

## REVIEW ARTICLE

**Effectiveness of Pranayama on Depression in Elderly***Kannan K<sup>1\*</sup>, Lalitha.K<sup>1</sup>, Ramachandra<sup>1</sup>, Sailaxmi Gandhi<sup>1</sup>, Naveen Kumar C<sup>2</sup>**<sup>1</sup>Department of Nursing, <sup>2</sup>Department of Psychiatry, NIMHANS, Bangalore -29 (Karnataka) India***Abstract**

The knowledge of Pranayama in elderly is very important in day to day life. In case of mental health problem like depression, the availability of the source of Complementary and Alternative Medicine (CAM) like Pranayama helps to decrease depression. The aim of the review is to discuss the articles pertaining to pranayama on depression in elderly including both quantitative and qualitative studies published and unpublished and to review the related studies and other articles regarding effectiveness of pranayama on depression in elderly. The review was based on the studies conducted globally. Systematic searches were conducted on a range of databases, citations were sought from relevant reviews and several websites were also included in the search, including those of MIND and the Mental Health Foundation. MEDline, EMBASE, and PsycINFO were searched for studies published from 2000 January to December 2013. Five independent reviewers assessed the eligibility of each report based on predefined inclusion criteria (study design and measure of depression). Individual effect sizes were standardized. Results of 87 abstracts reviewed, 7 results were not Randomized Controlled Trial (RCT), 36 Studies were excluded due to their intervention and other problems, 25 Studies were excluded due to their outcomes, 2 dissertations was excluded, 17 Full Text articles were assessed for eligibility, Exclusion of study reports through full text screening n=8 duplicated: editorial review article: 3 Did not meet inclusion criteria: 4 Incomplete information: 9 studies met inclusion criteria and were included for final review. Heterogeneity between studies was not explained by age or sex, but could be partly explained by the types of depression and assessments. Collaborative care interventions are more effective for depression in older people than

usual care and are also of high value. Pranayama are effective component with depression.

**Keywords:** Elderly, Efficacy, Depression, Pranayama, Randomized Controlled Trial, Systematic Review Protocol

**Introduction:**

Depression is characterized by a depressed mood or loss of interest or pleasure in almost all daily activities for a period of at least two weeks, with the clinical evolution, worldwide, life expectancy is increasing. Currently about 10% of the world's population is made up of older adults (aged 65 and above). This figure is set to rise steadily, to as much as 30% in many societies. To put this in context, we need to look at some figures: in 1950 the population of the world's elderly was 200 million and this is estimated to rise to 1.2 billion by 2025, a six fold increase in only 75 years. India is the second-most populated country in the world, in terms of elderly population of 60 years and above. The latest World Health Assembly of 24 May 2013 considered older people to be a vulnerable group, with a high risk of experiencing mental health problems in its report. The number of older adults is growing fast all over the world. The socioeconomic impact of such demographic changes is adding to the overall mental health consequences [1].

Chronic physical and mental illnesses mainly depression affect the elderly. Depression affects about one in ten people aged over 65 years, making it the most common among the mental health disorders of later life.

Depression affects more than 350 million people

of all ages, in all communities, and is a significant contributor to the global burden of disease. The World Health Organization estimated that the overall prevalence rate of depressive disorders among the elderly generally varies between 10 and 20%, depending on the cultural situations [2].

Depression among the aged is a widespread problem, but is often not recognized or treated. It may be overlooked because for some older adults who have depression, sadness is not their main symptom. They may have other, less obvious symptoms of depression or they may not be willing to talk about their feelings. Therefore, mental health care professional may be less likely to recognize the patients having depression [3].

Our very own system of yoga is being used for improving various physical and mental illnesses. However, few studies have been done to find the efficacy of yoga in the treatment of mental disturbances [4]. Yoga and its various techniques like pranayama can be a useful way to minimize the psychological distresses like depression of the individuals especially in elderly population. Thus, there is a high need for staying fit and healthy during this age.

Practice of the yoga techniques (asanas, pranayama, meditation, relaxation, concentration) is power tool to keep elderly in good psychophysical condition [5].

Pranayama has been reported to be beneficial in treating a range of depression and other related disorders, improving autonomic functions, relieving, and reducing signs of oxidative stress. Practitioners report that the practice of pranayama develops a steady mind, strong will-power, and sound judgment and also claim that sustained pranayama practice extends life and enhances perception [6].

This issue has not attracted many researchers. Hence the reviewers were interested to review the

research studies on the effectiveness of pranayama on depression in elderly people. Pranayama will have greater impact on reducing depression and improve the emotional status of elderly and it will change the attitude of elderly persons to accept the old age as a global phenomenon.

### **Background and Need:**

This review aimed at the effectiveness of pranayama in depression in elderly. Elderly depression can be quite common as ageing which presents its own set of challenges, many elderly people have to face few difficult situations where certain health conditions could be taking a toll on the person, failing health or death of a spouse could contribute heavily to depression in the elderly. Elderly people who have led a fairly independent life might be required to depend on others because of their disabilities. In such cases, it is natural to feel lonely and in the absence of a support system in terms of spouse, family, and friends, elderly depression sets in during old age. Only few seek professional help on time. In the absence of a spouse and children, who are busy with their own lives, everyone fails to pay attention to the subtle signs and symptoms of depression. The general mindset is to attribute these signs and symptoms of elderly depression as part of growing old [7]. It is also a wide spread problem globally; often it is not recognized and not treated. Surprisingly, there is little research that has been done on this disorder in the elderly.

Various therapies have been implemented in the treatment of depression in elderly. There is mounting evidence that different forms of pranayama work to treat symptoms of depression in elderly [8]. There is evidence to suggest that pranayama is effective in late-life depression [9-10]. The reduction of depression, in addition to physiologic regulation of the stress response system, may also improve cognitive function, an

area of particular importance to the elderly [11]. Pranayama has been shown to have a 62-79% success rate in the treatment of depression regardless of severity. Relief from depression determined by psychiatric evaluation and standard psychiatric measures (Beck Depression Inventory, Hamilton Rating Scale for Depression, etc.), Depression, Anxiety and Stress Scales (DASS-42), was experienced within three weeks. Published studies further suggest that pranayama normalizes patients' brainwave patterns, increases serum prolactin (a "wellbeing" hormone), and is as effective as standard antidepressant drug regimens. Yet it is safe, free of unwanted side effects, cost effective, and self empowering [12]. Pranayama leads to relaxation and better quality of life, which can reduce or eventually eliminate the symptoms of depression [13].

This review has focused mainly on the effectiveness of pranayama on depression in elderly.

#### **Aim & Objectives:**

The aim of this review is to discuss the articles pertaining to pranayama on depression in elderly including both quantitative and qualitative studies both published and unpublished.

1. To review the related studies on effectiveness of pranayama on depression in elderly.
2. To locate the effectiveness of pranayama on depression in elderly.

#### **Methods:**

##### **Approach: systematic mixed reviews approach**

This approach integrates study findings from studies conducted within and outside the country.

##### **Summary of the Search Strategy:**

A comprehensive search for clinical research was carried out. Systematic searches were conducted on a range of databases, citations were sought from relevant reviews and several websites were

also included in the search, including those of MIND and the Mental Health Foundation.

#### **Databases searched**

##### **General databases**

CINAHL, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, EMBASE, IndMED (Indian Medlars Centre), MEDLINE (and PubMed), PsycINFO, ProQUEST.

##### **Specialist CAM and Condition Based Databases**

AMED, CISCOM, Cochrane Depression, Anxiety and Neurosis (CCDAN) Review Group register.

Computerized literature searches were performed on the PubMed, The Cochrane Library and HELINET databases to locate all articles on effectiveness of pranayama on depression in elderly.

The search terms used were complementary therapy, yoga, pranayama and depression in elderly. The reference lists of articles were checked for further relevant presentation. The articles were read in full and data extracted in a standard pre-defined manner by the first author. The quality of these trials was assessed using the Jadad scoring system. The Jadad system awards up to five points for randomization, blinding and description of dropouts.

**Keywords used:** Effect of pranayama on depression in elderly, Pranayama on depression in elderly and Health Impacts of Yoga and Pranayama on elderly with depression

##### **Eligibility Criteria**

Both controlled trials as well as uncontrolled studies, were identified. The review was done to identify papers that clearly described effective-

ness of pranayama on depression in elderly.

**Inclusion criteria:** Quantitative data based study on depression in elderly and the effect of pranayama on them. Studies that included the effect of pranayama on depression alone. That had adequate information pertaining to the objectives. Studies which were available in English. Literature published from Jan 2000 to Dec 2013.

**Exclusion criteria:** Studies with insufficient information Studies that including the effect of pranayama on depression other than elderly. Studies before Jan 2000.

**Types of participants**

Participants who were elderly with depression

**Types of intervention**

Studies: Involves only Pranayama

Involve both Pranayama and other intervention. (Yoga, Physical Exercise, CAM)

**Types of outcome measures**

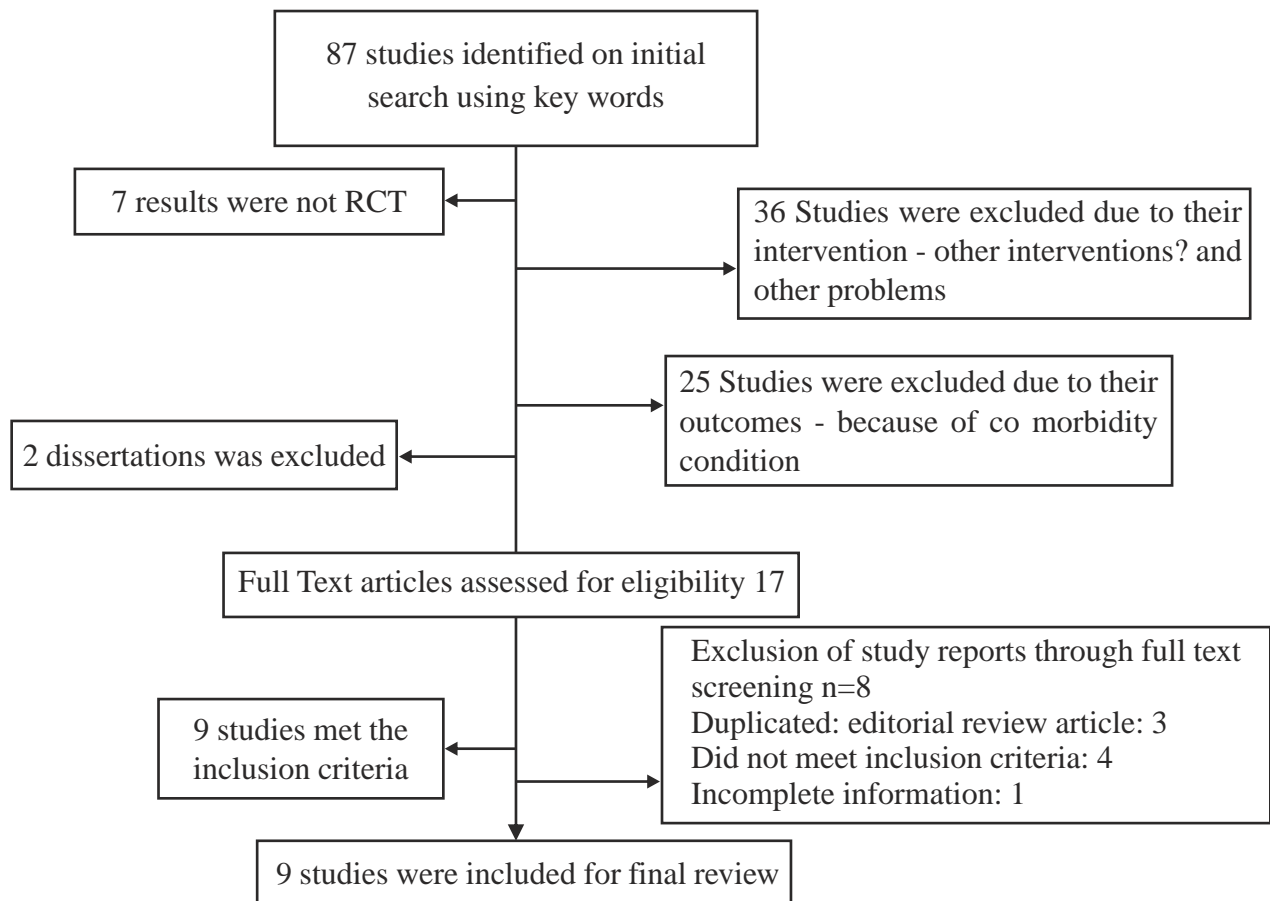
Depression rating scales.

**Data Extraction with Flow Chart**

The extracted data was assessed for adequate information about the methodology and the major findings were coded in the form of a table. Those studies which did not qualify the quality appraisal were excluded from the review.

**Data Analysis**

Data analysis included information about the various aspects of the study which were abstracted and coded as a part of the task. Integration of the review was done under the following subject



heads. Such as the data authors/source year of publication, place (country), methodological features (study design), sample size (no. of participants), variable, tools, and major findings.

The information was collected by recruiting

studies that fitted the eligibility criteria till there was saturation of the findings and the sample covered all major regions and countries and old age groups (elderly). The revived information was coded on the results background and the

**Table 1: Studies Included in the Review**

Sr. No.	Authors	Year	Place	Study Design	Sample Size	Variable	Tools	Major findings	Jaded score
1.	Krishna-murthy et al [14]	2007	India	Expt.	69	Depression	GDS -15	Significant decrease in the geriatric depression scores	4
2.	Richard P. Brown et al [15]	2007	New York	Expt.	45	Depression	Beck Depression Inventory	SK&P positive effects on quality of life in the elderly in-after? the diagnosis of depression.	4
3.	Anette Kjellgren et al [16]	2007	Norway	Pilot study	105	Depression	HAD	Sudarshan Kriya and related practices (SK&P) lowered their degree of depression.	4
4.	Kozasa EH et al [17]	2008	Brazil	Expt.	22	Depression	Beck Depression Inventory	A significant reduction in scores on depression.	4
5.	P. K. Gupta et al [6]	2010	India	Expt.	30	Depression	Beck Depression Inventory	Significant impact of the pranayama on their depression.	4
6.	Weili Chan et al [18]	2012	South Australia	RCT	419	Depression	GDS -15	Pranayama changes in depression did not significantly differ between intervention groups	3
7.	P. Uma Devi et al [19]	2013	India	RCT	43	Depression	Depression scale, WHO QOL	There was a significant decrease in depression score and improved quality-of-life	4
8.	V. R. Hariprasad et al [20]	2013	India	VPT	10	Depression and other disorder.	Performance of individual practices on a scale	It is feasible to train the elderly to perform these practices (pranayama)	3
9.	V. R. Hariprasad et al [21]	2013	India	RCT	120	Depression	GDS -15, WHOQOL-BREF	Potential benefits of yoga therapy for elderly in improving the QOL.	4

Experimental - Expt., Validated and then pilot-tested - VPT, Randomized Controlled Trial - RCT, Geriatric Depression Scale-15 - GDS-15, Short version of World Health Organization Quality of Life - WHOQOL)-BREF, Hospital Anxiety Depression Scale - HAD

major findings were tabulated and categorized into main sub themes that explained the phenomenon under the study.

The following steps were under taken

1. Pre-analysis phase: coding the data into the main results background
2. Preliminary assessments: were made about the quality of the data using Jadad scoring
3. Preliminary actions: domains wise identified and coded.
4. Principle analysis : percentage of the study results calculated
5. Interpretive phase: various themes were identified and the findings were summarised.

The results were mainly categorised as effect of

pranayama on depression and anxiety in elderly, then categorized in table chart in each variable. N=9 (Table 2)

A number of scientific studies have investigated the use of pranayama techniques as treatments for depressive disorders; however, research into their utility for other psychiatric disorders is limited.

**Depression 9(100%)**

Three randomized controlled trials (RCTs), four experimental studies and two pilot studies tested and validated in depression with a wide range of pranayama forms used across the studies. Overall, pranayama showed benefit for moderate to mild depression. In all studies only older adults were taken as samples. Eight studies reported

**Table 2: Result**

Sr. No.	Variable	No. of Studies	Before Intervention	After Intervention
1	Depression	9(100%)	HAD: 4.11 (SD = 2.99)	HAD-2,73 (SD = 2.19) [16] P< 0.001
			Beck Depression: 27.96± 12.76	D-15.63± 10.23[6] P<0.01
			HAD WHO QOL-7.88 (SD=3.86)	HAD WHO QOL-1.6 SD =5.72 [19] P<0.002
			Performance of individual practices on a scale-50%	Performance of individual practices on a scale-80% [20]
			QOL: (f=0.02, df=1, 117)	QOL (f=11.00, df=1, 117) [21] P=0.001
			GDS -15: 4 (SD 1.5±7.5)	GDS -15: 2 (SD 1.0±5.5) [18] P=0.407
			Beck Depression Inventory 49.7± 7.8	Significantly reduced (from 10.6 ±4.7 [17]) P< 0.01
			GDS -15: 80%	20% as opposed to 24% [14]. P<0.001
			Beck Depression Inventory 39.7± 6.8 and 39.8± 5.4	Beck Depression Inventory score was significantly reduced (9.6±3.7) [15] P< 0.0001

significant benefits ( $p < 0.01$ ). In one study it was reported that findings were not significant because of lesser sample and dropout. Study conducted on Sudarshan Kriya showed lowering of their degree of depression. (Before intervention HAD- 4.11 (SD = 2.99) (SD = 3.71), after intervention HAD- 2, 73 (SD = 2.19)  $p < 0.001$ .) [18]. In another study the mean score of Beck depression was 27.96 and a SD of 12.76 prior to the intervention. After 3 months of the training in anuloma viloma the mean score of Beck depression was  $15.63 \pm 10.23$ , the difference between the two conditions before and after the training in anuloma viloma pranayama suggested significant decrease in depression among elderly [6]. In another study the result showed that there was a significant decrease in depression score and improved quality-of-life after practicing yoga. (Pre-test score HAD WHO QOL-7.88(SD=3.86.post test score HAD WHO QOL -1.6 SD=5.72  $P < 0.002$ ) [19]. Another study showed the feasibility of training the elderly to perform these practices. Longer training seemed warranted. Before intervention, performance of individual practices was 50%, after intervention performance of individual practices is 80% [16]. There was a potential benefit after yoga therapy for elderly in improving the QOL. QOL ( $f=0.02$ ,  $df=1$ , 117 QOL ( $f=11.00$ ,  $DF=1$ , 117,  $P=0.001$ ) [21].

With Pranayama, changes in depression did not significantly differ between two groups (GDS (15) 2 (SD  $1.0 \pm 5.5$ )  $P=0.407$ ) [18]. One study showed a significant reduction in scores on depression. Beck depression was  $49.7 \pm 7.8$  to  $10.6 \pm 4.7$  ( $p < 0.01$ ) [17].

Four experimental studies, used a wide range of pranayama across the studies. Overall, pranayama showed benefit for moderate to mild depression. The Yoga Group showed a significant decrease in

the geriatric depression scores at 3 months ( $t = 4.295$ ,  $p < .001$ ), and at 6 months ( $t = 6.022$ ,  $p < .001$ ) [14]. In a study on SK&P showed positive effects on reduction of depression in elderly. In the Beck depression scales the scores changed from  $39.7 \pm 6.8$  to  $9.6 \pm 3.7$  more than in the standard treatment group (from  $39.8 \pm 5.4$  to  $16.4 \pm 4.2$ ) ( $p < 0.0001$ ) [15].

### Discussion:

The systematic review meta analysis has been undertaken to provide the necessary information on the problem reviewed. The findings reveal that there is a positive effect of pranayama on depression in elderly.

Even though depression is common among all the age groups, mental health problems pose additional challenges that increase its risk in old age with several reasons [22]. The periodical review covers a wide range of research designs, the quantitative measures have been found to be supporting. The strength of this review is that it has covered only elderly population with depression study subjects from developed and from developing nations and the age ranging from 60 and above [23, 24].

There are a few studies which are found to provide relevant information adding to the validity of the study findings to state that it is feasible to train the elderly to perform (pranayama) practices [20].

A few studies suggest that the most influential evidence for pranayama as a viable treatment for depression derives from research conducted by the National Institute of Mental Health and Neuroscience, Bangalore, in India. According to this study, 73% of participants with depression saw a significant improvement when practicing Sudarshan Kriya Yoga (SKY), a pranayama technique. Studies suggest that regular practice of

SKY lowers levels of triglycerides in the blood, significantly increases antioxidant capacity, marginally reduces oxidative stress, improves sleep, and increases an individual's overall sense of wellbeing. To date, there have been no significant side-effects reported [25].

Unpublished thesis results have shown that the practice of religious activity (yoga and meditation) lower the degree of depression and also correlated positively ( $p < 0.05$ ). Findings of this research are consistent with research done by Tahmasebi Pour, 1996 [26].

From the findings of these reviews it appears that pranayama is having potentially beneficial effects on depression in elderly. However, several aspects require consideration. Firstly, the interventions have varied incorporating a variety of asanas and/or breathing exercises. Therefore, it is not possible to assess which of these interventions or which aspect of each intervention is most effective. Consequently, the findings must be interpreted with caution [27].

In this review nine studies have been included and it has been found that eight (89%) studies indicate that pranayama is effective on depression in elderly. One (11%) study has revealed that there is

no significant reduction in depression in elderly after practicing pranayama.

### Limitations

1. Only nine papers were included in the review
2. Review included studies from 2000-2013

### Conclusion:

To our knowledge, this systematic review is the first to evaluate the effectiveness of pranayama in elderly. Summarizing the available RCT, experimental and pilot study evidence on the effectiveness of pranayama will be very useful, because there is a positive public perception of yoga, which could lead to high opinion of public faith. Further-more, pranayama may be cost- free, effective with rare adverse effects in preventing development of depression or treating depressive symptoms. The authors felt that the review would provide statistical support for effectiveness of pranayama on depression in elderly. The review will also probably inform clinicians and healthcare providers about a simple and acceptable intervention and method that will serve the needs of people at risk of depression or with depressive symptoms, or depression patients.

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## Appendix

### 1. List of Tools with Abbreviation:

1. CES-D Scale - Center for Epidemiologic Studies Depression Scale
2. Beck Depression Inventory: Depression levels were assessed with the Beck Depression Inventory (Beck, 1970),
3. GDS -Geriatric Depression Scale,
4. MMSE -Mini-Mental State Examination
5. SF-36 - Short-Form Health Survey-36
6. ISI - Insomnia Severity Index and Pittsburgh Sleep Quality Index (PSQI)
7. GDS-15-geriatric depression scale-15
8. HMSE- Hindi Mental State Examination
9. WHOQOL)-BREF- Short version of World Health Organization Quality of Life
10. HAD – Hospital Anxiety Depression Scale
11. SE – Stress and Energy
12. PSQI-Pittsburg Sleep Quality Index
13. SKY-Sudarshan Kriya Yogic Breathing

### 2. Jadad Scale to Assess the Quality of Clinical Trials [28]

The Jadad score was used as the 'gold standard' to assess the methodological quality of studies. This validated score lies in the range 0-5. Studies are scored according to the presence of three key methodological features of randomization, blinding and accountability of all patients, including withdrawals.

According to NIH website Appendix E:

1. The Jadad Score: A method for assessing the quality of controlled clinical trials.

Basic Jadad Score is assessed based on the answer to the following 5 questions. The maximum score is 5.

#### Question Yes/No

1. Was the study described as random? 1 0
2. Was the randomization scheme described and appropriate? 1 0
3. Was the study described as double-blind? 1 0
4. Was the method of double blinding appropriate? (Where both the patient and the assessor appropriately blinded?) 1 0
5. Was there a description of dropouts and withdrawals? 1 0

Quality Assessment Based on Jadad Score

**Range of Score Quality:** 0–2 Low, 3–5 High

Jadad Scale has been frequently used as a study selection criteria when the literature review or meta analysis are performed.

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