Sleep Health and Youth Suicide Prevention: Methods, Findings & Future Directions

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# Disclosures

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Agenda

• Why Sleep?
• Methodological Considerations
• Recent Studies / Findings
• Future Directions
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Optimal Targets for Suicide Prevention are:

1) Proximal  
2) Dynamic  
3) Modifiable

Rudd et al. 2006
Optimal Targets for Suicide Prevention are:

1) Proximal  
2) Dynamic  
3) Modifiable

...LIKE SLEEP?!
Epidemic of Sleep Deprivation in US Teens (age 14-18)

Insufficient sleep - 73%

Basch et al 2014
n=52,718
CDC - Youth Risk Behavior Survey (YRBS)
# The Sleep-Suicide Association: What Do We Know?

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<tr>
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<th>Death by suicide</th>
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For reviews, see: Liu et al 2005; Pigeon et al 2012; Winsper & Tang, 2014; Chiu et al 2018; Liu et al 2019; Goldstein & Franzen, 2022
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• Next Steps
Which Aspect(s) of Sleep Matter? Applying the Sleep Health Framework

Sleep health is a multidimensional pattern of sleep-wakefulness, adapted to individual, social, and environmental demands, that promotes physical and mental well-being.

Buysse 2014
Slide Courtesy of Dr. Daniel Buysse
How to Measure Sleep?
“Objective” vs Subjective Measures

Wearables
Sensitive for sleep
Poorly specific for wake
Various scoring algorithms
Best combined with sleep diary

Retrospective self-report
Recall bias
Specificity of sleep constructs?

Mobile Sensing
Ubiquitous
Unobtrusive
Validity?
Acceptability?

Daily self-report/EMA
Poor sleepers overestimate sleep problems/ good sleepers underestimate
Adherence
Prompts per day
Over What Timeframe Does Sleep Affect Suicide Risk?

Sleep difficulties are:

- Acute
- Chronic
- Cumulative
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Greater Rates of Sleep Disturbance in the Preceding Week Among Youth who Died by Suicide vs. Controls

Goldstein et al 2008
Examining the prospective association between sleep health and suicidality in adolescents and college students at ultra-high risk for suicide

S.P.O.T. Study
Sleep Predicting Outcomes in Teens

Funded by: The American Foundation for Suicide Prevention
The University of Pittsburgh Clinical and Translational Science Institute
**STAR IOP**

Adolescents age 13-18 (n=50)

- Baseline
- Clinical Assessment
- Suicidality
- Related risk factors

**Co-STAR IOP**

College Students age 18-24 (n=20)

- 1-month
- 2-month
- 3-month

**Measurement Tools**

- **Daily Actigraphy**: Objective sleep health - 91%
- **Daily Cellphone Ratings**: Suicidal ideation / behavior - 84%
  Subjective sleep health
- **Weekly Clinical Ratings**: Related risk factors eg, substance use
Does Last Night’s Sleep Predict Suicidal Ideation Today?

Standardized Effect: Odds Ratio for Next Day Suicidal Ideation

Franzen, Goldstein et al in preparation
**HOW** Does Sleep Disturbance Contribute to Adolescent Suicide Risk? Examining Mechanisms

Positive and Negative Interpersonal Events

Hamilton, Tsypes et al 2022
HOW Does Sleep Disturbance Contribute to Suicide Risk in Adolescents?

Less sleep & Poorer quality sleep → Reactivity to interpersonal events → Suicidal ideation

Hamilton, Totypes et al 2022
Rest-Activity Rhythms Among Youth with Bipolar Disorder

- Youth ages 12-18 (n=33) diagnosed with Bipolar spectrum disorder
- Actigraphy collected for ~ 2 weeks
- Calculated ‘non-parametric’ rest-activity rhythms
  (Van Someren et al 1999; Mitchell et al 2018)

IS: Interdaily stability

Franzen et al in prep
Lower Interdaily Stability (IS) Associated with More Severe Suicidal Ideation and Depressive Symptoms in Youth with Bipolar Disorder
Transdiagnostic Intervention for Sleep and Circadian Dysfunction (TSC / TranS-C)

- Youth with evening chronotype, age 10-18 (n=176; Dolson et al 2021)
- ADHD (n=14, ages 13–17; Becker et al 2022)
- Adults with serious mental illness in community care settings (n=92; Harvey et al 2016, 2021)
Open Pilot Study: Transdiagnostic Intervention for Sleep and Circadian Dysfunction (TSC) for Suicidal Adolescents

- Depressed and suicidal adolescents (n=20; age 13-18)
- TSC adjunct to IOP (M=5.1TSC sessions)
- Daily diary + Actigraphy
- Increase am light (Re-Timer) & decrease pm light (Blue Blockers)

Next steps: RCT (ETUDES P50)

Actigraphy-derived interdaily stability improves from pre- to post-TSC

Williamson et al 2022
P50 MH115838
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Promising Strategy for Suicide Prevention…?

Real-time monitoring of sleep health

Alert providers, parents

High risk

Prompt teen to use skills and safety plan

Low risk

Ongoing individualized evidence-based sleep promotion strategies
How Does Sleep Disturbance Contribute to Adolescent Suicide Risk?

**Distal Factors**
- Psychopathology
- Substance Use
- Family History
- Hopelessness
- Non-Suicidal Self-Injury
- Sexual/Gender Minority
- Emotion Dysregulation
- Family conflict
- Trauma
- Suicide attempt history
- Physical illness

**Proximal Factors**

**Poor Sleep Health**
- Short / Long Duration
- Timing / Duration Variability
- Poor Satisfaction / Quality
- Late Timing
- Low Efficiency
- Low Daytime Alertness

**Neural Changes**
- Cortico-limbic
- Cortico-striatal circuits

**Affective / Behavioral Dysregulation**
- Emotion Dysregulation
- Impulsivity
- Poor problem solving
- Social withdrawal
- Increased stress reactivity
- Blunted reward sensitivity
- Interpersonal conflict
- Substance use

**Suicidal Outcomes**

Developmental Changes (Biological & Psychosocial)

Goldstein & Franzen, 2021
Conclusions

• Why Sleep?
  Proximal, Dynamic, Modifiable risk factor for suicide

• Methodological Considerations
  Defining and measuring sleep health constructs
  Considering timeframes
  Defining suicidal outcomes

• Recent Studies / Findings
  Prospective, longitudinal multi-method with high-risk samples
  Behavioral intervention targeting sleep among suicidal youth

• Future Directions
  Just in time interventions
  Underlying mechanisms
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