meta-analysis	Older sedentary adults	Structured yoga sessions focusing on flexibility, breathing, and relaxation	Physical function, balance, flexibility, quality of life	Yoga significantly improved flexibility, balance, lower-body strength, mobility, and health-related quality of life in older adults.
Warburton & Bredin, 2016[5]	Narrative review	Sedentary adults and general populations	Aerobic exercise, resistance training, and physical activity programs	Functional health, mobility, cardiovascular fitness, physical function	Exercise improved mobility, muscular strength, cardiovascular fitness, and reduced the risk of chronic diseases while promoting

					functional independence.
Lohmann et al., 2024[3]	Systematic review	Adults and sedentary populations	Static and dynamic stretching interventions	Balance, range of motion, postural control, functional mobility	Stretching interventions positively affected balance, flexibility, ROM, and postural stability, improving neuromuscular coordination and functional performance.
Biswas et al., 2024[9]	Meta-analysis	Adults with musculoskeletal conditions and sedentary lifestyles	Therapeutic yoga postures, breathing exercises, mindfulness practices	Pain, mobility, physical function, quality of life	Yoga significantly improved mobility, reduced pain, enhanced physical function, and improved quality of life in adults with musculoskeletal conditions.
Wang et al., 2025[10]	Umbrella review	Adults with chronic diseases and sedentary behaviours	Various yoga interventions including asanas, meditation, and pranayama	Functional health, physical performance, mental health, quality of life	Yoga improved flexibility, mobility, emotional well-being, physical performance, and overall functional health across chronic disease populations.

Discussion

The present narrative review evaluated the influence of yoga and exercise on muscle flexibility, quality of life (QOL), and functional outcomes in sedentary adults. The findings from the reviewed literature indicate that both yoga and conventional exercise interventions produce significant improvements in physical and psychological health parameters. However, yoga appears to provide a more holistic benefit due to the integration of physical activity, breathing control, relaxation, and mindfulness techniques. [22]

Sedentary behavior is strongly associated with reduced flexibility, impaired posture, muscular imbalance, and diminished physical performance. Prolonged sitting and physical inactivity contribute to adaptive muscle shortening, decreased joint mobility, and reduced neuromuscular efficiency. [23] the reviewed studies consistently demonstrated that yoga and exercise interventions effectively counteract these negative effects by improving range of motion (ROM), muscular extensibility, and functional mobility.

Tran et al.[4] reported significant improvements in flexibility, balance, and muscular endurance following structured yoga practice among sedentary adults. Similar findings were observed by Cowen and Adams[5], who demonstrated enhanced flexibility and psychological well-being after yoga interventions. These improvements may be attributed to sustained stretching postures, controlled breathing, and increased body awareness associated with yoga practice.

Conventional exercise interventions also demonstrated beneficial effects on physical function and mobility. Warburton and Bredin[5] highlighted that regular physical activity improves cardiovascular fitness, muscular strength, endurance, and overall functional independence. Exercise-based interventions involving stretching and strengthening exercises were particularly effective in improving physical fitness and reducing functional limitations in sedentary populations.

The current review also identified that yoga provides substantial psychological benefits in addition to physical improvements. Cramer et al.[7] found significant improvements in health-related QOL, stress reduction, emotional stability, and mental well-being following yoga interventions. Yoga's emphasis on mindfulness, meditation, and breathing regulation may positively influence autonomic nervous system activity, thereby reducing stress and anxiety levels. [24] These findings support the growing role of yoga as a complementary intervention in physiotherapy and rehabilitation settings.

Flexibility was one of the most consistently improved outcomes across the reviewed studies. Behm et al.[2] and Lohmann et al.[3] demonstrated that stretching and flexibility training significantly enhance ROM, postural stability, balance, and movement efficiency. Yoga interventions specifically improved lower-body flexibility, spinal mobility, and balance through repetitive stretching and postural alignment techniques. Sivaramakrishnan et al.[8] further concluded that yoga improves flexibility, balance, and mobility in sedentary and aging populations, thereby reducing fall risk and enhancing functional independence.

Functional outcomes, including balance, posture, gait, and mobility, were also positively influenced by both yoga and exercise interventions. Improved flexibility and muscular coordination contribute to enhanced performance of activities of daily living (ADLs). Yoga-based interventions demonstrated additional benefits in proprioception and neuromuscular control due to the mindful execution of movements and emphasis on postural awareness. [25]

The reviewed literature also suggests that yoga may be particularly beneficial for individuals who experience poor adherence to conventional exercise programs. Since yoga combines relaxation and mental well-being with physical activity, it may improve motivation, participation, and long-term compliance. [26] This holistic approach may explain the superior psychological outcomes observed in yoga interventions compared to conventional exercise alone.

Despite the positive findings, several methodological limitations were identified in the reviewed studies. Considerable heterogeneity existed regarding intervention duration, yoga styles, exercise protocols, outcome measures, and participant characteristics. Most studies involved relatively small sample sizes and short intervention periods, limiting the generalizability of findings. Furthermore, variability in assessment tools for QOL and flexibility made direct comparisons across studies difficult. [27]

Another limitation is the lack of standardized yoga protocols across studies. Different yoga styles, including Hatha yoga, integrated yoga therapy, and therapeutic yoga, were used with varying intensities and session frequencies. Similarly, exercise interventions differed substantially in type and duration. Future studies should aim to establish standardized intervention protocols and long-term follow-up assessments.

From a physiotherapy perspective, integrating yoga with conventional exercise may provide optimal outcomes for sedentary adults. Exercise interventions can effectively improve muscular strength, endurance, and cardiovascular fitness, while yoga contributes additional benefits in flexibility, balance, stress management, and emotional well-being. Therefore, a combined rehabilitation approach may address both physical and psychological aspects of sedentary behaviour more comprehensively. [28]

Overall, the findings of this narrative review support the effectiveness of both yoga and exercise in improving flexibility, QOL, and functional outcomes in sedentary adults. However, yoga demonstrates broader holistic benefits, making it a valuable adjunct in physiotherapy rehabilitation and health promotion programs.

Limitations

This narrative review has several limitations. The included studies showed considerable heterogeneity in study design, intervention protocols, duration, sample size, and outcome measures, making direct comparison difficult. Most studies involved small sample populations and short-term interventions, limiting the generalizability of findings. Only English-language articles were included, which may have excluded relevant studies published in other languages. Additionally, variations in yoga styles, exercise intensity, and assessment tools for flexibility and quality of life may have influenced the reported outcomes. Since this review is narrative in nature, quantitative analysis and meta-analysis were not performed.

Conclusion

This narrative review concludes that both yoga and conventional exercise are effective in improving muscle flexibility, quality of life (QOL), and functional outcomes in sedentary adults. Yoga provides additional psychological and holistic benefits through relaxation and mindfulness, while exercise primarily enhances strength and physical fitness. Integrating yoga and exercise into physiotherapy rehabilitation programs may help improve overall physical and mental well-being in sedentary populations.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this narrative review.

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