



## Research Article

### FLEXIBILITY EXERCISE AND PHYSICAL ACTIVITY IMPROVEING OLDER ADULTS COGNITIVE FUNCTION: 25 YEARS OVERVIEW

\*Santanu Patar

Dr. S. Radhakrishnan, Post Doctoral Fellow, Exercise & Sport Physiology Laboratory, Department of Physical Education VinayaBavana, Visva Bharati University, Santiniketan-731235, West Bengal, India

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#### ABSTRACT

**Introduction:** Physical as well as mental health of older adults tends to continuously declined around the world. Advancements in medical science in the past century have markedly increased life expectancy but have also heralded a broad set of challenges that accompany an aging population. Age-related cognitive decline is one such challenge, producing wide ranging psychological, social, and economic consequences at both the individual and population level. Evidence suggests that age-related neuro cognitive-decline should not be seen as fixed or immutable. Rather, cognitive function seems to benefit from a healthy lifestyle, most notably from regular physical activity.

**Aim:** The aim of this project was to review the scientific literature of flexibility exercise and physical activity and its effect on cognitive function of older adults.

**Method:** The researcher independently evaluated the scientific studies according to 5 criteria of methodological quality. The five criteria are (i) Age 50 to 90 years (ii) Flexibility exercise (iii) subject men and women (iv) Physical Exercise (v) Cognitive function.

**Conclusion:** Cognitive function can improve by the flexibility Exercise and various physical activities of older adults when mental function started decline.

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#### INTRODUCTION

The world's population is ageing rapidly. Between 2015 and 2050, the proportion of the world's older adults is estimated to almost double from about 12% to 22%. In absolute terms, this is an expected increase from 900 million to 2 billion people over the age of 60. Older people face special physical and mental health challenges which need to be recognized. Over 20% of adults aged 60 and over suffer from a mental or neurological disorder (excluding headache disorders) and 6.6% of all disability (disability adjusted life years-DALYs) among over 60s is attributed to neurological and mental disorders. These disorders in the elderly population account for 17.4% of Years Lived with Disability (YLDs). The most common neuropsychiatric disorders in this age group are dementia and depression. Anxiety disorders affect 3.8% of the elderly population, substance use problems affect almost 1% and around a quarter of deaths from self-harm are among those aged 60 or above. Substance abuse problems among the elderly are often overlooked or misdiagnosed. Mental health problems are under-identified by health-care professionals and older people themselves, and the stigma surrounding mental illness makes people reluctant to seek help.

\*Corresponding author: Santanu Patar,  
Post Doctoral Fellow, Exercise & Sport Physiology Laboratory,  
Department of Physical Education VinayaBavana, Visva Bharati  
University, Santiniketan-731235.

Multiple social, psychological, and biological factors determine the level of mental health of a person at any point of time. As well as the typical life stressors common to all people, many older adults lose their ability to live independently because of limited mobility, chronic pain, frailty or other mental or physical problems, and require some form of long-term care. In addition, older people are more likely to experience events such as bereavement, a drop in socioeconomic status with retirement, or a disability. All of these factors can result in isolation, loss of independence, loneliness and psychological distress in older people. Mental health has an impact on physical health and vice versa. For example, older adults with physical health conditions such as heart disease have higher rates of depression than those who are medically well. Conversely, untreated depression in an older person with heart disease can negatively affect the outcome of the physical disease. Older adults are also vulnerable to elder abuse - including physical, sexual, psychological, emotional, financial and material abuse; abandonment; neglect; and serious losses of dignity and respect. Current evidence suggests that 1 in 10 older people experience elder abuse. Elder abuse can lead not only to physical injuries, but also to serious, sometimes long-lasting psychological consequences, including depression and anxiety. Dementia is a syndrome in which there is deterioration in memory, thinking, behavior and the ability to perform everyday activities. It mainly affects older people, although it is not a normal part of ageing.

It is estimated that 47.5 million people worldwide are living with dementia. The total number of people with dementia is projected to increase to 75.6 million in 2030 and 135.5 million in 2050, with majority of sufferers living in low- and middle-income countries. There are significant social and economic issues in terms of the direct costs of medical, social and informal care associated with dementia. Moreover, physical, emotional and economic pressures can cause great stress to families. Support is needed from the health, social, financial and legal systems for both people with dementia and their caregivers. Depression can cause great suffering and leads to impaired functioning in daily life.

Unipolar depression occurs in 7% of the general elderly population and it accounts for 5.7% of YLDs among over 60 year olds. Depression is both under diagnosed and undertreated in primary care settings. Symptoms of depression in older adults are often overlooked and untreated because they coincide with other problems encountered by older adults. Older adults with depressive symptoms have poorer functioning compared to those with chronic medical conditions such as lung disease, hypertension or diabetes. Depression also increases the perception of poor health, the utilization of medical services and health care costs. The physical as well as mental health of older adults tends to continuously declined around the world.

Advancements in medical science in the past century have markedly increased life expectancy but have also heralded a broad set of challenges that accompany an aging population. Age-related cognitive decline is one such challenge, producing wide ranging psychological, social, and economic consequences at both the individual and population level. Evidence suggests that age-related neuro cognitive-decline should not be seen as fixed or immutable. Rather, cognitive function seems to benefit from a healthy lifestyle, most notably from regular physical activity.

## MATERIALS AND METHODS

### Search Strategy

Pub Med, Google data based were systematically searched for randomized trials using terms related to cognition and physical exercise or memory, mild cognitive impairment or flexibility training or stretching or flexibility review or flexibility elderly. The search was performed I march 2015 to January 2016. Previous systematic reviews on this topic and references from the review papers were also examined.

### Inclusion Criteria

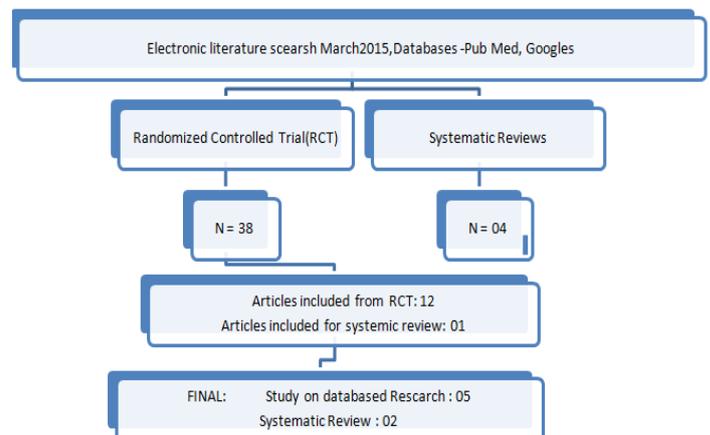
The trials selected in this review had to meet the following inclusion criteria: Flexibility exercise, physical exercise and cognition of older adults.

### Methodological Quality

Reviewers independently evaluated the included studies according to 5 criteria of methodological quality. The five criteria are (i) Age 50 to 90 years (ii) Flexibility exercise (iii) subject men and women (iv) Physical Exercise (v) Cognitive function.

## RESULTS

Identification and selection of studies:



In the following RCT research study was presented for ready reference (Table – I)

## DISCUSSION

(Blumenthal 1989 a) strength and flexibility regimens as well as results for younger age groups and cognitively impaired individuals. Cognition was categorized in terms of reasoning skills, verbal ability, memory, mathematical ability, creativity, motor skills, perception, IQ, dual task paradigms, reaction time and academic achievement. (van Uffelen JG<sup>1</sup>, Chin A Paw MJ, Hopman-Rock M, van Mechelen W. 2008) Beneficial effects of various exercise programs on aspects of cognition have been observed in studies among subjects with and without cognitive decline. The majority of the studies, however, did not find any effect. The small number of included studies; lack of high-quality studies; and the large variability in study populations, exercise protocols, and outcome measures complicate interpretation of the results.

More high-quality trials are needed to assess the effects of different types of exercise on cognitive function in older adults with and without cognitive decline. (Alves CR. *Et al* 2014) High intensity interval training session can improve cognitive function. (Nouchi *et al.* 2014) Beneficial effects of short term combination exercise training on diverse cognitive functions of elderly people. (Lee YH<sup>1</sup>, Yoon ES, Park SH, Heffernan KS, Lee C, Jae SY 2014) Arterial stiffness measured by carotid femoral pulse wave velocity is associated with cognitive function in patients with chronic stroke, but not after adjustment for physical fitness.

Maintaining appropriate levels of physical fitness may have a favourable effect on both vascular and cognitive function in patients with stroke. (Zuniga KE *et al.*, 2015,) Subject memory impairment (SIM) was not responsive to exercise interventions, and the relationship between SIM and negative well beings demonstrates a need for interventions to reduce memory complaints in high-risk group. (Sink KM *et al.*, 2015,) Among sedentary older adults a 24 month moderate – intensity physical activity program compared with a flexibility exercise did not result in improvements in global or domain – specific cognitive function.

Table 1. Randomized control trail study

STUDY	PARTICIPANTS	INTERVENTIONS	OUTCOMES
Blumenthal et.al 1989 a	48 subjects (8 males and 40 females) were randomly assigned to an aerobic exercise programme (N = 15), social activity group (N = 15) or a control group (N = 18). One subject was lost from the aerobic group, 4 from the social group and 4 from the control group. No intention to treat analysis. The participants were not blinded, it is unclear whether the outcome assessor and the caregiver were blinded Follow-up: 12 weeks	Exercise: 3 sessions per week for approximately 60 minutes. 10 to 15 minutes of stretching exercises followed by 20 to 25 minutes of aerobic exercise (at 70% of age-adjusted max = 220-age), including rapid walking as well as rhythmic muscle strengthening exercises (e.g. repeatedly standing up and sitting down) . 5 minutes of cooling down with dancing and light exercises. Social activity: 3 sessions per week for 60 minutes. Participation in non-physical activities (card games, art projects, political discussion groups, watching films). Controls: not described.	The data on strength and flexibility regimens as well as results for younger age groups and cognitively impaired individuals. Cognition was categorized in terms of reasoning skills, verbal ability, memory, mathematical ability, creativity, motor skills, perception, IQ, dual task paradigms, reaction time and academic achievement
van Uffelen JG <sup>1</sup> , Chin A Paw MJ, Hopman-Rock M, van Mechelen W. 2008	Twenty-three studies were included-15 among cognitively healthy subjects and 8 among subjects with cognitive decline. Seven studies were qualified as high-quality studies, 2 in cognitively healthy subjects and 5 in subjects with cognitive decline. In cognitively healthy subjects, significant beneficial intervention effects were observed in 5 studies on information processing, executive function, or memory.	in these studies included aerobic exercise only (n = 2); strength exercise (n = 1); strength and balance exercise (n = 1); or all-round exercise including aerobic, strength, balance and flexibility training (n = 1). In subjects with cognitive decline, 5 studies observed beneficial effects on general cognition, executive functions, and memory. Interventions included aerobic (n = 3) or strength exercise combined with flexibility or balance exercise (n = 2).	Beneficial effects of various exercise programs on aspects of cognition have been observed in studies among subjects with and without cognitive decline. The majority of the studies, however, did not find any effect. The small number of included studies; lack of high-quality studies; and the large variability in study populations, exercise protocols, and outcome measures complicate interpretation of the results. More high-quality trials are needed to assess the effects of different types of exercise on cognitive function in older adults with and without cognitive decline.
Alves CR. Et al 2014,118(1):63-72,percept mot skill	Middle aged individual, mean age 53.7 yr. Inclusion Criteria: Healthy middle age individual. Exclusion Criteria: not healthy middle age individual	22 healthy subjects (i) High intensity interval training session,101min cycling bouts at the intensity corresponding to 80% of the reserve heart rate interspersed by 1 min. (ii) A control session, consisting of an active stretching exercise.	High intensity interval training session can improve cognitive function.
Nouchi R et al 2014, 36(2): 787-99	Healthy older adults age Inclusion Criteria: Healthy older adults. Exclusion Criteria: Those who are not healthy older adults.	Total subject 64 short term combination exercise training( aerobic, strength and stretching exercise training) three days per week during the four weeks (12 work outs in total)	Beneficial effects of short term combination exercise training on diverse cognitive functions of elderly people.
Lee YH <sup>1</sup> , Yoon ES, Park SH, Heffernan KS, Lee C, Jae SY 2014	102 patients with chronic stroke who participated in an exercise rehabilitation programme.	Carotid femoral pulse wave velocity and augmentation index were measured as indices of arterial stiffness and central systolic loading. Cognitive function was assessed with the Mini Mental State Examination. Parameters of physical fitness included the 6-min walk test, flexibility, balance, and muscle strength tests.	Arterial stiffness measured by carotid femoral pulse wave velocity is associated with cognitive function in patients with chronic stroke, but not after adjustment for physical fitness. Maintaining appropriate levels of physical fitness may have a favourable effect on both vascular and cognitive function in patients with stroke.

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<p>Zuniga KE et al, 2015, Psychogeriatrics</p>	<p>Community- dwelling older adults mean age 66.4 years Inclusion Criteria: Community-dwelling older adults. Exclusion Criteria: Those are not Community-dwelling older adults</p>	<p>The total number of subjects 179, Participated in walking, Flexibility, toning and balance group for 12 months report was measured at baseline 6 months and 12 months.</p>	<p>Subject memory impairment (SIM) was not responsive to exercise interventions, and the relationship between SIM and negative well beings demonstrates a need for interventions to reduce memory complaints in high-risk group.</p>
<p>Sink KM et al, 2015, 25:314(8):781-90, JAMA</p>	<p>Sedentary adults age 70 to 89. Inclusion Criteria: Community-living participants who were at risk for mobility disability but able to walk 400 mt. Exclusion Criteria: Risk for mobility disability person but not able to walk 400 mt.</p>	<p>Moderate Intensity physical activity program ( N = 818) Flexibility Exercise ( N = 817 ) 24 Months physical activity program.</p>	<p>Among sedentary older adults a 24 month moderate – intensity physical activity program compared with a flexibility exercise did not result in improvements in global or domain – specific cognitive function.</p>

**Authors Conclusion**

Total 2073 older adults age 50 to 90 years were studied. Researcher observed that flexibility exercise and other physical activity and executive function were closely interlinked. Our analyses showed that the magnitude of the relationship between flexibility exercise, other physical activity and neuro cognitive performance appeared to be strongest in the direction from executive function to flexibility exercise, other physical activity. The current study suggested that executive abilities may have favorable effects on flexibility exercise, other physical activity in older people. The present researcher found that the relationship between flexibility exercise, stretching exercise, other physical activity and cognitive function. This study strengthens and extends existing evidence demonstrating that flexibility exercise, other physical activity can buffer the effects of aging on cognitive decline, particularly in relation to the executive function.

**Conclusion**

Cognitive function may improve by the flexibility exercise and various physical activities of older adults when mental function start decline.

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