Evidence-based yoga methods for treating depression

Dr. Shivarama Varambally MD, MNAMS
Associate Professor of Psychiatry
NIMHANS
- Consultant, Schizophrenia Clinic
- Consultant, Metabolic Clinic in Psychiatry
- Member, NIMHANS Integrated Centre for Yoga

**Research interests:**

- Neurobiology of psychiatric disorders, particularly schizophrenia

- Yoga in the management of psychiatric disorders
Presentation Layout

- Rationale for use of Yoga in Depression
- Current status of evidence
- Current understanding and possible Mechanisms of Action
- Summary of findings and conclusions
The six friends of knowledge

I keep six honest serving-men
(They taught me all I knew);
Their names are What and Why
and When
And How and Where and Who.

Sir Rudyard Kipling
The Elephant's Child
Yogasana as Therapy in Depressive Disorders
Somehow, running aimlessly in circles, barking at harmless passersby, and destroying the evening paper have become meaningless.
Depression causes Burden DALY/Person (NIMHANS Study 2005)
What is Yoga?

- Designed originally as a way of life to achieve self-realization (‘Yuj’ = Union)
- Time-tested way to achieve personal growth
- Sage Patanjali structured yoga as an eight-limbed practice
"Ashtanga Yoga" (Patanjali)

Yama, niyama (rules/ regulations)
Asana, pranayama
Pratyahara (sense-withdrawal),
Dharana (Concentration),
Dhyana (Meditation)
Samadhi (Balance)
asanas to be held easily and for a longer duration, without strain.

Sacharya Iyengar in Setubandha Sarvangasana

version of the posture requires considerable strength in the neck, shoulders, and back, requiring years

notice to achieve. It should not be attempted without supervision.
Effects of Yoga

- **Physical** — Flexibility, coordination, and strength.

- **Mental** — Stabilization of the mind

  'Yoga chitta vritti nirodah’

  'Samatvam Yoga Uchyate’
Why Yoga for Depression?

- Yoga has been found effective in stress management.
- Depression is affected by stress and has a strong component of cognitive dysfunction.
- Current treatments of depression are suboptimal and have problematic side effects.
- Many lines of research have showed that a combination of conventional and complementary treatments provide the best results.
Yoga therapy in Depressive disorders - Evidence
Yoga on our minds: a systematic review of yoga for neuropsychiatric disorders

Meera Balasubramaniam1,*, Shirley Telles2 and P. Murali Doraiswamy1,3,*

1 Department of Psychiatry and Behavioral Sciences, Duke University School of Medicine, Durham, NC, USA
2 Indian Council of Medical Research Center for Advanced Research in Yoga and Patanjali Research Foundation, Bengaluru, India
3 Duke Institute for Brain Sciences, Durham, NC, USA

Background: The demand for clinically efficacious, safe, patient acceptable, and cost-effective forms of treatment for mental illness is growing. Several studies have demonstrated benefit from yoga in specific psychiatric symptoms and a general sense of wellbeing.

Objective: To systematically examine the evidence for efficacy of yoga in the treatment of selected major psychiatric disorders.

Methods: Electronic searches of The Cochrane Central Register of Controlled Trials and the standard bibliographic databases, MEDLINE, EMBASE, and PsycINFO, were performed through April 2011 and an updated in June 2011 using the keywords yoga AND psychiatry OR depression OR anxiety OR schizophrenia OR cognition OR memory OR attention AND randomized controlled trial (RCT). Studies with yoga as the independent variable and one of the above mentioned terms as the dependent variable were included and exclusion criteria were applied.

Results: The search yielded a total of 124 trials, of which 16 met rigorous criteria for the final review. Grade B evidence supporting a potential acute benefit for yoga exists in depression (four RCTs), as an adjunct to pharmacotherapy in schizophrenia (three RCTs), in children with ADHD (two RCTs), and Grade C evidence in sleep complaints (three RCTs). RCTs in cognitive disorders and eating disorders yielded conflicting results. No studies looked at primary prevention, relapse prevention, or comparative effectiveness versus pharmacotherapy.

Conclusion: There is emerging evidence from randomized trials to support popular beliefs about yoga for depression, sleep disorders, and as an augmentation therapy. Limitations of literature include inability to do double-blind studies, multiplicity of comparisons within small studies, and lack of replication. Biomarker and neuroimaging studies, those comparing yoga with standard pharmaco- and psychotherapies, and studies of long-term efficacy are needed to fully translate the promise of yoga for enhancing mental health.

Keywords: yoga, meditation, depression, schizophrenia, cognition, ADHD, clinical trials, alternative medicine
Complementary and alternative therapies as add-on to pharmacotherapy for mood and anxiety disorders: A systematic review

Arun V. Ravindran a,b,*, Tricia L. da Silva b,c

a Department of Psychiatry, University of Toronto, 250 College Street, Toronto, Ontario, Canada M5T 1R8
b Division of Mood and Anxiety Disorders, Centre for Addiction and Mental Health, 100 Stokes Street, Toronto, Ontario, Canada M6J 1H4
c Institute of Medical Science, University of Toronto, 1 King's College Circle, Room 2374, Toronto, Ontario, Canada M5S 1A8

ARTICLE INFO

Article history:
Received 22 January 2013
Received in revised form 22 March 2013
Accepted 17 May 2013
Available online 12 June 2013

Keywords:
Anxiety disorders
Augmentation
Combination
Complementary and alternative medicine
Depressive disorders
Systematic review

ABSTRACT

Background: Depressed and anxious patients often combine complementary and alternative medicine (CAM) therapies with conventional pharmacotherapy to self-treat symptoms. The benefits and risks of such combination strategies have not been fully evaluated. This paper evaluates the risk-benefit profile of CAM augmentation to antidepressants in affective conditions.

Methods: PubMed was searched for all available clinical reports published in English up to December 2012. Data were evaluated based on graded levels of evidence for efficacy and safety.

Results: Generally, the evidence base is significantly larger for depression than for anxiety disorder. In unipolar depression, there is Level 2 evidence for adjunctive sleep deprivation (SD) and Free and Easy Wanderer Plus (FEWP), and Level 3 for exercise, yoga, light therapy (LT), omega-3 fatty acids, 5-adenosylmethionine and tryptophan. In bipolar depression, there is Level 1 evidence for adjunctive omega-3s, Level 2 for SD, and Level 3 for LT and FEWP. In anxiety conditions, exercise augmentation has Level 3 support in generalized anxiety disorder and panic disorder. Though mostly well-tolerated, these therapies can only be recommended as third-line interventions due to the quality of available evidence.

Limitations: Overall, the literature is limited. Studies often had methodological weaknesses, with little information on long-term use and on potential drug–CAM interactions. Many CAM studies were not published in English.

Conclusions: While several CAM therapies show some evidence of benefit as augmentation in depressive disorders, such evidence is largely lacking in anxiety disorders. The general dearth of adequate safety and tolerability data encourages caution in clinical use.
Yoga therapies in depression
Sudarshan Kriya Yoga (SKY)

- SKY is part of the stress management package offered by the Art of Living foundation
- Apart from stress reduction, individuals experience a sense of well-being and relief from dysphoria
- Stress plays a role in depression and its relief can improve depression
- Neurobiological effects demonstrated in those practicing the Kriya
SKY comparable to antidepressant drugs

Fig. 3. Comparison of BDI scores. Occasion effect (over five assessments in four weeks), $F = 50.8$, $df = 4,168$, $P = 0.0001$, power = 1.0. Group (three treatment groups) effect, $F = 1.25$, $df = 2,42$, $P = 0.3$, power = 0.26. Group x occasion effect, $F = 3.04$, $df = 8,168$, $P = 0.003$, power = 0.95 (RMANOVA).

(Janakiramaiah et al J Affect Disord 2000)
SKY in Dysthymia – Clinical Trial

- Dysthymia outpatients (n=46)
  - Daily out-patient SKY training for one week
  - 37 (80%) completed three-month open trial
  - 25 (68%) were remitted by one month and maintained same for three months
  - Only 1 of 26 practicing regularly did not remit at one month, 5 of 30 at 3rd month
  - ‘dose-dependent’ effect suggest a role for SKY (all remitted had practiced regularly)

Janakiramaiah et al 1998
Development and validation of a generic Yoga module

- Specific Yoga practices were matched for clinical features of depression based on a thorough literature review and a yoga program was developed.
  - Suksmavyayama (loosening exercises), asanas, relaxation techniques, pranayama and chanting meditation
  - This was validated by 9 Yoga experts and pilot-tested after modification based on their suggestions.
YOGA FOR DEPRESSION

AUTHORS

DR NAVEEN G H
DR SHIVARAMA VARAMBALLY
DR JAGADISHA THIRTHALLI

Advanced Centre for Yoga-Mental Health & Neuro Sciences
National Institute of Mental Health And Neuro Sciences (NIMHANS), Bangalore.

In collaboration with
Morarji Desai National Institute of Yoga (MDNIY)
New Delhi.
## Yoga Module For Depression - 50 Mins

### I. PREPARATORY PRACTICES: Sukshma & Sthula vyayama

**SURYANAMASKARA:** (3 Rounds) | 15 minutes

### II. SHAVASANA

2 minutes

### III. ASANAS AND MUDRA:

#### STANDING POSTURE:

i. Ardha chakrasana

**SITTING POSTURES:**

i. Ushtrasana

ii. Paschimottanasana

**PRONE POSTURE:**

i. Bhujangasana

**SHAVASANA:**

2 minutes

**SUPINE POSTURES:**

i. Pavanamukthasana

ii. Viparitakarani mudra

iii. Sethubandhasana

6 minutes
# Yoga Module – Part II

## Yoga Module for Depression – 50 Mins

<table>
<thead>
<tr>
<th>V. SHAVASANA (QRT)</th>
<th>4 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>VI. KRIYA</td>
<td></td>
</tr>
<tr>
<td>Kapalabhati</td>
<td>2 minutes</td>
</tr>
<tr>
<td>VII. PRANAYAMA</td>
<td>6 minutes</td>
</tr>
<tr>
<td>i. Suryanulomaviloma</td>
<td></td>
</tr>
<tr>
<td>ii. Ujjayi</td>
<td></td>
</tr>
<tr>
<td>iii. Bhashrika</td>
<td></td>
</tr>
<tr>
<td>VIII. PRANAVA JAPA (AUM chanting)</td>
<td>5 minutes</td>
</tr>
<tr>
<td>A</td>
<td>9 times</td>
</tr>
<tr>
<td>U</td>
<td>9 times</td>
</tr>
<tr>
<td>M</td>
<td>9 times</td>
</tr>
<tr>
<td>AUM</td>
<td>9 times</td>
</tr>
</tbody>
</table>
ARDHA USTRASANA

PADAHASTHASANA
BHUIJANGASANA

PASCHIMOTTANASANA
A generic Yoga module alone worked in OP’s with depression - Comparative study

Gangadhar et al Ind J Psychiatry 2013

HDRL (Mean)

Baseline  I-Month  3-Month

Assessment time points

Drug-only (n=16)

Drug+Yoga (n=27)

Yoga-only (n=15)
Regular Yoga practice improves Depression scores.
How and why does Yoga help in depression?
‘Biological’ or ‘Psychological’?

- The boundaries between these traditionally defined treatments are increasingly blurred.
- What defines “biological effect”? Is it the method of applying the treatment (physical/mental) or the mechanism by which the effect is produced?
- ? Placebo response
Neuroplasticity

Neuroplasticity: Ability of elements in the brain to exhibit structural and functional changes in response to external or internal perturbations.

At the neuronal level: Cascade of neurophysiological, neurochemical and neurohistological changes that result in synaptic strengthening, dendritic growth and branching, and new synapse formation.

Andrade and Rao 2010
Neuroplasticity in Depression

- Increasing evidence demonstrates that neuroplasticity, a fundamental mechanism of neuronal adaptation, is disrupted in mood disorders and in animal models of stress.
- Chronic stress disrupts neuroplasticity, and high levels of cortisol may mediate this effect.
- Antidepressant treatment produces opposing effects and can enhance neuroplasticity

Pittenger and Duman 2008
Stress, Depression, and Neuroplasticity: A Convergence of Mechanisms

Christopher Pittenger¹ and Ronald S Duman²

¹Department of Psychiatry, Connecticut Mental Health Center, Yale University School of Medicine, New Haven, CT, USA

Increasing evidence demonstrates that neuroplasticity, a fundamental mechanism of neuronal adaptation, is disrupted in mood disorders and in animal models of stress. Here we provide an overview of the evidence that chronic stress, which can precipitate or exacerbate depression, disrupts neuroplasticity, while antidepressant treatment produces opposing effects and can enhance neuroplasticity. We discuss neuroplasticity at different levels: structural plasticity (such as plastic changes in spine and dendrite morphology as well as adult neurogenesis), functional synaptic plasticity, and the molecular and cellular mechanisms accompanying such changes. Together, these studies elucidate mechanisms that may contribute to the pathophysiology of depression. Greater appreciation of the convergence of mechanisms between stress, depression, and neuroplasticity is likely to lead to the identification of novel targets for more efficacious treatments.

How antidepressant drugs act: A primer on neuroplasticity as the eventual mediator of antidepressant efficacy

Chittaranjan Andrade, N. Sanjay Kumar Rao
Department of Psychopharmacology, National Institute of Mental Health and Neurosciences, Bangalore, India.
1The Logos Centre for Cognitive Behavioural Therapy and Mental Health Promotion, Tees Esk and Wear Valley NHS Trust, County Hospital, Durham, UK.

ABSTRACT

Depression is conventionally viewed as a state of chemical imbalance, and antidepressants are suggested to act through increasing monoaminergic neurotransmission. These views are currently considered simplistic. This article examines the animal and human literature on the neurohistological mechanisms underlying stress, depression and antidepressant treatment. Pathological stress and depression are associated with changes such as loss of dendritic spines, shrinkage of the dendritic tree and loss of synapses in the hippocampus and prefrontal cortex. There is also a decrease in glia. Apoptosis may occur under extreme circumstances. In contrast, there is increased dendritic arborization and synaptogenesis in the amygdala. Antidepressant treatment protects against and even reverses some but not all of these stress-induced neurohistological changes. Pathological stress results in an aberrant neuroplasticity response characterized by abnormally increased activity in the amygdala and by impaired functioning of the hippocampus, prefrontal cortex and downstream structures. This aberrant neuroplasticity response directly explains most of the clinical symptoms of depression. Antidepressant treatment protects against stress-induced pathplastic neurohistological and neurocognitive changes. Antidepressant treatment also restores functional neuroplasticity in stressed organisms and, thereby, presumably, facilitates re-adaptation through learning and memory mechanisms. Thus, the stress-depression syndrome and the therapeutic and prophylactic efficacy of antidepressant treatments can be explained through a hardwiring analogy. In
Compared to REST, OM Chanting produced deactivation of limbic structures, anterior cingulum (B), hippocampi (C), insula (D), parahippocampi (E) and thalami (F). Control ‘chanting’: no effect (A)

_Kalyani et al Int J of Yoga 2011_
Markers of neuroplasticity in Depression: BDNF

BDNF levels were low & rose after treatment

Regular practice of Yoga ‘normalized’ plasma BDNF levels

6/24/2014
BDNF rise after Yoga correlated with Cognitive improvement
Pts treated only with Yogasana obtained reductions in depression scores & elevations in BDNF: The two effects were highly correlated ($r=0.7$, $p=0.001$)

Naveen et al Ind J Psychiatry 2013
In the Yoga-treated depressives (n=19) drop in cortisol was significantly related to rise in BDNF ($r=-0.6$, $p=0.008$)
Depression & Yoga: Summary

- Yoga is therapeutic in depression
- Regular practice has better therapeutic effect
- Yoga improves brain function (P300) and cognitive functions
- Yoga lowers stress hormone (cortisol)
- Yoga facilitates neuroplasticity (BDNF)
- BDNF increase is related to drop in cortisol
- Improvement is related to both of the above
Caveats and problems in yoga research

- Yoga as ‘therapy’ Vs Yoga as ‘lifestyle’

- Multiple schools/ training standards for yoga therapy

- Should yoga be studied with methods meant to evaluate medications (RCT’s)?, and if so, is there a suitable placebo/ comparator?

- Is double blinding possible or even desirable?
Advantages of yoga

- Acceptable and sought after
- Needs lesser ‘professional’ inputs
- Side-effect-free & no self-poisoning risk
- Sense of ‘conquering’ disease for patients
Acknowledgements

B N Gangadhar
Jagadisha
Venkat/ Rita C
Naveen/ Hariprasad
Rashmi/ Vishal
Mukund
NIMHANS Yoga Team

Director/ Administration of NIMHANS
Art of living, Bangalore
SVYASA Yoga University, Bangalore
MDNIY, New Delhi
AYUSH Department, Govt. of India
THANK YOU

ssv.nimhans@gmail.com

kalyanybg@yahoo.com