

Effect of Yoga and Exercises to improve Physical Function and Quality of Life in Elderly: A Systematic Review of Randomized Controlled Trials

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Abstract

Introduction: Aging is a natural process associated with many functional and structural changes. These changes include impaired self-regulation, changes in tissues organs and also affects mood, physical status and social activity. There are adverse changes in cognitive behaviour, perceived sensation and thinking process. Regular physical activity can alleviate many health problems, yet many older adults are inactive. Yoga is one of the scientific and popular lifestyle practice considered as the integration of mind, body and soul¹.

However, there is scarcity of scientific information where yoga's effect is examined on overall well being and on multiple health outcomes simultaneously in elderly. Therefore, we conducted this systematic review of available RCT,s on this subject.

Methods: We performed a systematic search of RCT's published between 2015-2020 in English language using database including Pubmed Medline, Google scholar studies conducted on older adults with physical ability. QOL and physical function as intended outcomes have been included. Data extraction, critical appraisal was done and decisions on quality of life were made on mental consensus.

Results: Out of all identified studies, only 4 studies comprising 275 participants fulfilled the inclusion criteria and met the quality assessment. 3 month follow-up done, Yoga group had a higher score compared with the control group (mean difference 0.9, 95 % CI, 0.3 to 2.0). Yoga group also had superior health status and mental well being (Vs. Control) at 3 months, with mean differences in QOL scores of 0.12(95% CI 0.03 to 0.21) and 6 (95% CI, 1 to 11) respectively. We anticipate that practicing yoga will improve well being and mental health.

Conclusion: The adapted yoga programme appeared to be feasible and potentially beneficial in terms of improving mental and social wellbeing and health related quality of life in elderly people.

Keywords: Yoga, Exercise, Elderly, Quality of Life, Physical and Mental Wellbeing, Systematic Review

Introduction

The world's population is ageing. Virtually every country in the world is experiencing growth in the number and proportion of older persons in their population. Globally, the population aged 65 and over is growing faster than all other age groups¹.

Population ageing is poised to become one of the most significant social transformations of the twenty-first century. Older persons are increasingly seen as contributors to development, whose abilities to act for the betterment of themselves and their societies should be woven into policies and programmes at all levels⁴.

Physical activity plays an important role in reducing the risk of chronic disease and disability with increasing age and promoting independence in older age as it impacts on both physical and mental health⁶.

Yoga is a mind-body physical activity that includes a combination of stretching and holding movements and postures. Yoga is growing in popularity among older people and is associated with significant health benefits such as improved strength, flexibility, balance and mobility and mood. The physical and mental benefits associated with yoga suggest that it has the potential to produce improvements in the overall quality of life¹².

Quality of Life (QOL) is a multi dimensional concept that incorporates the different domains of health; physical, mental, emotional and social functioning and how these impact on overall health status. QOL encompasses more than just direct measures of population health, life expectancy and causes of death, and acknowledges that an individual's capacity to interact and participate with their environment is important for maximizing overall quality of life³.

The current systematic review aimed to answer the following questions:

1. What is the effect of yoga on QOL in elderly
2. What is the effect of exercises on improvement of physical function in elderly

In order to make recommendations based on the highest level of evidence, this review only included randomized controlled trials (RCTs).

Materials and Methods

We have conducted systematic review methods on yoga and exercises, physical function and QOL. Studies were reported as per PRISMA guidelines.

We performed a systematic search in electronic databases including PUBMED, MEDLINE, GOOGLE SCHOLAR, MENDELIC. The review explored studies published between 2015-2020 in English language with all identified index terms and key words. For search in different databases following key words and MESH terms were used in combinations. Yoga, exercises, physical function, QOL, elderly and RCTs. The search was also extended to peerreviewed journals and references of similar studies were also reviewed thoroughly to gather maximum number of eligible studies for this systematic review.

Inclusion Criteria

1. Design: Randomized Controlled Trials
2. Participants: 65 years and above
3. Interventions: Yoga, Physical Exercises. No limitation was placed on the type, duration and frequency of yoga programme.
4. Control: No intervention, usual care or wait list control.
5. Outcome Measured: Physical Function and Quality of Life

Two reviewers (DPD & MLJ) independently searched and did screening of the records for title and abstracts. Later, full text articles were extracted and assessed to identify eligibility for inclusion by two reviewers (KBNP & DPD) independently. Two reviewers (KBNP & MTA) cross checked all the data and solves any discrepancy between two reviewers if present.

Randomized Controlled Trials which were included in this systematic review were from United Kingdom, Austria & Sweden & Brazil.

A total of 529 studies (excluding duplicates) were identified. After screening, 4 eligible randomized controlled trials were included for our systematic review to evaluate the effect of yoga and exercises on physical function & QOL.

Characteristics of included studies

The four studies included in the systematic review had a total of 275 participants. Table 1 provides a summary of the characteristics of trials including the participant's age, gender, intervention details, results and outcome measures.

S. NO:	TOTAL SAMPLE	GROUP	NO: OF SUBJECTS
1	52	Intervention Group	25
		Control Group	27
2	80	Intervention Group	39
		Control Group	41
3	91	Intervention Group	61
		Control Group	30
4	52	Intervention Group	26
		Control Group	26
TOTAL			275

Participants

The mean age of participants ranged from 60 to 80 years. Participants were recruited from both community and residential aged care settings. Three of the studies included participants who were healthy community dwelling older adults, one recruited participants with Osteoporosis. Both men and women were included in all but two studies which included females only and 76% (312/406) of included were female.

Intervention

In all studies, the experimental group received a physical yoga and/or exercises intervention. The included yoga styles were asana, pranayama, relaxation techniques, mental focus and philosophy; Participants in the yoga group attended ten yoga sessions during a 12 week period for 75 minutes duration (approximately one class per week)(1). All yoga interventions were delivered by qualified & trained yoga instructors with some using props such as chairs, blankets, blocks etc to provide comfort and support. The mean proportion of yoga sessions attended ranged from 71 to 74%.

The intervention for 12 weeks, twice a week for approximately 1 hour. The training unit lasted about 30minutes and included a 5 min warmup (mobilization) & six strength exercises, which were performed in two sets, with 12-15 repetitions, until muscular exhaustion, on the principle of progressive

increasing exertion. The strength training included the following exercises: mini squats inform of a chair, 'beetles' exercise for the abdominal muscles, hip extension in standing position reverse butterfly, chest press and shoulder press against elastic resistance. The exercises were designed to stimulate all major muscle groups¹⁰.

In addition, the importance of health enhancing physical activity was discussed with the participants. A total of eight nutritional messages (such as fluid intake, animal and plant protein; energy intake) were discussed during each home visit. The subjects were provided with a hand book covering all eight nutritional themes.

Intervention group participated in a 12 week balance training programme with three 45 minute sessions per week. The exercises in the balance training program were progressive and specific to functional balance and incorporated dual and multi task exercises like counting, carrying a tray, or having to avoid obstacles. Every session included exercises while sitting on a large balance ball, while standing and while walking².

The exercises differed across sessions to achieve variety but every exercise was repeated later on in the program, often in a more challenging form. The groups consisted of 6 to 10 participants, with 2 or 3 physical therapists present at each session to ensure participant safety and allow individual progression of exercises².

The intervention lasted for 24 weeks. The participants took part in a twice weekly group exercise session approximately 60 mts each with load and intensity adjusted regularly. At all times , training sessions were conducted by a fully qualified physical therapist. At the beginning and the end of the exercise sessions, arterial blood pressure and radial pulse were measured and the participants performed stretching exercises. Once a week, participants were wearing a heart rate monitor to ensure training safety and maintenance of heart rate within individually determined zones that were based on maximal predicted heart rate. Aerobic training involved 20mts of walking at 60% to 75% HR for the first 4 weeks, then gradually increased to 30mts by the 12th week. As the intervention progressed, maintenance of the HR at the training frequency was obtained with an increase in the walking speed, observed in the distance walked⁵.

Adverse Events

There was one non-serious adverse event, which was probably related to the yoga programme; here, the participant reported that specific exercises aggravated her existing lower back pain during the first couple of sessions, but that this problem soon subsided and did not occur again for the remainder of the course.

One participant in the interventional group reported an adverse event (back pain) that may have been associated with the exercise program. Most frequently anticipated adverse events are muscle strains, soreness, knee pain, Achilles tendon, back spasms, neck pain, vertigo, migraine reoccurrence of prior lower back pain or shoulder problems.

Findings

We combined different search methods as mentioned in study selection and a total of 647 studies were extracted from different databases. After screening 4 eligible randomized controlled Trials were included for our systematic review to evaluate the effect of yoga on physical function and QOL.

Discussion

This systematic review included 4 trials of moderate to high methodological quality that found exercises and yoga improved QOL, physical and mental wellbeing in people aged 60 years and over.

1. In this study, the 5 - level EQ-5D and WEMWBS were used to assess health status and mental well - being respectively. Although there is no consensus, changes in the EQ-5D utility index and WEMWBS of 0.10(24) and between 3 and 8 points (25), respectively, have been recommended as clinically important. In this trial, we observed that scores on these questionnaires were, on average, 0.12 and 6 points higher, respectively in the Yoga group at 3 months.

This 10-week adapted Yoga programme showed a relatively low attrition rate of 16% with the reasons for withdrawal being unrelated to the intervention. The feasibility of the Yoga programme was also demonstrated by the ease of recruitment in a short period of time from a small geographical area, and excellent attendance with two thirds of the

participants attending at least 8 of the 10 classes. The interview responses indicated that participants found the programme to be suitable for their abilities and enjoyable. Finally, the Yoga programme appeared to be safe.

2. The combined nutrition and exercise intervention did not lead to significant improvements in QOL compared to social support only. Although the physical performance and physical activity shows a significant improvement, there were no significant changes in the physical health domain. It can e expected that an active lifestyle preserves physical function in older adults, which in turn leads to higher levels of QOL scores in domains related to physical health. The present study was not able to demonstrate greater values in the physical health domain.
3. This study demonstrates that a specific progressive balance training programmes, focusing on dual and multitask exercises, can have an impact on objectively measures physical activity levels in older adults with osteoporosis. We found that participants who had taken part in a balance training program had a statistically significant higher scores for physical activity after 12 weeks.
4. The older adults in the intervention group showed significant cognitive and functional improvement after 6 months of aerobic and strength exercises with a medium to large effect size. At the same time, the group presented with significant deterioration in cognition with a large effect size, as well as a worsening of the functional reach test scores, while its conditioning and lower limb muscle endurance showed no significant changes.

Outcome Measures

Quality of life and physical ability were measured in all included trials.

1. The yoga group had better self reported health status and mental well being at 3 months than the control group
2. At the end of the intervention, a significant difference in past, present and future activities and changes in physical activity related

parameters in favour of the intervention group was observed.

3. A significantly higher proportion of participants in the intervention group has improvement in overall health.
4. Post intervention, significant differences were observed in cognition, conditioning, muscle endurance and balance.

Conclusion

For elderly, yoga may provide a broad range of healthcare benefits for the mind and body. Yoga may be practiced to maintain health, reduce particular symptoms commonly associated with skeletal pain, and assist in pain relief, and enhance well-being. We anticipate that practicing yoga may improve subjective wellbeing and mental health and may result in significant improvement in depression, pain and sleep quality. Furthermore, regular yoga practice can increase mindfulness of the body state and can restore the mind body balance among elderly people. The intervention may encourage participants to develop further interest in continuing the physical activity even after the completion of the study.

There is a requirement of well-designed community based follow up studies to assess long term changes and outcomes. We feel that with yoga being a practical, easy and feasible exercise that it can help in emotional and physical betterment and ultimately wellbeing in an elderly group. This project aimed to encourage participants to initiate and continue a yoga based activity after study completion. We anticipate significant improvements in several health domains. The intervention would benefit participants, their families and society in terms of (anticipated) lower health costs. Moreover, the study results may be of broader use in other settings. We would use the standardised measurements and blinded follow up assessments to reduce the assessment bias.

Conflict of Interest: Authors have no conflict of interest in carrying out these systematic review.

Source of Funding: Nil

Ethical Clearance: The project was a systematic review and meta analysis so, do not require ethical approval as there was no direct information or intervention performed on human sample. Institutional ethical committee has refrained authors from ethical permission.

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