Scientific Research on Yoga and Sleep

Yoga Alliance Webinar
June 11, 2020

Sat Bir S. Khalsa, Ph.D.
Assistant Professor of Medicine, Harvard Medical School
Director of Yoga Research, Yoga Alliance
Director of Research, Kundalini Research Institute
Editor in Chief, International Journal of Yoga Therapy
Research Associate, Benson Henry Institute for Mind Body Medicine
Research Affiliate, Osher Center for Integrative Medicine
Sleep

- A biological need
- Sleep : Wakefulness
- An active process
- A complex process
# How Much Sleep Do I Need?

How much sleep you need changes as you age.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Recommended Hours of Sleep Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn</td>
<td>14-17 hours (National Sleep Foundation)¹&lt;br&gt;No recommendation (American Academy of Sleep Medicine)²</td>
</tr>
<tr>
<td>Infant</td>
<td>12-16 hours per 24 hours (including naps)²</td>
</tr>
<tr>
<td>Toddler</td>
<td>11-14 hours per 24 hours (including naps)²</td>
</tr>
<tr>
<td>Preschool</td>
<td>10-13 hours per 24 hours (including naps)²</td>
</tr>
<tr>
<td>School Age</td>
<td>9-12 hours per 24 hours²</td>
</tr>
<tr>
<td>Teen</td>
<td>8-10 hours per 24 hours²</td>
</tr>
<tr>
<td>Adult</td>
<td>7 or more hours per night³</td>
</tr>
<tr>
<td>61-64 years</td>
<td>7-9 hours¹</td>
</tr>
<tr>
<td>65 years and older</td>
<td>7-8 hours¹</td>
</tr>
</tbody>
</table>
Physiologic Determinants
Sleep and Wakefulness

- Biological Time of Day (circadian phase)
- Number of Hours Awake
- Nightly Sleep Duration
- Sleep Inertia
Sleep Disorders

Three major categories:
• Parasomnias
• Disorders of excessive daytime sleepiness
• Insomnia
Insomnia
America Insomnia Study

“…the overall prevalence estimate of broadly defined insomnia [is 23.6%…”

“Insomnia is…associated with substantial decrements in perceived health.”

America Insomnia Study

“The magnitude of the association between insomnia and days-out-of-role is substantial: an estimated gross 590 million days/year…”

“Insomnia was one of the most important conditions studied…at the aggregate level, where it was associated with 13.6% of all days-out-of-role.”

From: Days-out-of-role associated with insomnia and comorbid conditions in the America Insomnia Survey.

“…insomnia is much more strongly related to presenteeism than absenteeism. This means that workers with insomnia generally put in the same number of work hours as other workers, but that their on-the-job performance is lower than other workers.”

“…estimate of $59.8 billion annual lost productivity…”

Insomnia Presentation

- Sleep onset insomnia
- Sleep maintenance insomnia
- Poor quality/non-restorative sleep
Insomnia Diagnostic Criteria

- Sleep onset latency > 30 minutes
- Wake time after sleep onset > 30 minutes
- Frequency at least 3 times/week
- Duration at least 6 months
- Significant daytime impairment
INSOMNIA

Medications and substances
- Acute use
- Chronic use
- Withdrawal

Circadian Factors
- Jet lag
- Shift work
- Advanced, delayed sleep phases

Medical/Neurological Factors
- Pain, discomfort
- Specific disorders

Psychiatric or Psychological Factors
- Depression or Anxiety
- Bereavement
- Acute stress

Environmental Factors
- Physical discomfort
- Noise
- Light

Primary Sleep Disorders
- Restless Legs Syndrome
- Periodic limb movements
- Respiratory arousals
- Parasomnias

Behavioral, Psychophysiological, and Conditioning Factors
- Fear, frustration with insomnia
- Sleep-incompatible behaviors
- Increased arousal

INSOMNIA
Behavioral, Psychophysiological, and Conditioning Factors

- Fear, frustration with insomnia
- Sleep-incompatible behaviors
- Increased arousal

INSOMNIA
Impact of Insomnia

INSOMNIA

- Medical Illnesses
- Reduced Quality of Life
- Higher Absenteeism
- Increased Accident Risk
- Higher Health Care Costs
- Cognitive Impairment
- Psychiatric Disorders

Insomnia Treatment

- Treat underlying cause (secondary insomnia)
  - Pain, depression, anxiety, sleep disordered breathing, RLS/PLMD
- Pharmacological Treatments
- Behavioral Treatments
Behavioral Treatments for Insomnia

**Sleep Hygiene**
General sleep-specific recommendations for facilitating sleep

**Stimulus control**
Association/Reassociation of the bed/bedroom solely for sleep or sex

**Cognitive therapy**
Challenge dysfunctional beliefs and misperceptions about sleep and insomnia

**Sleep restriction**
Improve sleep continuity by limiting time spent in bed

**Relaxation training**
Relaxation treatments employing cognitive and/or somative techniques to reduce tension and arousal
Yoga Practices
Postures, Breathing, Relaxation, Meditation

Fitness
↑Flexibility
↑Strength
↑Coordination/Balance
↑Respiratory Function
↑Self-Efficacy

Self-Regulation
↑Stress Regulation
↑Emotion Regulation
↑Resilience
↑Equanimity
↑Self-Efficacy

Awareness
↑Attention
↑Mindfulness
↑Concentration
↑Cognition
↑Meta-cognition

Spirituality
↑Unitive State
↑Transcendence
↑Flow
↑Transformation
↑Life Meaning/Purpose

Global Human Functionality
↑Physical & Mental Health, ↑Physical Performance
↑Stress & Emotion Regulation, ↑Awareness/Mindfulness, ↑Meta-cognition
↑Positive Behavior, ↑Wellbeing, ↑Values, ↑Life Purpose & Meaning, ↑Spirituality
Yoga for Sleep

This morning was brought to you by a good night’s sleep.

For great mornings, take comfort in our strength.
Mind-body interventions were able to improve sleep efficiency and total sleep time. Most can ameliorate sleep quality; some can reduce the use of hypnotic drugs in those who are dependent on these drugs."

“…self-reported sleep was improved by all mind-body treatments, among them yoga, relaxation, Tai Chi…”

“Yoga practice is well suited to complement existing therapies and to address sleep problems in a more holistic way.”

“Yoga teachers and practitioners have long touted the positive effects of yoga and meditation on sleep…improvements in sleep are among the first (and often most valued) changes observed by new practitioners (Cimini, 2010). Yoga is already one of the top five alternative medicine interventions for insomnia, based on consumer surveys…”
CLINICAL REVIEW

The effect of meditative movement on sleep quality: A systematic review

Fang Wang a, Othelia Eun-Kyoung Lee b, Fan Feng a, Michael V. Vitiello c, Weidong Wang a,*, Herbert Benson d, Gregory L. Frichione d, John W. Denninger d

a Department of Psychology, Guang’an Men Hospital of China Academy of Chinese Medical Sciences, Beijing, China
b School of Social Work, University of North Carolina at Charlotte, Charlotte, NC, USA
c Department of Psychiatry and Behavioral Sciences, University of Washington, Seattle, WA, USA
d Benson Henry Institute for Mind Body Medicine of Massachusetts General Hospital, Boston, MA, USA

ARTICLE INFO

Article history:
Received 24 March 2015
Received in revised form
28 November 2015
Accepted 1 December 2015
Available online 12 December 2015

Keywords:
Meditative movement
Sleep quality
Systematic review

SUMMARY

The purpose of this systematic review was to identify and assess evidence related to the efficacy of meditative movement (MM) on sleep quality. We conducted a comprehensive review of relevant studies drawn from English and Chinese databases. Only randomized controlled trials (RCTs) reporting outcomes of the effects of MM (tai chi, qi gong, and yoga) on sleep quality were taken into consideration. Twenty-seven RCTs fulfilled our inclusion criteria and formed the basis for this review. Due to clinical heterogeneity, no meta-analysis was performed. Seventeen studies received a Jadad score of ≥3 and were considered high-quality studies. Findings of the 17 studies showed that MM has beneficial effects for various populations on a range of sleep measures. Improvement in sleep quality was reported in the majority of studies and was often accompanied by improvements in quality of life, physical performance, and depression. However, studies to date generally have significant methodological limitations. Additional RCTs with rigorous research designs focusing on sleep quality or insomnia and testing specific hypotheses are needed to clearly establish the efficacy of MM in improving sleep quality and its potential use as an intervention for various populations.

© 2015 Elsevier Ltd. All rights reserved.
Integrative Medicine for Insomnia

Eric S. Zhou, PhD\textsuperscript{a,*}, Paula Gardiner, MD, MPH\textsuperscript{b}, Suzanne M. Bertisch, MD, MPH\textsuperscript{c}

KEY POINTS

- Insomnia is a common sleep disorder that is associated with poorer physical and psychological health.
- The comprehensive evaluation of a patient’s health status is important when diagnosing insomnia and devising a treatment plan.
- Consistent evidence has demonstrated the efficacy of cognitive-behavioral therapy (CBT) for insomnia. CBT should be considered as first-line treatment.
- There is a growing body of literature suggesting that mindfulness-based stress management, yoga, and tai chi may improve insomnia symptoms. Current data do not support routine use of dietary supplements for sleep.
- Well-designed research studies are needed to better understand the impact of other complementary treatment approaches for insomnia (eg, acupuncture).
Yoga for Sleep Problems in Women


MBSR as a Treatment for Insomnia


Multicomponent Cognitive Behavioral Treatment for Insomnia

### TABLE III

**Posttreatment Improvements in Sleep and Sleep Medication Use**

<table>
<thead>
<tr>
<th>Patients reporting improved sleep (n = 102)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Significant improvement</td>
<td>58%</td>
</tr>
<tr>
<td>Moderate improvement</td>
<td>33%</td>
</tr>
<tr>
<td>Slight improvement</td>
<td>9%</td>
</tr>
<tr>
<td>No improvement</td>
<td>0%</td>
</tr>
<tr>
<td>Sleep worse</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patients reporting sleeping medication reduction or cessation (n = 68)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eliminated medication</td>
<td>38%</td>
</tr>
<tr>
<td>Reduced dosage or increased number of medication-free nights</td>
<td>53%</td>
</tr>
<tr>
<td>No change</td>
<td>9%</td>
</tr>
<tr>
<td>Increased medication use</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patients reporting maintenance or enhancement of improvement in sleep at 6-month follow-up (n = 70)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement enhanced</td>
<td>47%</td>
</tr>
<tr>
<td>Improvement maintained</td>
<td>43%</td>
</tr>
<tr>
<td>Sleep worse</td>
<td>10%</td>
</tr>
</tbody>
</table>
Yoga on Insomnia in the Elderly

Table 2. Subjective Sleep Quality Pre- and Postintervention Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Subset Groups</th>
<th>n</th>
<th>Preintervention M (SD)</th>
<th>Postintervention M (SD)</th>
<th>df</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSQI Global Score</td>
<td>WLC</td>
<td></td>
<td>21</td>
<td>10.14 (3.21)</td>
<td>10.00 (3.08)</td>
<td>1.64</td>
<td>.81</td>
</tr>
<tr>
<td></td>
<td>Total YI</td>
<td></td>
<td>45</td>
<td>9.82 (3.49)</td>
<td>8.67 (3.62)</td>
<td>1.64</td>
<td>.011</td>
</tr>
<tr>
<td></td>
<td>YI subsets</td>
<td></td>
<td>18</td>
<td>9.17 (3.94)</td>
<td>9.72 (4.03)</td>
<td>1.63</td>
<td>.39</td>
</tr>
<tr>
<td></td>
<td>YHC</td>
<td></td>
<td>27</td>
<td>10.26 (3.14)</td>
<td>7.96 (3.22)</td>
<td>1.63</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>PSQI Sleep Quality Score</td>
<td>WLC</td>
<td></td>
<td>25</td>
<td>1.84 (0.62)</td>
<td>1.72 (0.54)</td>
<td>1.78</td>
<td>.44</td>
</tr>
<tr>
<td></td>
<td>Total YI</td>
<td></td>
<td>55</td>
<td>1.60 (0.65)</td>
<td>1.27 (0.52)</td>
<td>1.78</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>YI subsets</td>
<td></td>
<td>25</td>
<td>1.56 (0.71)</td>
<td>1.28 (0.46)</td>
<td>1.77</td>
<td>.076</td>
</tr>
<tr>
<td></td>
<td>YHC</td>
<td></td>
<td>30</td>
<td>1.63 (0.61)</td>
<td>1.27 (0.58)</td>
<td>1.77</td>
<td>.012</td>
</tr>
<tr>
<td>PSQI Sleep Latency Score</td>
<td>WLC</td>
<td></td>
<td>22</td>
<td>2.45 (0.67)</td>
<td>2.00 (0.93)</td>
<td>1.62</td>
<td>.012</td>
</tr>
<tr>
<td></td>
<td>Total YI</td>
<td></td>
<td>42</td>
<td>1.86 (0.98)</td>
<td>1.48 (1.02)</td>
<td>1.62</td>
<td>.004</td>
</tr>
<tr>
<td></td>
<td>YI subsets</td>
<td></td>
<td>17</td>
<td>1.94 (1.03)</td>
<td>1.82 (1.07)</td>
<td>1.61</td>
<td>.56</td>
</tr>
<tr>
<td></td>
<td>YHC</td>
<td></td>
<td>25</td>
<td>1.80 (0.96)</td>
<td>1.24 (0.93)</td>
<td>1.61</td>
<td>.001</td>
</tr>
<tr>
<td>PSQI Sleep Duration Score</td>
<td>WLC</td>
<td></td>
<td>23</td>
<td>2.04 (0.82)</td>
<td>2.26 (0.75)</td>
<td>1.73</td>
<td>.17</td>
</tr>
<tr>
<td></td>
<td>Total YI</td>
<td></td>
<td>52</td>
<td>2.00 (0.99)</td>
<td>1.77 (0.85)</td>
<td>1.73</td>
<td>.042</td>
</tr>
<tr>
<td></td>
<td>YI subsets</td>
<td></td>
<td>23</td>
<td>1.74 (1.10)</td>
<td>1.87 (0.87)</td>
<td>1.72</td>
<td>.41</td>
</tr>
<tr>
<td></td>
<td>YHC</td>
<td></td>
<td>29</td>
<td>2.21 (0.86)</td>
<td>1.69 (0.85)</td>
<td>1.72</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>


FIG. 2. Results of pretreatment and posttreatment ISI scores for the three groups: control, passive stretching, and yoga. †Comparison between the preintervention and postintervention time points for each group; ‡comparison of the effect of treatment between groups; ‡comparison of the groups at the postintervention time point (P < 0.05). ISI, Insomnia Severity Index.
Shabad Kriya for Deep, Relaxing Sleep

The best time to practice this kriya is every night before bed, but it can be practiced any time of the day. It is said that if it is practiced regularly, sleep will be deep and relaxed, and the nerves will regenerate. After a few months, the rhythm of your breath as you sleep will be subconsciously regulated in the rhythm of the mantra. You will think better, work better, share better, love better, and fight better.

This rhythmic mantra will eventually progress so that even in daily activities you will automatically hear the mantra and take on the breath rhythm.

The breath is regulated into 22 beats. In Numerology, the number 11 is the number of infinity. The number 22 is the mastery of the mental realm. This 22 beat breath gives the mind the power to stretch to the Infinite.

There cannot be enough praise of this meditation and its growth-promoting effect on the personality. It gives radiance, and the radiance gives patience, which is the first condition of real love. In love you give without attention to all the mistakes of another as the sun gives light and warmth to all people.

**Posture:** Sit in any comfortable posture with the spine straight. Place the hands in the lap, palms up with the right hand over the left. The thumbs are together and point forward.

**Eyes:** Focus the eyes on the tip of the nose, the eyelids 9/10 closed.

**Breath and Mantra:** Inhale in 4 equal parts, mentally vibrating the mantra Sa-To-Na-Ma. Hold the breath, vibrating the mantra 4 times for a total of 16 beats. Exhale in 2 equal strokes projecting mentally Wahe Guru. Continue for 15 to 62 minutes.

©1975 The Teachings of Yogi Bhajan

This meditation was practiced for 31 minutes in a successful pilot sleep trial for chronic insomnia conducted by Sat Bir Singh Khalsa, Ph.D. at Harvard Medical School. For 20 participants completing the protocol, statistically significant improvements in sleep were observed.

https://www.3ho.org/articles/shabad-kriya-deep-sleep-and-radiance
### Sleep Onset Latency

**Baseline**

**Wk 1-2**

**Wk 3-4**

**Wk 5-6**

**Wk 7-8**

**Followup**

**Average Sleep Onset Latency (minutes)**

- Baseline: 20
- Wk 1-2: 30
- Wk 3-4: 40
- Wk 5-6: 50
- Wk 7-8: 60
- Followup: 70

### Sleep Efficiency

**Baseline**

**Wk 1-2**

**Wk 3-4**

**Wk 5-6**

**Wk 7-8**

**Followup**

**Average Sleep Efficiency (%)**

- Baseline: 70
- Wk 1-2: 75
- Wk 3-4: 80
- Wk 5-6: 85
- Wk 7-8: 90

### Total Wake Time

**Baseline**

**Wk 1-2**

**Wk 3-4**

**Wk 5-6**

**Wk 7-8**

**Followup**

**Average Total Wake Time (hr)**

- Baseline: 0.8
- Wk 1-2: 1.0
- Wk 3-4: 1.2
- Wk 5-6: 1.4
- Wk 7-8: 1.6
- Followup: 1.8

### Total Sleep Time

**Baseline**

**Wk 1-2**

**Wk 3-4**

**Wk 5-6**

**Wk 7-8**

**Followup**

**Average Total Sleep Time (hr)**

- Baseline: 5.5
- Wk 1-2: 6.0
- Wk 3-4: 6.5
- Wk 5-6: 7.0
- Wk 7-8: 7.5

---

**Shabad Kriya for Chronic Insomnia**
Kriya for Conquering Sleep

1. Sit on the heels with the palms on the thighs. Keep the spine straight and lean back 30 degrees from the vertical position. Hold the posture with long deep breathing for 1 minute. Then relax.

2. Sit up sitting on the heels, fold the arms across the chest and hold onto the elbows. Rotate the turnk in a circle from right to left. Continue this for 3 minutes.

3. Immediately stretch the legs out straight. Put the hands on the ground next to the hips. With the inhale lift the heels and body off the ground. With the exhale drop the body. Do 30 of these "body drops" with the breath.

4. Repeat Exercise 3 for 3 minutes.

5. Repeat Exercise 3 for 15 body drops.

6. Come into Bridge Pose. Raise the hips up and bend at the knees. The palms and feet are on the ground. Let the head relax back. Hold the pose for 1 minute with normal breathing. Continue with breath of fire for 3 minutes. Then inhale, exhale completely, and hold the breath out as you apply mulabandh. Relax.

7. Repeat Exercise 3 for 10 body drops.

8. Repeat Exercise 6 (Bridge Pose) for 3 minutes with breath of fire.

9. Relax completely on the back for 2 to 3 minutes.

10. Come into Bridge Pose. Raise the right leg 60 degrees. Point the toes forward. Do a powerful breath of fire for 1 1/2 minutes. Then inhale deeply, exhale completely, and apply mulabandh. Repeat the exercise with the leg raised. Relax.

11. Sit in Crow Pose. Squat down with the feet flat on the ground. With the palms facing down, extend the arms in front parallel to the ground. Inhale deeply as you stand up. Exhale completely as you squat down. Keep the spine as straight as possible. Do 30 of these Crow Pose squats.

12. Lie on the stomach. Put the palms on the ground under the shoulders. Slowly arch up into Cobra Pose. Hold the pose with normal breathing for 1 minute. Then kick the buttocks with one leg for 3 minutes. Each time the heel strikes the buttocks, inhale slightly. Kick with the other leg for 2 more minutes. Relax.

13. Sit on the heels in Rock Pose. Extend the arms straight over the head with the palms flat together. Bring the palms down halfway toward the top of the head with the elbows slightly bent. Raise the eyes up, and focus at the center of the skull on the point of light and through the top of the head. Continue for at least 3 minutes.

Comments:

If sleep is a constant problem for you, practice this kriya regularly for 90 days. It can be done before bed at night or in the morning. We waste billions of dollars on sleeping pills and stimulants when a much safer and more natural approach exists in yoga and meditation. Unfortunately, the exercises take effort; a pill doesn’t. If you choose to put the effort into this kriya, it will eliminate sleep disturbances and give you alertness throughout the day.

© The Teachings of Yogi Bhajan

This Kriya can be found in the Sadhana Manual available from KRI.

Note: Always seek the advice of a licensed health professional before beginning any exercise program. The information presented here is not intended to diagnose, treat, cure, or replace proper medical care. The benefits attributed to the practice of yoga come from the centuries old yoga traditions. Results will vary with individuals.

Hold for 5 minutes and then let it go. Repeat a second time for 5-10 minutes and a third time if you can.

https://www.3ho.org/3ho-lifestyle/health-and-healing/kriya-conquering-sleep
Serving the Yoga Community

Yoga Alliance® is committed to promoting and supporting the integrity and diversity of the teaching of yoga.
Scientific Research on Yoga

Substantial research has been done on many of the populations and parts of the body that COVID-19 preys on most. Use this section of Yoga Alliance's website to learn more about scientific research on the effects of yoga on the elderly, respiratory function, anxiety, and depression, to name a few.

Perhaps more than ever, yoga is being widely studied and evaluated for its positive effects and benefits. At Yoga Alliance, we curate the latest and most relevant research on yoga's applications in health, wellness, and disease. We have filtered it in a digestible manner for our Registered Yoga Schools and Registered Yoga Teachers as well as for the broader yoga community.

This evidence-based research not only reveals the science of yoga, it also explains its therapeutic efficacy when used in conjunction with conventional medicine. Our goal is that this impactful content will be utilized in a way that highlights even more of yoga's ancient, multi-faceted ability to improve lives.

Join us! Let us know how research on yoga is important or valuable to you on social media (@YogaAlliance) or by emailing us at research@yogaalliance.org. We honor and value your personal experiences and look forward to featuring your stories.

Our Research Conversation

Main Research Categories

- Basic Research
- Special Populations
- Disease and Disorders

Archived Videos
Browse our selection of yoga research videos to learn more about research done in specific categories of health and wellness.
Other Mental Health Conditions | Addictions, Substance Abuse, Trauma, Post-Traumatic Stress Disorder, Neuroses, Psychotic Conditions, Insomnia

Our hope is for yoga schools and yoga teachers to utilize this impactful content in their teachings to promote and highlight yoga's evident multi-faceted ability to improve lives. Let us know how research on yoga is important or valuable to you on social media (@YogaAlliance) or by emailing us at research@yogaalliance.org. We honor and value your personal experiences and look forward to featuring your stories.

These citations were curated by Yoga Alliance's Director of Yoga Research, Dr. Sat Bir Singh Khalsa.

Review Papers (What's this?)

Wang X, Beauchemin J, Liu C, Lee M.Y.
[abstract]

The effect of mind-body and aerobic exercise on negative symptoms in schizophrenia: A meta-analysis.
Vogel JS, van der Gaag M, Slofstra C, Knegtering H, Bruins J, Castelein S.
Psychiatry Res. 2019 Sep;279:295-305.
[full text]

Meditation-based mind-body therapies for negative symptoms of schizophrenia: Systematic review of randomized controlled trials and meta-analysis.
Sabe M, Sentissi O, Kaiser S.
Schizophr Res. 2019 Aug 1. pii: S0920-9964(19)30310-X.
[abstract]

Notable Publications (What's this?)

Psychological wellness, yoga and quality of life in patients affected by schizophrenia spectrum disorders: A pilot study.
Caponetto P, Auditore R, Meglia M, Pipitone S, Inguscio L.
[full text]

The use of mind-body medicine among US individuals with sleep problems: analysis of the 2017 National Health Interview Survey data.
Yoii P, Hoefermann MD, Dobos G, Cramer H.
Sleep Med. 2019 Apr;56:151-156.
[abstract]

Meals, Mindfulness, & Moving Forward: A feasibility study to a multi-modal lifestyle approach in early psychosis.
Early Interv Psychiatry. 2019 Feb;13(1).147-150.
[full text]