Youth Self Report Thought Problems and Sleep Difficulties Are Linked to Suicidal Ideation Among Psychiatrically Hospitalized Adolescents

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Abstract

Objectives: Thought problems, such as hallucinations and delusional or disorganized ideas, have been associated with increased sleep problems and risk for suicidal ideation (SI). Sleep problems have also been linked directly to suicidality in adolescence. The nature of the relationship between these symptoms among adolescents with acute suicidality is not well understood. This study aims to examine the interrelationships between thought problems, sleep difficulties, and SI in adolescents psychiatrically hospitalized for safety concerns, with the goal of informing suicide risk screening and intervention for this population.

Methods: Participants included adolescents ($n=690$) aged 11–18. A retrospective chart review was used to obtain scores on study measures, including the Suicidal Ideation Questionnaire Junior (SIQ-Jr), the thought problems and sleep disturbance scales on the Youth Self Report (YSR), and mental health diagnoses using the Children's Interview for Psychiatric Syndromes (ChIPS).

Results: Findings indicate that SIQ-Jr scores are moderately correlated with both YSR thought problems ($r=0.51, p<0.001$) and YSR sleep disturbance ($r=0.47, p<0.001$). Further, linear regression analyses support the hypotheses that thought problems ($\beta=0.28$) and sleep difficulties ($\beta=0.11$) are uniquely associated with SI, beyond the significant effects of depression ($\beta=0.36$) and female sex ($\beta=-0.07$); $R^2=0.43, F(8, 673)=62.49, p<0.001$.

Conclusions: These results suggest that sleep interventions and treatment of thought problems may be important for reducing SI, within and outside the context of depression. Furthermore, the adolescent version of the YSR may be a useful tool to evaluate these risk factors alongside other psychiatric concerns.

Keywords: thought problems, sleep disturbance, suicidal ideation, youth self-report (YSR), adolescents, inpatient

Introduction

THE EXPERIENCE OF THOUGHT PROBLEMS in adolescence, including hallucinations, disorganized thoughts and behaviors, or delusional ideas, warrants attention due to the associated distress, functional interference, and increased risk for safety concerns. Youth with thought problems often experience comorbid sleep disturbances and suicidal ideation (SI), which can cause additional distress and impairment in functioning (Davies et al. 2017). Sleep difficulties have been linked to thought problems and related distress among non-clinical samples of young adults (Andorko et al. 2017). Sleep problems have been shown to be elevated among youth at clinical high risk for psychosis (i.e., experiencing clinically significant thought problems below the diagnostic threshold for psychosis; Lunsford-Avery et al. 2013). Furthermore, specific sleep difficulties, including insomnia and nightmares, are associated with a higher risk for suicide

among adults with schizophrenia-spectrum disorders, including thought problems (Li et al. 2016). Although prior research has supported links between thought problems, sleep disturbances, and SI in community and outpatient settings, little is known about the interrelationship of these experiences among adolescents psychiatrically hospitalized for acute safety concerns, typically including suicidality. Exploring the relationship between thought problems, sleep difficulties, and risk for SI among high-risk adolescents is important to inform suicide risk screening, treatment, and prevention efforts.

The current cross sectional study examined the relationship between thought problems, sleep disturbance, and SI in a sample of psychiatrically hospitalized adolescents, many of whom were admitted due to suicidal thoughts and behaviors. The commonly used Youth Self Report (YSR) form from the Achenbach System of Empirically Based Assessment (ASEBA; Achenbach and Rescorla 2001) was used to evaluate thought problems and sleep difficulties to

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(1) investigate the relationships between these symptoms and SI and (2) explore the potential utility of the YSR as a screener for suicide risk factors. We accounted for clinical diagnoses (e.g., depression, anxiety, ADHD) and demographic features (i.e., biological sex, age, and race) previously linked to suicidality to explore the incremental value of using the YSR thought problems and sleep disturbance scales to evaluate risk for SI. We hypothesized that psychiatrically hospitalized adolescents who report greater thought problems and sleep disturbances will demonstrate greater severity of SI.

Methods

Participants

Participants were 760 adolescents (ages 11–18) hospitalized on a psychiatric inpatient unit in the Northeast United States between April 2017 and February 2019. All adolescents admitted to the unit were asked to complete self-report measures of psychiatric symptoms, namely SI, thought problems, and sleep difficulties, after which they completed a brief psychiatric interview to evaluate mental health diagnoses. This study was approved by the Institutional Review Board (IRB) and classified as a retrospective chart review and quality improvement initiative; thus, informed consent was waived.

Measures

Background and demographic information were pulled from the hospital's electronic medical record system (Epic Systems Corporation 2019) to characterize the sample. Demographic information was obtained directly from patients at the time of hospital enrollment.

The Children's Interview for Psychiatric Syndromes. The children's interview for psychiatric syndromes (ChIPS) was used as part of standard unit procedures to identify diagnoses based on DSM-IV-TR criteria (Weller et al., 2000). The ChIPS is a highly structured diagnostic interview covering 20 Axis-I disorders designed for 6–18-year-old youth. The ChIPS is administered to adolescents within 72 hours of admission by psychology staff trained to use the interview. Diagnoses were coded 0 for no diagnosis and 1 when full criteria were met.

Suicidal Ideation Questionnaire. Participants were administered the Suicidal Ideation Questionnaire (SIQ)-Jr, a 15-item instrument designed to assess the severity and frequency of SI among adolescents, upon admission to the hospital (Reynolds and Mazza, 1999). Items are scored from 0 (never) to 6 (almost every day) for a possible range of 0–90. Total scores include a sum of all items, with higher scores indicating greater severity of SI. The creators indicate a clinical cutoff score of 31, however, the continuous total score was used as the primary outcome in this study.

Youth Self-Report form. The adolescent version of the ASEBA YSR was used to measure a broad range of behavioral and emotional symptoms, including thought problems and sleep disturbance (Achenbach and Rescorla, 2001). The YSR includes 112 items that ask respondents to indicate if, from their perspective, the experiences are not true (0), sometimes/somewhat true (1), or very/often true (2). The *thought problems* syndrome scale was included in this study, along with a scale that was created for this study to capture sleep disturbance. Ratings from three sleep-specific items, having nightmares, feeling overtired, and having trouble sleeping, were summed to create a *sleep disturbance* scale (possible range 0–6), consistent with prior research exploring sleep problems using YSR

items (Wong et al. 2011). The *thought problems* scale is designed to measure unusual experiences (e.g., auditory and visual hallucinations, and strange ideas and behavior) linked to multiple psychiatric disorders, including psychosis. To avoid item overlap among the measures used in our analyses, 2 of the 12 items were removed from the thought problems scale: (1) “I deliberately try to hurt or kill myself,” due to overlap with suicidality, and (2) “I have trouble sleeping,” due to overlap with the created sleep disturbance scale. Given these modifications, an adjusted total score (possible range 0–20) for the thought problems scale was used in analyses.

Data analysis

Data were analyzed using SPSS Software for Windows, Version 24 (IBM Corporation 2016). Data were screened for normality, including distribution, skewness, and kurtosis; all data were approximately normal and suitable for methods used. Correlational analyses were used to explore the interrelationships between suicidality, sleep disturbance, thought problems, and ChIPS diagnoses. Linear regression was used to explore whether the severity of SI is statistically predicted by the modified thought problems scale and the sleep disturbance scale. The interaction between sleep and thought problems was also tested, to determine whether the effect of thought problems on SI was moderated by level of sleep disturbance. Significant findings were defined by p -values below 0.05. Effect sizes are reported using Cohen's f^2 , using the following convention: small -0.02 , medium -0.15 , and large -0.35 (Cohen 1988).

Results

A total of 690 adolescents ($M_{\text{age}} = 14.69$, $SD = 1.78$) had complete data and were included in analyses. Of the sample, 428 (62.0%) participants were biologically female. Per participants' medical records, the following racial identities of the sample were reported: 52.3% white, 8.6% black, 15.3% other race, and 23.8% unknown race (including missing data and those who declined to report race). Age and race were not significantly associated with SIQ scores, whereas female sex was moderately correlated with SIQ. Based on ChIPS data, 70.4% of participants ($n = 486$) met criteria for depression, 63.0% ($n = 435$) had anxiety, 35.4% ($n = 244$) had a behavioral disorder (conduct or oppositional defiant disorders), 23.8% ($n = 164$) had ADHD, 22.6% ($n = 156$) had PTSD, and 10.9% ($n = 75$) met criteria for a psychotic disorder. Other ChIPS domains (e.g., eating and bipolar disorders) had very low base rates in this sample ($<5\%$), and thus they were not included in the analyses. See Table 1 for correlations between variables of interest.

The mean scores for the clinical variables of interest were as follows: SIQ $m = 34.85$ ($SD = 27.98$, range 0–90), thought problems $m = 6.45$ ($SD = 4.29$, range 0–20), and sleep disturbance $m = 2.74$ ($SD = 1.78$, range 0–6). Simple linear regression results indicated that SIQ score was statistically and uniquely predicted by thought problems with a small-medium effect and sleep disturbance with a small effect, when controlling for biological sex. All three variables remained significant predictors of SIQ (with small effects) when controlling for ChIPS diagnoses, and most notably, the moderate effects of depression diagnosis (Table 2).

An independent regression model was used to test the interaction of sleep disturbance and thought problem scores in predicting SIQ. Although the interaction effect was significant in this model ($t [686] = -2.00$, $p < 0.05$), the effect was very small ($f^2 < 0.01$). To explore the interaction, we defined moderate, low, and high sleep disturbance as the mean and one SD below and above the mean (Aiken et al., 1991). After probing the interaction, thought problem

TABLE 1. CORRELATIONS BETWEEN CLINICAL VARIABLES ($N=681$)

	1	2	3	4	5	6	7	8	9	10
1. SIQ score	—	—	—	—	—	—	—	—	—	—
2. YSR thought problems	0.51**	—	—	—	—	—	—	—	—	—
3. YSR sleep disturbance	0.47**	0.59**	—	—	—	—	—	—	—	—
4. Depression diagnosis	0.55**	0.37**	0.43**	—	—	—	—	—	—	—
5. Anxiety diagnosis	0.31**	0.29**	0.36**	0.39**	—	—	—	—	—	—
6. ADHD diagnosis	0.10**	0.12**	0.12**	0.09*	0.12**	—	—	—	—	—
7. PTSD diagnosis	0.20**	0.21**	0.26**	0.25**	0.23**	0.05	—	—	—	—
8. Psychosis diagnosis	0.20**	0.36**	0.19**	0.16**	0.08*	0.04	0.08*	—	—	—
9. Conduct or ODD diagnosis	0.02	0.07	-0.02	-0.09*	-0.08*	0.15**	0.09*	-0.04	—	—
10. Sex (0 = female, 1 = male)	-0.25**	-0.17**	-0.24**	-0.26**	-0.20**	-0.02	-0.16**	-0.08*	0.11**	—

* $p < 0.05$.** $p < 0.01$.

Pearson correlations were used for two continuous variables (SIQ, Thought Problems, and Sleep Disturbance), point biserial correlation was used for one continuous variable and one dichotomous variable, and Phi coefficient was used for two dichotomous variables (depression & sex).

SIQ, suicidal ideation questionnaire Jr.; YSR, youth self report.

scores were found to significantly predict SIQ at each level of sleep disturbance, with small to moderate effects: high (1 SD+ above m ; $\beta = 0.31$, $t [686] = 6.84$, $p < 0.001$; $f^2 = 0.07$), medium (within 1 SD of m ; $\beta = 0.38$, $t [686] = 9.26$, $p < 0.001$; $f^2 = 0.12$), and low (1 SD+ below m ; $\beta = 0.44$, $t [686] = 7.58$, $p < 0.001$; $f^2 = 0.08$). Notably, the interaction effect was no longer significant when the covariates of sex and depression diagnosis were added to the model.

Discussion

The main findings of the study were that both thought problems and sleep disturbance, as measured by the YSR, were significant, unique predictors of SI (with small to medium effects) in a large population of adolescents hospitalized for acute safety concerns. Consistent with previous research, females in our sample were more likely than males to report SI, and thus, sex was included in our regression analyses and demonstrated small effects on SI. These three variables accounted for ~32% of the variance in SIQ scores. The unique effects of thought problems, sleep disturbance, and female sex were maintained, although attenuated, when depression and other ChIPS diagnoses were added as covariates to the model. This model accounted for 43% of the variance in SIQ scores. Notably, none of the ChIPS diagnostic categories other than depression were significant predictors of SIQ scores in this acute sample. These findings indicate that the YSR thought problems and

sleep disturbance scales are of incremental value in the statistical prediction of SI via the SIQ, beyond the moderate effect of the well-known, and oft-evaluated, risk factor of depression. These results are consistent with prior research indicating links between suicide risk and both psychosis spectrum symptoms (e.g., hallucinations, delusions) and sleep difficulties (Li et al. 2016; Davies et al. 2017), demonstrated here in an acute population of psychiatrically hospitalized adolescents. Results also showed a significant but small interaction between thought problems and sleep disturbance in the statistical prediction of SIQ scores. Thought problems significantly predicted SIQ scores at all levels of sleep disturbance, with the strongest association at the lowest level of sleep disturbance. This finding is somewhat surprising and warrants further exploration, particularly as it relates to the unique characteristics of this highly acute and suicidal sample.

From a clinical standpoint, elevations in thought problems in particular, and sleep problems to a lesser degree, may necessitate further probing of SI, even in the absence of reported depression. In addition, sleep difficulties among youth with thought problems (e.g., those at clinical high risk for psychosis) may be associated with an increased risk for SI, warranting ongoing monitoring. Interventions intended to reduce thought and sleep problems may have a positive impact on SI. Results also suggest that the YSR may be a useful tool for measuring these risk factors, alongside the broad spectrum of emotional and behavioral concerns captured by this tool.

TABLE 2. LINEAR REGRESSIONS PREDICTING SUICIDAL IDEATION QUESTIONNAIRE SCORES ($N=682$)

	R^2	β	Statistic	df	p	f^2
Step 1	0.32	—	$F = 105.68$	3, 678	<0.001	—
YSR thought problems		0.35	$t = 9.03$	678	<0.001	0.12
YSR sleep disturbances		0.23	$t = 5.68$	678	<0.001	0.05
Sex		-0.13	$t = -4.09$	678	<0.001	0.02
Step 2	0.43		$F = 62.49$	8, 673	<0.001	—
YSR thought problems		0.28	$t = 7.27$	673	<0.001	0.08
YSR sleep disturbances		0.11	$t = 2.93$	673	<0.01	0.01
Sex		-0.07	$t = -2.35$	673	<0.05	0.01
Depression diagnosis		0.36	$t = 10.52$	673	<0.001	0.16
Anxiety diagnosis		0.03	$t = 0.80$	673	0.426	<0.01
ADHD diagnosis		0.02	$t = 0.61$	673	0.545	<0.01
PTSD diagnosis		0.003	$t = 0.08$	673	0.935	<0.01
Psychosis diagnosis		0.01	$t = 0.46$	673	0.647	<0.01

SIQ, suicidal ideation questionnaire Jr.; YSR, youth self-report.

Another essential consideration for treatment is the likely bidirectional relationship between sleep disturbances and psychiatric symptoms, including depression and thought problems. Although increased sleep disturbances are linked to greater severity of mental health problems (Davies et al. 2017), sleep difficulty is often considered a byproduct of psychiatric disorders and thus, not given priority within the context of treatment. The finding that sleep problems are uniquely linked to SI in hospitalized adolescents indicates that sleep interventions may be useful, and perhaps more proximally beneficial than longer term focus on mood and thought problems, in the treatment of suicidality. Given stigma related to mental illness, targeting sleep difficulties may be a more palatable approach to treatment for some individuals, which could increase early engagement while reducing risk for suicide.

Limitations

The primary limitation of this study was the use of self-reported measures via a single informant, the teen. Self-report measures were completed upon admission, a particularly vulnerable point in their hospital course and life. This may limit the accuracy of self-report data due to factors such as high levels of stress, fear, embarrassment, and lack of insight. Obtaining caregiver information about teens' mental health could improve our understanding of observable behaviors and experiences that may be linked to SI. Nevertheless, given that teens are often the most accurate reporters of their own internalized states (Sourander et al. 1999), results provide important considerations for risk screening from the perspective of teens.

The current study was cross sectional, with all data collected at a single time point. Thus, the degree to which thought problems and sleep disturbance influence each other over time was not explored. Establishing temporal precedence and exploring bidirectional influences should be a focus of future research to better inform intervention. Despite limitations regarding causal influence, it is important to consider measurable risk factors for current SI to improve suicide risk screening. Follow-up or discharge measures were not part of this study; however, short- and long-term follow-up would facilitate a better understanding of how symptom improvements, fluctuations, and persistence influence suicide risk. It will be important to extend this research to measure longitudinal outcomes related to thought problems, sleep disturbance, and suicide risk. Despite our inability to explore long-term outcomes, SI is, in and of itself, distressing and warrants attention. Understanding experiences linked to current distress related to SI is critical for improving treatment.

Conclusions

Findings support the notion that thought problems and sleep difficulties are uniquely associated with SI among adolescents with acute psychiatric concerns, beyond the effects of depressive symptoms commonly evaluated in suicide risk assessments. Furthermore, the YSR may be a useful tool to evaluate these risk factors alongside other psychiatric concerns. These results reinforce that sleep interventions and treatment of distress related to thought problems (e.g., hallucinations, delusions) may be important for reducing SI, within and outside the context of depression.

Clinical Significance

This study examines the interrelationships between thought problems, sleep difficulties, and SI in adolescents psychiatrically hospitalized for safety concerns. Results indicate that thought problems and sleep difficulties are uniquely associated with SI

within this population, beyond the moderate effects of depression. Furthermore, the YSR may be a useful tool to evaluate these risk factors alongside other psychiatric concerns. Elevations in thought problems and sleep difficulties among adolescents may necessitate further probing of SI, and interventions intended to reduce thought and sleep problems may have a positive impact on SI.

Disclosures

The authors, including Drs. Thompson, Lapomardo, Hunt, and Wolff, and Ms. Fox, do not have any real or potential conflicts of interest to disclose. None of the authors has any financial relationships with any pharmaceutical companies.

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