



Sleep Roses and Thorns

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The Pittsburgh Study

The Summit on the Science of Sleep

Disclosures

- Research Funding: NIH, University of Pittsburgh
- Royalties: American Psychological Association Books
- Employment: University of Pittsburgh, UPP

Sleep problems are common among adolescents

- Insomnia

36% Symptoms

11% Diagnosis

- Delayed sleep-wake phase disorder

8% Diagnosis

- Insufficient sleep

75% on
Weeknights

- Irregular sleep timing

≥ 4.5 Hours
Weekend
Oversleep

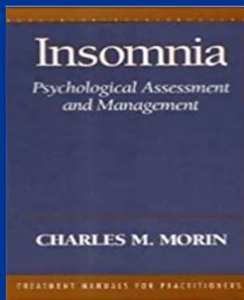
Johnson et al., 2006, *Pediatrics*;
Sivertsen et al., 2013, *BMC Pub Health*
Saxvig et al., 2012, *Sleep Med*
Gradisar & Crowley, 2013, *Curr Opin Psy*
Lovato et al., 2013, *JCSM*
CDC, 2019, YRBSS
Hysing et al., 2013, *J Sleep Res*
Gradisar et al, 2011, *Sleep Med*

Where are the roses?

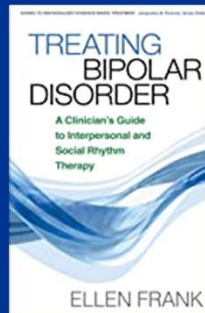
Good treatments exist!

Cognitive Behavioral Interventions for Adolescent Sleep Problems

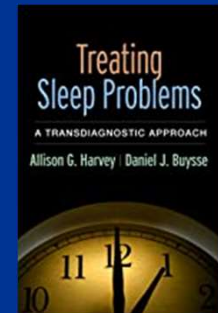
- Cognitive Behavioral Therapy for Insomnia (CBTI)
- Interpersonal and Social Rhythm Therapy (IPSRT)
- Transdiagnostic Intervention for Sleep and Circadian Dysfunction (TranS-C)
- Sleep education
- Healthy sleep habits
- Keep the bed for sleep only
- Sleep restriction
- Addressing unhelpful beliefs about sleep
- Regularize daily routines



Morin 1993, *Psychological Assessment and Management*



Frank 2005, *Treating Bipolar Disorder: A Clinician's Guide to Interpersonal and Social Rhythm Therapy*



Harvey & Buysse 2016, *Treating Sleep Problems: A Diagnostic Approach*

Some terminology...

- Behavioral Sleep Interventions = BSIs
- Behavioral and/or cognitive strategies
- Address adolescent sleep problems

Do BSIs Improve Sleep?

2017 Systematic Review, Meta-Analysis

- 9 adolescent-focused BSIs
- Improvements in
 - Time to fall asleep
 - Time spent asleep
 - Time awake during the night
 - Sleep efficiency

Review > Clin Child Fam Psychol Rev. 2017 Sep;20(3):227-249. doi: 10.1007/s10567-017-0234-5.

Systematic Review and Meta-analysis of Adolescent Cognitive-Behavioral Sleep Interventions

Matthew J Blake ¹, Lisa B Sheeber ², George J Youssef ^{3 4}, Monika B Raniti ¹, Nicholas B Allen ^{5 6}

Do BSIs Improve Sleep?

2018 Systematic Review, Meta-Analysis

- 6 trials, 4+ treatment sessions
- Improvements in
 - Time spent asleep
 - Time to fall asleep

Meta-Analysis > J Clin Sleep Med. 2018 Nov 15;14(11):1937-1947. doi: 10.5664/jcsm.7498.

Cognitive and Behavioral Interventions to Improve Sleep in School-Age Children and Adolescents: A Systematic Review and Meta-Analysis

Lie Åslund ^{1 2}, Filip Arnberg ^{1 3}, Marie Kanstrup ^{1 4}, Mats Lekander ^{1 2}

Do BSIs Improve Sleep?

2021 Scoping Review Behavioral Treatments Pediatric Insomnia

- 120 studies

	All Groups (n = 120)	RCTs (n = 44)	Typically Developing			
			Prevention (n = 14)	Young Children (n = 47)	School-Aged Children (n = 9)	Adolescents (n = 10)
Bedtime/Positive Routines	62 (51.7)	21 (47.7)	3 (21.4)	29 (61.7)	3 (33.3)	1 (10.0)
Parent Education	44 (36.7)	19 (43.2)	—	21 (44.7)	5 (55.6)	2 (20.0)
Sleep Hygiene	41 (34.2)	19 (43.2)	3 (21.4)	2 (4.3)	7 (77.8)	9 (90.0)
Graduated Extinction	37 (30.8)	18 (40.9)	—	22 (46.8)	4 (44.4)	—
Positive Reinforcement	34 (28.3)	10 (22.7)	—	11 (23.4)	2 (22.2)	—
Standard Extinction	29 (24.2)	6 (13.6)	—	14 (29.8)	2 (22.2)	—
Cognitive Strategies	20 (16.7)	10 (22.7)	—	—	4 (44.4)	9 (90.0)
Relaxation	19 (15.8)	9 (20.5)	—	2 (4.3)	5 (55.6)	5 (50.0)
Stimulus Control	19 (15.8)	9 (20.5)	—	—	3 (33.3)	8 (80.0)
Extinction with Parental Presence	18 (15.0)	6 (13.6)	—	14 (29.8)	—	—
Bedtime Fading	16 (13.3)	6 (13.6)	—	6 (12.8)	3 (33.3)	1 (10.0)
Early Education/Prevention	14 (11.7)	10 (22.7)	14 (100.0)	—	—	—
Sleep Restriction	12 (10.0)	4 (9.1)	—	1 (2.1)	2 (22.2)	3 (30.0)
Bedtime Fading with Response Cost	9 (7.5)	2 (4.5)	—	1 (2.1)	1 (11.1)	—
Mindfulness	5 (4.2)	2 (4.5)	—	—	—	2 (20.0)
Scheduled Awakenings	4 (3.3)	3 (6.8)	—	2 (4.3)	—	—
Medications	3 (2.5)	1 (2.3)	—	1 (2.1)	—	—

Where are the thorns?



- Of 120 studies reviewed in the 2021 Scoping Review Behavioral Treatments Pediatric Insomnia, **only 10** focused on adolescents
- Lack of BSI research with children and families of racially and ethnically minoritized and/or lower SES background
- Evidence-based BSIs are not accessible to nor received by most youth and families

What impedes access/receipt?

Thorns
Not enough trained providers
Few BSIs tested in non-research settings
Limited time to address sleep
Mismatch between BSI format and setting needs
Many youth cannot access/receive specialty care



Why Deliver a Sleep Promotion Program in Schools?

- Most kids are in school
- School-based providers have relevant training
- Provide resources and training to schools
- **Most school-based sleep promotion programs have limited impact on sleep behavior**



Why?

- Universal intervention vs. targeted intervention
 - Inclusion of those with good sleep can diminish effects of intervention
- Low involvement of parents/caregivers
- Limited staff time

Qualitative Work



How can we adapt an existing sleep promotion program to be suitable for the school setting?

Qualitative work with stakeholders

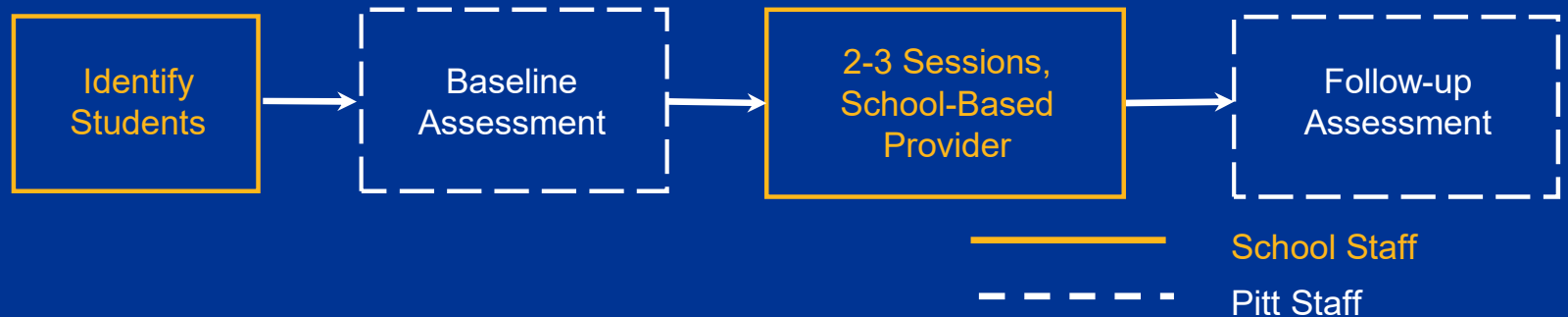
- High school staff, administrators, board members
- High school students

Study Aim

Deliver and test a school-based sleep promotion program for adolescents

Study Design

- School-based providers identify participants
- Pre-program assessment
- Program: 2-3 sessions (30-45 minutes)
- Post-program assessment



School Partnership

- Woodland Hills School District
- Steel Valley School District
- Schools selected which provider would deliver the program
 - One teacher
 - One social worker
- Study-specific training

Feedback:

- 3 sessions was not feasible
- Groups?
- ~20 minutes



Eligibility

- 8th, 9th, or 10th grade
- Age 12-16
- Mild to moderate truancy*
- Regular access to a mobile phone
- Insufficient sleep
 - OR sufficient sleep timing that results in arriving late to school



Program Satisfaction -- Provider

- Program Training
- Program Relevance
- Program Format
- Overall
- Comments

This program is important to the success of the students it aims to help:

- a. **Strongly agree n=1**
- b. **Agree n=1**
- c. Disagree
- d. Strongly Disagree

Program Satisfaction -- Provider

- Program Training
- Program Relevance
- Program Format
- Overall
- Comments

The thing I liked least about delivering the program was:

1. Recruiting (very time consuming) and keeping up to date with tasks involved
2. Time constraints with other job responsibilities; recruitment was more time consuming than I thought it would be

Program Satisfaction -- Provider

- Program Training
- Program Relevance
- Program Format
- Overall
- Comments

Things that made it hard for me to be involved in the research and/or deliver the research program include:

1. My schedule and work load as a teacher is demanding, and my schedule provided little time for this
2. Other job duties

Program Satisfaction -- Youth

Things I liked the **most**:

- “That I am actually getting help with my attendance because my lack of sleep is the reason I miss school mostly”
- “Everyone was very nice and I think I learned more than I expected to”
- “I’m a bad sleeper so it helped me and the compensation”

Program Satisfaction – Youth (n=9)

Satisfaction Item

Rating

Is the Program Associated with Changes in Sleep?

Sleep Diary

	Baseline (N=9)	Post (N=9)
Total Sleep Time		
Mean (SD)	6:40 (2:01)	7:16 (0:53)
Range	4:14-9:49	6:00-8:46

Lessons Learned

- School-based sleep program is acceptable, shows promise for improving sleep
- Need to find ways of limiting staff burden (time)
- Provider acceptability may be improved by better integrating the program into existing school workflows
- How to improve acceptability among youth?

Lessons Learned

- School partnership is critical
- Feasibility = flexibility
 - Listen to your community partners!
- Need additional studies testing BSIs among adolescents, among minoritized youth
- Need to increase receipt of BSIs among youth
- Need to adapt BSIs to suit the needs of various settings

Discussion Ideas

- How can we better integrate evidence-based sleep programs into accessible settings?
- Which personnel would be most appropriate to deliver a brief sleep program in schools? Clinics? Other community settings? Listen to your community partners!



Thank you!

TPS Sleep Summit Survey



Thriving Children & Racial Equity