



Welcome to the SBSM Virtual Journal Club Webinar

Topic: [Rise and Shine: A Treatment Experiment Testing a Morning Routine to Decrease Subjective Sleep Inertia in Insomnia and Bipolar Disorder](#)

Presenter: Kate Kaplan, PhD

Clinical Instructor in Psychiatry and Behavioral Sciences at Stanford University and has a private practice in nearby Menlo Park, where she provides behavioral sleep medicine services to adults and adolescents. Her research interests include treatments for insomnia, hypersomnia and circadian disturbances, as well as machine learning methods for big data.

Discussant: Rachel Manber, PhD, DBSM

Professor of Psychiatry and Behavioral Sciences at Stanford University and the director of the Sleep Health and Insomnia Program, where she provides cognitive behavioral sleep medicine therapies to adults, adolescents, and children. Her recent and current research has been focused on CBT for insomnia in specific populations and development and testing of stepped care models to enhance its broad dissemination.



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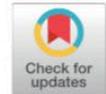
Rise and shine: A treatment experiment testing a morning routine to decrease subjective sleep inertia in insomnia and bipolar disorder

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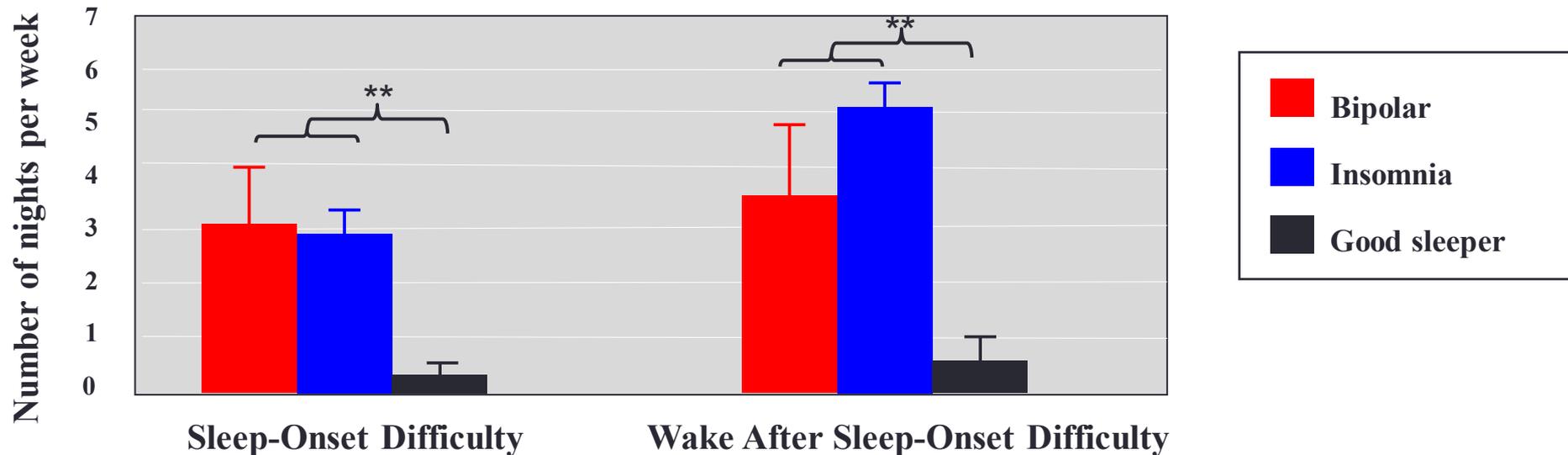
Sleep Inertia

Sleep inertia is “a transitional state of lowered arousal occurring immediately after awakening from sleep” (Tassi & Muzet, 2000)

- Impairs a wide variety of cognitive processes, including alertness, attention and working memory (e.g. Jewett et al., 1999; Wertz et al., 2006)
- Objective impairments last up to three hours (Jewett et al., 1999)
- More severe when waking around biological night, from SWS or recovery sleep following sleep deprivation
- Prominent in adolescents, DSPD, IH, mood disorders (Trotti, 2017)
- Mechanisms not well understood

Sleep in Bipolar Disorder

- Mania: Reduced need for sleep (69-99%)
- Depression: Insomnia (80-100%) or hypersomnia (23-78%)
- Interepisode period: Sleep disturbances persist



Harvey AG, et al. (2005) *Am J Psychiatry*, 162:50-57.

Kaplan KA & Harvey AG. (2009) *Sleep Med Rev*, 13: 275-85.

Sleep Inertia in Comorbid Bipolar Disorder & Insomnia

Sleep inertia (SI) is prominent in bipolar disorder and insomnia

- Population-based surveys suggest SI strongly associated with BD and insomnia (Ohayon et al., 2000, 2014)
- Individuals with BD more likely to have evening chronotypes (Giglio et al., 2010), which are more likely to experience daily sleep inertia (Roennenberg et al., 2003) and insomnia symptoms (Merikanto et al., 2012)
- Shared polymorphisms (NPAS2, CLOCK) in SI severity, BD, and insomnia (Gamble et al., 2011; McCarthy et al., 2012; Soria et al., 2010)

CBT-I is a multicomponential treatment proven effective in multiple meta-analyses (e.g. Irwin et al., 2006; Trauer et al., 2015)

Relatively few recommendations to address sleep inertia

Reducing Sleep Inertia: The RISE UP Routine

R: Refrain from Snoozing

| Rationale | Participant Instructions |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Delays physical activity and associated physiological arousal (Leary, 2002).• Compromises regularity in sleep-wake cycle and entrainment (Manber et al., 1996)• Delays postural changes that might promote alertness | <ul style="list-style-type: none">• Get out of bed immediately following your alarm.• Consider keeping the alarm at a distance, or setting multiple alarms for the same time, to reduce desire to return to bed. |

Reducing Sleep Inertia: The RISE UP Routine

I: Increase Activity for the First Hour

| Rationale | Participant Instructions |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">Multiple studies suggest nighttime exercise and increased physical activity attenuates subjective sleepiness (e.g., Leproult et al., 1997; Matsumoto et al., 2002) | <ul style="list-style-type: none">Increase activity in first hour upon waking, including taking a short walk or doing household chores.Avoid sedentary activities such as newspaper reading and email. |

Reducing Sleep Inertia: The RISE UP Routine

S: Shower or Wash Face and Hands with Cold Water

| Rationale | Participant Instructions |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Distal vasoconstriction parallels declines in subjective sleepiness upon waking; use of cold water to encourage vasoconstriction may curtail sleep inertia (Krauchi, et al., 2004; Krauchi, et al., 2006).• Face-washing with cold water reduced fatigue after waking from a nap (Hayashi, et al., 2003). | <ul style="list-style-type: none">• Use cold water to shower or wash up. |

Reducing Sleep Inertia: The RISE UP Routine

E: Exposure to Sunlight

| Rationale | Participant Instructions |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Direct alerting effect (Cajochen, 2007)• Suppresses melatonin production (Lewy et al., 1980)• Elevates cortisol levels (Leproult et al., 2001)• Facilitates entrainment | <ul style="list-style-type: none">• Get outdoor sunlight (take a quick walk, have breakfast outside) if possible.• Open up blinds or shades to allow natural light in at night.• Turn room lights on if still dark. |

Reducing Sleep Inertia: The RISE UP Routine

U: Upbeat Music

| Rationale | Participant Instructions |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Reduces subjective sleepiness and improve performance when played immediately after waking (Hayashi, et al., 2004)• Promotes wakefulness in low-arousal conditions (Bonnet & Arand, 2000) | <ul style="list-style-type: none">• Create an upbeat morning playlist on portable music players or use an alarm clock with an audio function. |

Reducing Sleep Inertia: The RISE UP Routine

P: Phone a Friend

| Rationale | Participant Instructions |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Short breaks that include social conversation along with postural change have an acute alerting effect (Neri, et al., 2002).• “Social zeigeber” (Ehlers, Frank, & Kupfer, 1988). | <ul style="list-style-type: none">• Converse with housemates or call family and friends within the first hour of waking. |

Study Aims

- Aim 1: Evaluate whether the RISE UP routine increases activity levels in the morning
- Aim 2: Evaluate whether the RISE UP routine decreases the severity and duration of self-reported sleep inertia
- Aim 3: Evaluate treatment acceptability and expectancy of the RISE UP routine

Introduced as the first intervention in a larger RCT (Harvey et al., 2015), which can be an efficient way of determining effective treatment components (Clark et al., 2004)

Participants

Inclusion

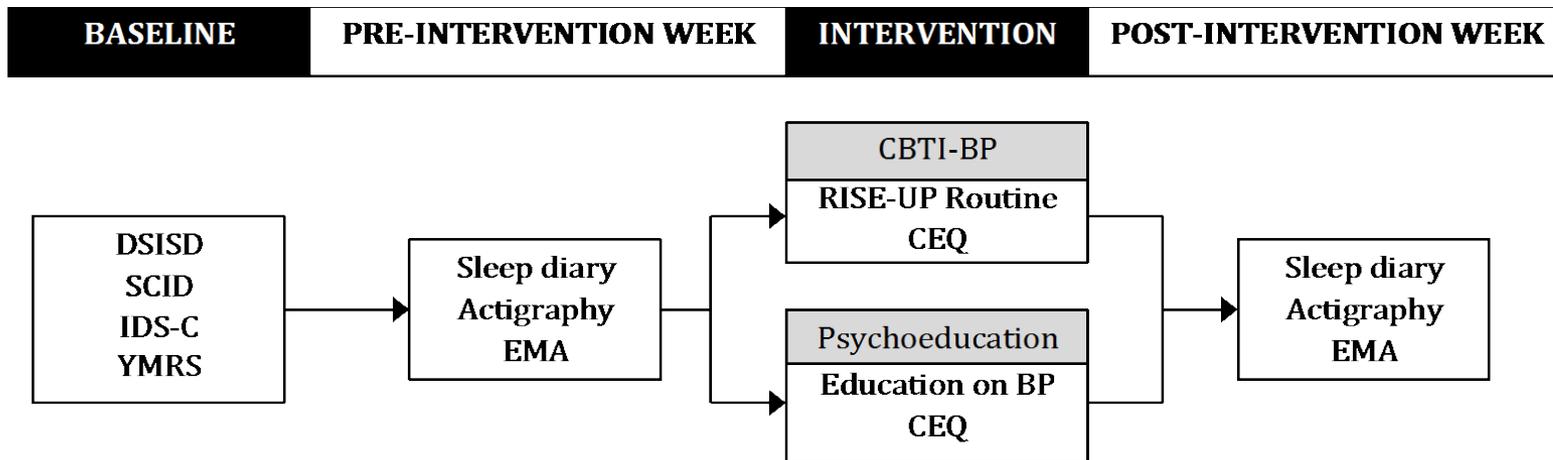
- DSM-IV-TR Bipolar I Disorder
- Currently euthymic (via the SCID, IDS-C, YMRS)
- Stable medication regimen for prior month
- Subjective difficulties initiating or maintaining sleep >1mo
- Under care of prescribing provider

Exclusion

- Current substance use disorders, PTSD, active suicide or homicide risk, OSA, PLMD, RLS, physical illness related to insomnia, pregnancy, shift work in past 3 months

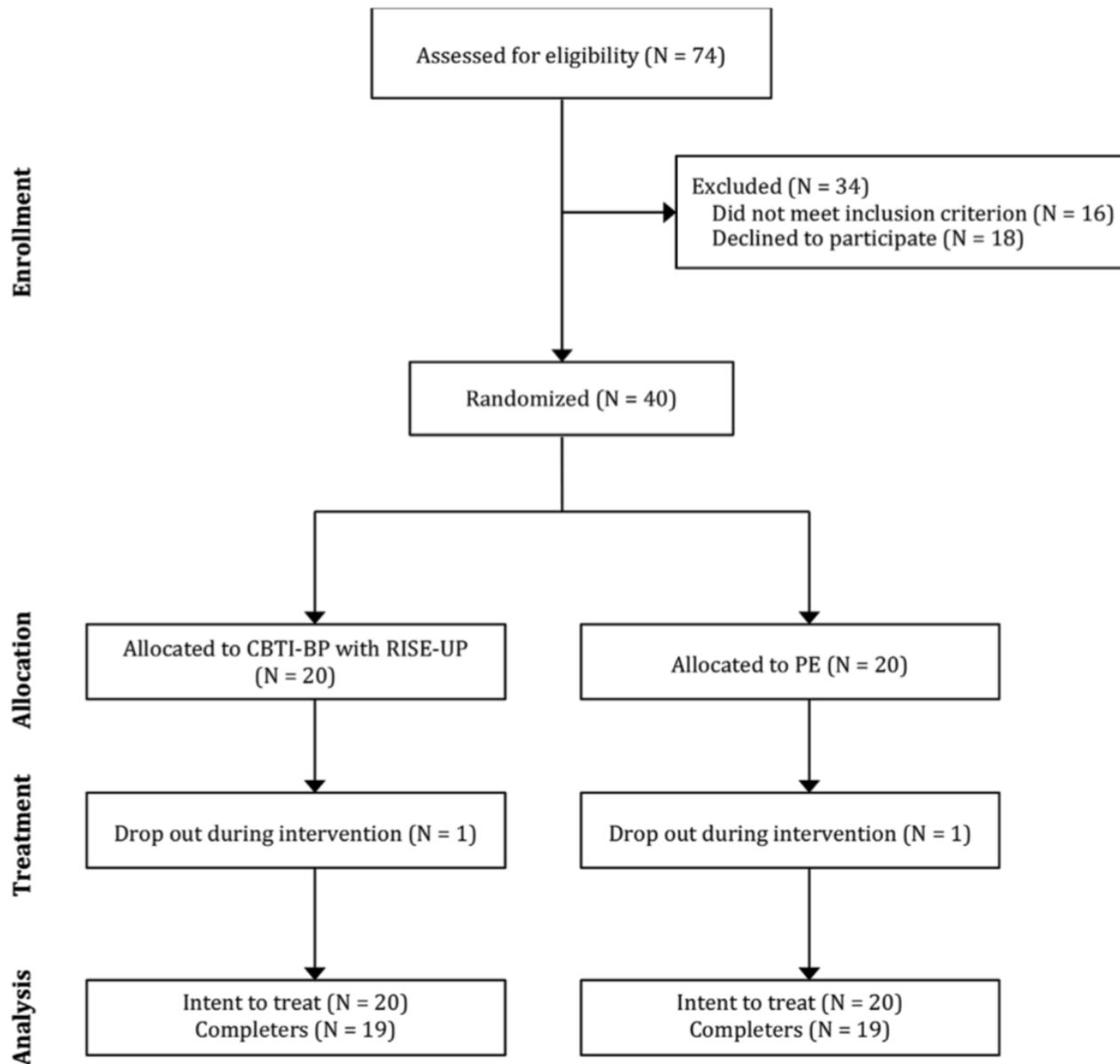
Study Design

S1



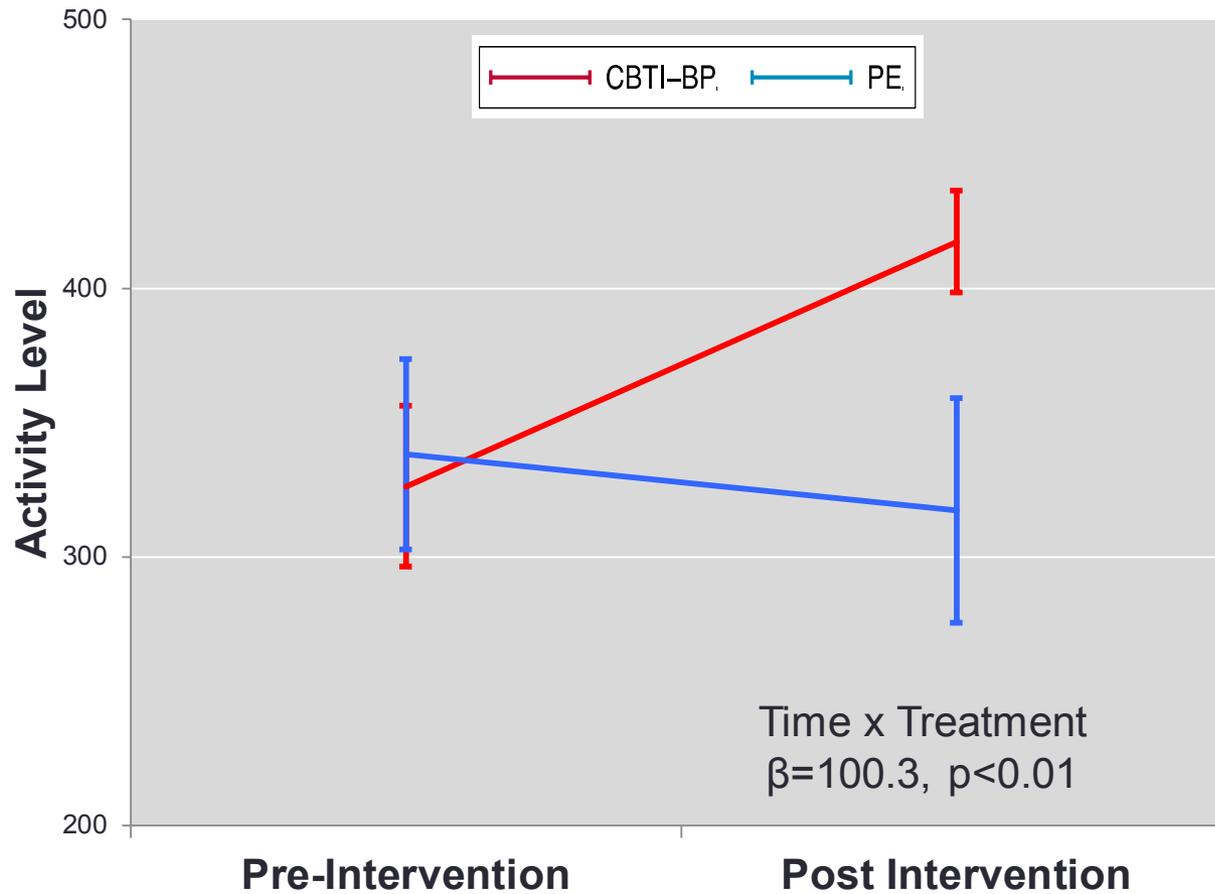
- *Sleep Diary* (Carney et al., 2012)
- *Stanford Sleepiness Scale* (Hoddes et al., 1973)
- *Actigraphy* (AW-64, Mini Mitter Respironics Inc; Kaplan et al., 2011)
- *Ecological Momentary Assessment* (Shiffman et al., 2008)
- *Credibility/Expectancy Questionnaire* (Borkovec & Nau, 1972)



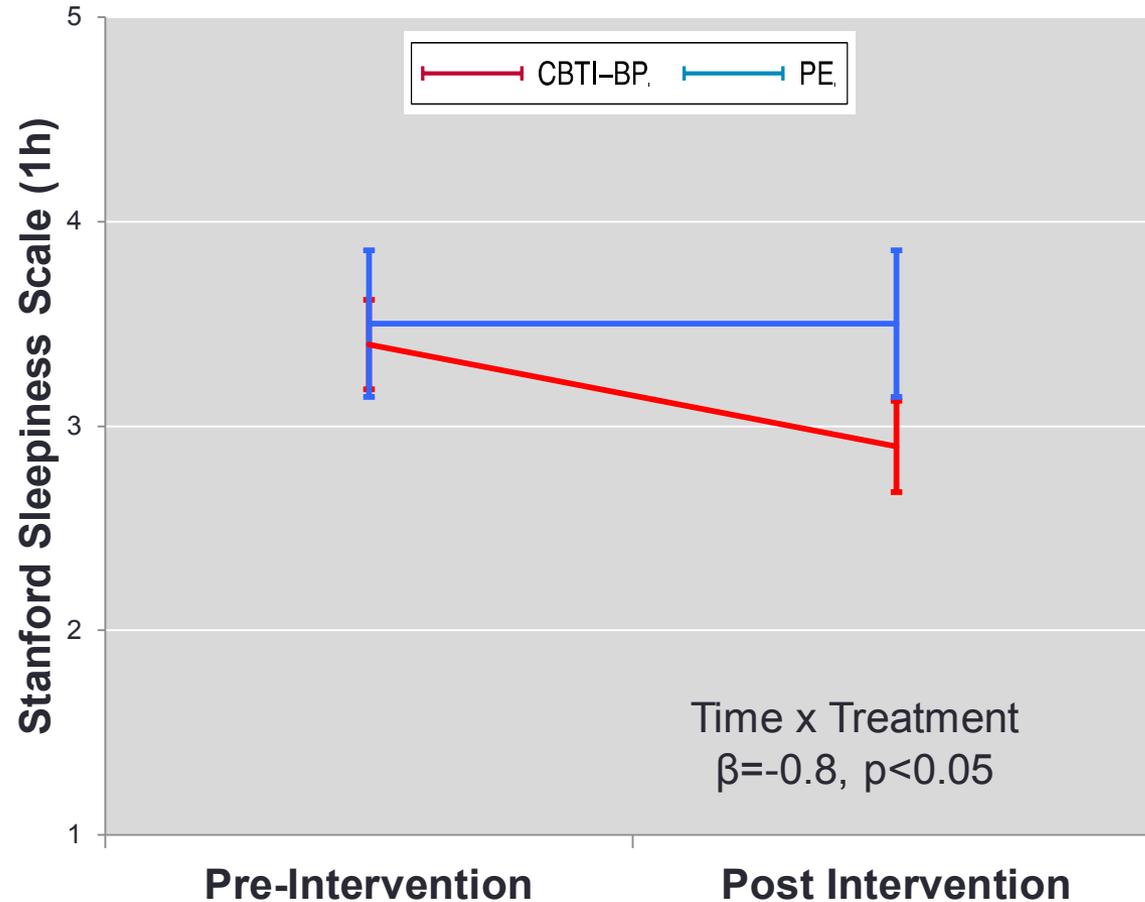


Note. CBTI-BP = cognitive behavior therapy for insomnia modified for bipolar disorder; PE = psychoeducation.

RISE UP Increased Activity Levels



RISE UP Reduced Severity of Morning Sleepiness



RISE UP Reduced Duration of Morning Sleepiness

Mixed effects model results for RISE-UP and Psychoeducation groups.

| Measure | Treatment Effect | | | Time Effect | | | Treatment x Time Effect | | | |
|-----------------------------------|------------------|-------|-------|-------------|-------|-------|-------------------------|-------|-------|--------|
| | β | SE | p | β | SE | p | β | SE | p | d |
| Activity 1h After Waking | -6.52 | 44.6 | 0.884 | -18.0 | 24.5 | 0.464 | 108.7 | 34.88 | 0.002 | 0.540 |
| Activity 3h after waking | 7.71 | 36.1 | 0.832 | 18.4 | 18.8 | 0.328 | 14.9 | 26.6 | 0.576 | 0.091 |
| Sleep Inertia duration (diary) | 27.1 | 12.0 | 0.029 | -4.93 | 5.31 | 0.354 | -16.3 | 7.79 | 0.037 | -0.241 |
| SSS 1h After Waking | -0.054 | 0.416 | 0.897 | 0.104 | 0.244 | 0.667 | -0.768 | 0.338 | 0.024 | -0.418 |
| SSS 3h After Waking | 0.654 | 0.391 | 0.101 | 0.319 | 0.248 | 0.199 | -1.11 | 0.348 | 0.002 | -0.592 |

Note. d = Cohen's d between-group effect size. SSS = Stanford Sleepiness Scale.

High Rates of Compliance

- Checklist = average of 4.25 activities completed daily (4 individuals with missing data conservatively entered as noncompliant)

| RISE UP Component | % Compliance |
|-------------------|--------------|
| Cold Water | 70% |
| Sunlight | 67% |
| Activity | 62% |
| Snoozing | 55% |
| Upbeat Music | 50% |
| Social Contact | 50% |

- Credibility / Expectancy Questionnaire = favorable ratings of acceptability and expectations for success

Summary

The RISE UP intervention:

- Increased morning activity levels
- Decreased subjective sleep inertia duration
- Decreased subjective sleep inertia intensity at one and three hours after waking
- Was favorably received and demonstrated reasonable rates of compliance

Limitations and Future Directions

- Objective sleep inertia measurement
- Actigraphic data loss due to watch malfunction, loss and non-availability
- Longer follow-up intervals
- Replication in larger sample
- Replication in additional populations
- Can RISE UP improve CBTI adherence?

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