

Background

Approximately 46.3 million people aged 12 years \geq in the US (16.5% of the population) are affected by substance misuse and overall poor sleep health.

- Over 1/3 of adults do not achieve NSF recommended 7 – 9 hours of sleep.
- Common misused substances are alcohol (47%), cannabis (18%), prescription pain relievers (4%), and prescription benzodiazepines (2%).
- Short sleep and substance use can have negative effects on emotional and mood regulation.
- About 14.3 million people reporting misusing any prescription psychotherapeutic (non prescribed) drug in the last year (2021)
- Worse mental health problems are associated with shorter sleep duration and drug misuse, while sleep problems and drug use further exacerbate mental health symptoms and affect recovery.
- Adverse consequences of short sleep duration due to substance use are not routinely assessed in clinical practice.

Population

Civilian, noninstitutionalized US residents ages 18 years \geq , including 14 geographic regions in Ohio (14, 676 adults) using the 2020 Behavioral Risk Factor Surveillance System (BRFSS) (Table 1, QR code).

BRFSS collects health-related telephone surveys on their risk behaviors, chronic health conditions, and use of preventative services. They also have state-specific added questions to help inform local programs and advocacy groups conducted by the Ohio Dept. of Health with support from CDC.

Learning Objectives

1. Determine the prevalence of sleep disturbance and sleep health in young adults ages 18 y and older with substance/opioid use disorder or who self-report use.
2. Examine the association between the social vulnerability index, sleep health, and mental and physical health.
3. Compare sleep, general, mental and physical health outcomes among Ohio residents relative to the total population sample.

Activities

Professional: Manuscript and grant writing workshops; 1:1 meetings discussing career paths; R00 Study participant recruitment and tracking (clinic + phone); qualitative interviews and coding; Data management with RedCAP.

Academic: Codebook development, quantitative descriptive analysis and interpretation, create community-appropriate materials, brief literature review on existing methods and community needs.

Foundational Competencies

- Evidence-based approaches to public health
- Leadership
- Communication
- Interprofessional Practice
- Population Health Research: a retrospective analysis of an existing data
- Health Promotion/Education

Deliverables

- ✓ Published in Preventing Chronic Disease Journal 2023
- ✓ Substances and Sleep Health Brochure

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Methods

A cross sectional secondary analysis and quantitative descriptive approach using BRFSS data to characterize substance use (PPM-NP and cannabis) [independent variable], sleep duration (<6 h per night), and health (mental, physical, and general) [dependent variable].

Used linear and logistic regression modeling while adjusting for individual-level (age, sex, race, and ethnicity, education, income, and BMI) and area-level (socioeconomic deprivation) covariates.

Tables

Table 1. Characteristics of Study Population (N = 14,676), Ohio Behavioral Risk Factor Surveillance System Survey, 2020

Characteristic	No. of respondents who answered question	Value
Mean no. (SD) of days of poor health in previous 30 days		
Poor mental health	14,182	4.5 (8.7)
Poor physical health		12.4 (11.3)
Poor general health		12.6 (10.6)
Mean no. (SD) of days of marijuana use of respondents who reported using marijuana	12,342	17.3 (12.2)
Substance use		
Used marijuana	12,362	1,140 (9.2)
Used nonprescribed prescription pain medication	8,203	111 (1.4)
General health		
Excellent	14,644	2,666 (18.3)
Very good		4,925 (33.6)
Good		4,486 (30.6)
Fair		1,917 (13.1)
Poor		630 (4.3)

* The 6 domains of the composite Social Deprivation Index are: 1) income (percentage of the population living in poverty), 2) education (percentage with <12 years of education), 3) housing (percentage living in rented housing unit and percentage living in overcrowded housing unit), 4) household characteristics (percentage of single-parent households with dependents aged <18 y), 5) transportation (percentage of households without a car), and 6) employment (percentage of unemployed adults aged <65) (15). The index is scaled from 1 to 100, with higher scores indicating higher levels of social deprivation.

Table 2. Results of Logistic Regression Models for Use of Nonprescribed Prescription Pain Medications, Marijuana, and Outcomes, Ohio Behavioral Risk Factor Surveillance System Survey, 2020

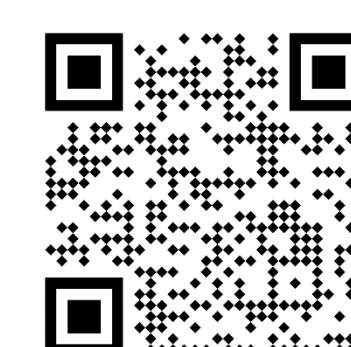
Outcome	OR (95% CI)	P value	Adjusted OR (95% CI) ^a	P value
Use of nonprescribed prescription pain medication				
Short sleep duration (<6 hours per night)	2.78 (1.80–4.30)	<.001	2.37 (1.50–3.76)	<.001
Poor mental health (>14 poor mental health days in past 30 days)	1.38 (0.91–2.11)	.13	1.37 (0.88–2.12)	.17
Poor physical health (>14 poor physical health days in past 30 days)	1.30 (0.75–2.25)	.35	1.06 (0.57–1.98)	.86
Poor general health (fair/poor health)	1.75 (1.14–2.66)	.01	1.60 (0.99–2.58)	.05
Use of marijuana				
Short sleep duration (<6 hours per night)	1.70 (1.46–1.97)	<.001	1.46 (1.24–1.73)	<.001
Poor mental health (>14 poor mental health days in past 30 days)	1.55 (1.36–1.78)	<.001	1.34 (1.16–1.55)	<.001
Poor physical health (>14 poor physical health days in past 30 days)	1.68 (1.43–1.98)	<.001	2.14 (1.78–2.57)	<.001
Poor general health (fair/poor health)	1.53 (1.33–1.75)	<.001	1.92 (1.64–2.24)	<.001

Abbreviation: OR, odds ratio.
^a Covariates adjusted for age, sex at birth, race and ethnicity, education, annual household income, body mass index (individual level), and socioeconomic deprivation (area level).

Table 3. Results of Linear Regression Models for Marijuana Use and Covariates to Sleep, Mental, and Physical Health Outcomes, Ohio Behavioral Risk Factor Surveillance System Survey, 2020

Model	Dependent variable	B (SE)	β	P value	R ²
Model 1 (unadjusted)	Sleep duration	0.007 (0.002)	0.093	.001	0.009
	Mental health	0.027 (0.02)	0.055	.06	0.003
	Physical health	0.007 (0.01)	0.016	.58	0.000
	General health	0.002 (0.001)	0.031	.28	0.001
Model 2 (adjusted for covariates) ^a	Sleep duration	0.008 (0.003)	0.089	.003	0.016
	Mental health	0.04 (0.02)	0.077	.01	0.025
	Physical health	0.01 (0.01)	0.023	.45	0.050
	General health	0.003 (0.002)	0.063	.03	0.126

Abbreviations: B, unstandardized regression coefficient; β , standardized regression coefficient; R², coefficient of determination.
^a Covariates adjusted for age, sex at birth, race and ethnicity, education, annual household income, body mass index (individual level), and socioeconomic deprivation (area level).



Scan the QR codes to see all deliverables

Results

Of the respondents who answered the questions, 1,140 (9.2% reported using cannabis and 111 (1.4%) used prescription pain medication not prescribed (PPM-NP)

People who reported PPM-NP use had 2.8 times (unadjusted) and 2.4 times (adjusted) **higher odds of short sleep duration** than people who did not use. (see Table 2). They also had 1.7 times **higher odds of poor general health** (unadjusted) but no longer associated after adjusting for covariates. Associations between PPM-NP and mental or physical health had no association.

People who reported cannabis use had 1.7 (unadjusted) times and 1.5 times (adjusted) **higher odds of short sleep duration**. They also had 1.6 and 1.3 times **higher odds of poor mental health**, 1.7 and 2.1 times **higher odds of poor physical health**, and 1.5 and 1.9 times **higher odds of poor general health** in the unadjusted and adjusted models, respectively, than people who did not use.

In the linear regression models, higher rates of cannabis were associated with longer sleep duration (Table 3), worse mental health symptoms, and poorer general health only after adjusting for covariates.

Conclusion

Understanding the connection between substance use and health outcomes is needed to improve trajectories of substance use and recovery. Sleep duration is often underassessed among people who use substances. Expanding diagnostics and treatment options for those who use substances may result in lower levels of substance use and improved overall health.

Public Health Implications

Short sleep duration is underassessed and underdiagnosed. A need exists to increase global interest and awareness in understanding how sleep duration can affect substance use behaviors, recovery, and vice versa. **Difficult to assess sleep health dimensions** due to heterogeneity and confounding factors (polysubstance use, comorbid mental health conditions) when self-reported. Despite the known relationship between sleep and substance use, **more effort is needed to ensure those actively in treatment are being screened, assessed, and treated for sleep disorders. Resources that do not reflect community members' cultural, political, and economic values and beliefs on substance and sleep health undermine the association** between socioeconomic differences, health risks, and healthcare utilization.

Lessons Learned

Communication is key: From participant recruitment to proper handling of data, communication across the team is required to work proactively and pragmatically.

Writing is a process: I quickly learned from colleagues and PhD fellows that writing takes time and is an ongoing skilled to be improved upon. Give yourself grace as you work on your manuscripts. It helps settings aside at least 1 hour a day for writing.

Sleep and substance use is bidirectional: Poor sleep once thought of as a symptom of drug use while substance use problems complicate sleep quality and health. Sleep issues can also make recovery significantly harder.

Acknowledgements

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