35

The Clinical and Humanistic Burden of Idiopathic Hypersomnia in the United States: Analysis of the National Health and Wellness Survey

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Introduction

- Idiopathic hypersomnia is a central disorder of hypersomnolence characterized by excessive daytime sleepiness, sleep inertia, long and unrefreshing naps, and cognitive impairment[1,2]
- Understanding of the clinical and humanistic burden experienced by adults with idiopathic hypersomnia in the United States is limited
- The few studies that have assessed this burden have shown that individuals with idiopathic hypersomnia have impaired health-related quality of life,[3-6] experience high rates of depression and anxiety,[3,7,8] and are more likely to have been involved in a motor vehicle crash within the past 5 years[9]

Objective

- This study aimed to evaluate the clinical and humanistic burden of idiopathic hypersomnia in a geographically diverse US sample of community-dwelling adults with idiopathic hypersomnia and matched non–idiopathic hypersomnia controls

Methods

- This retrospective, observational study used de-duplicated data from the 2021 and 2023 National Health and Wellness Survey (NHWS), a nationally representative, cross-sectional online survey completed by a sample of adults in the United States
  - A quota-sampling procedure was used with sex, age, and race strata to ensure that the demographic composition of the NHWS sample is representative of the US adult population
- Eligible participants were ≥18 years of age and resided in the United States; participants were excluded from this analysis if they self-reported a physician diagnosis of narcolepsy
- Adults who self-reported a physician diagnosis of idiopathic hypersomnia and experienced hypersomnia within the past 12 months were included in the idiopathic hypersomnia cohort; adults who did not report a diagnosis or experience idiopathic hypersomnia within the past 12 months were included in the matched non–idiopathic hypersomnia control cohort
- Baseline differences in demographic and health characteristics were minimized between adults with idiopathic hypersomnia and matched non–idiopathic hypersomnia controls using 1:2 propensity score matching
  - The covariates selected for matching were survey year, sex, age, race, marital status, education, annual household income, insurance type, smoking status, and days exercising vigorously for ≥20 minutes within the past month
- Frequencies and percentages were reported for categorical variables; means and standard deviations were reported for continuous variables
- Bivariate analyses compared demographic characteristics, comorbidities, body mass index (BMI), and scores on the Charlson Comorbidity Index (CCI), 9-item Patient Health Questionnaire (PHQ-9), 7-item Generalized Anxiety Disorder (GAD-7) assessment, 36-item RAND Short Form Survey Instrument (RAND-36; 2023 only), 36-item Short Form Health Survey version 2 (SF-36v2; 2021 only), Short Form Six-Dimension (SF-6D) Health Utilities Index (2021 only), EQ-5D index, and EQ visual analog scale (EQ-VAS) between adults with idiopathic hypersomnia and matched non–idiopathic hypersomnia controls

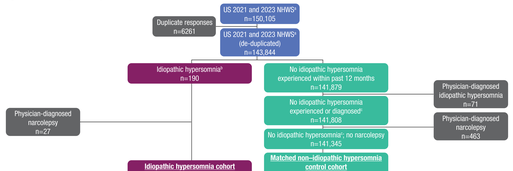
References: 1. Arnulf I, et al. *Sleep Med Rev.* 2023;69:101766. **2.** American Academy of Sleep Medicine. *International Classification of Sleep Disorders – Third Edition, Text Revision.* Darien, IL: American Academy of Sleep Medicine; 2023. **3.** Stevens J, et al. *Nat Sci Sleep.* 2023;15:593-606. **4.** Wasling HB, et al. *Sleep Med.* 2020;76:104-112. **5.** Avis KT, et al. *J Clin Sleep Med.* 2015;11(11):1281-1288. **6.** Ozaki A, et al. *J Clin Sleep Med.* 2008;4(6):572-578. **7.** Neikrug AB, et al. *Behav Sleep Med.* 2017;15(2):158-171. **8.** Vernet C, Arnulf I. *Sleep.* 2009;32(6):753-759. **9.** Pizza F, et al. *PLoS One.* 2015;10(6):e0129386. **10.** Löwe B, et al. *Med Care.* 2004;42(12):1194-1201. **11.** Toussaint A, et al. *J Affect Disord.* 2020;265:395-401. **12.** Samsa G, et al. *Pharmacoeconomics.* 1999;15(2):141-155. **13.** Maruish ME. *User's Manual for the SF-36v2 Health Survey.* Lincoln, RI: Quality Metric Incorporated; 2011. **14.** Ware JE, et al. *SF-36 Health Survey Manual and Interpretation Guide.* Boston, MA: Health Institute; 1993. **15.** Walters SJ, Brazier JE. *Qual Life Res.* 2005;14(6):1523-1532. **16.** Del Corral T, et al. *Biomedicines.* 2023;11(9):2522. **17.** Zanini A, et al. *Respir Care.* 2015;60(1):88-95. **18.** Pickard AS, et al. *Health Qual Life Outcomes.* 2007;5:70. **19.** Nolan CM, et al. *Thorax.* 2016;71(6):493-500. **20.** Chen P, et al. *Qual Life Res.* 2016;25(6):1585-1596. **21.** Saad R, et al. *Sleep Epidemiol.* 2023;3:100059. **22.** Lillaney P, et al. Presented at: Annual Meeting of the Associated Professional Sleep Societies; June 3-7, 2023; Indianapolis, IN. Poster 250.

Support and Acknowledgments: This study was supported by Jazz Pharmaceuticals. Under the direction of the authors, Peloton Advantage, LLC (an OPEN Health company) employees Joseph Mansonet, MPH, and Nicole Boyer, PhD, provided medical writing support and Christopher Jaworski provided editorial support, which were funded by Jazz Pharmaceuticals. The authors thank Jacob Matta of Oracle Life Sciences for his contributions to study analysis and reporting.

Disclosures: C Drachenberg and **M Whalen** are full-time employees of Jazz Pharmaceuticals who, in the course of this employment, have received stock options exercisable for, and other stock awards of, ordinary shares of Jazz Pharmaceuticals, plc. **MJ Cambron-Mellott** and **L Yang** are full-time employees of Oracle Life Sciences, a division of Oracle Corporation, which was paid by Jazz Pharmaceuticals to conduct this study; MJ Cambron-Mellott owns stock in Oracle Corporation. **BL Balkaran** is a former full-time employee of Oracle Life Sciences, a division of Oracle Corporation, who owns stocks in Oracle Corporation. **DT Plante** is a consultant and advisory board member for Jazz Pharmaceuticals. He has also served as a consultant/advisory board member for Alkermes, Harmony Biosciences, and Takeda and consultant for Aditum Bio, LLC and Teva Pharmaceuticals (Australia).

Results

Figure 1. Study Sample



[a]NHWS was reviewed by Pearl Institutional Review Board (Indianapolis, IN) and granted exemption status. [b]Participants experienced idiopathic hypersomnia within past 12 months and reported a physician diagnosis of idiopathic hypersomnia. [c]Participants did not experience idiopathic hypersomnia within past 12 months or report a physician diagnosis of idiopathic hypersomnia.
NHWS, National Health and Wellness Survey.

- Included in this study were 163 adults with idiopathic hypersomnia and 326 matched non–idiopathic hypersomnia controls

Table 1. Sociodemographic and Health Characteristics: Adults With Idiopathic Hypersomnia Compared With Matched Non–Idiopathic Hypersomnia Controls

	Idiopathic Hypersomnia Cohort (n=163)	Matched Non–Idiopathic Hypersomnia Control Cohort (n=326)	*P*
Age, years, mean (SD)	38.4 (13.7)	39.6 (14.7)	0.405
Female, n (%)	105 (64.4)	215 (66.0)	0.737
Race, n (%)			
White	130 (79.8)	263 (80.7)	
Black/African American	19 (11.7)	32 (9.8)	0.925
Asian	3 (1.8)	7 (2.1)	
Other race or origin/multi-race	11 (6.7)	24 (7.4)	
Hispanic ethnicity, n (%)	23 (14.1)	51 (15.6)	0.655
Married/living with partner, n (%)	78 (47.9)	162 (49.7)	0.701
University or higher degree, n (%)	71 (43.6)	136 (41.7)	0.698
Employment status, n (%)			
Employed[a]	108 (66.3)	204 (62.6)	
Retired	11 (6.7)	29 (8.9)	0.053
Long- or short-term disability	14 (8.6)	10 (3.1)	
Unemployed	17 (10.4)	36 (11.0)	
Annual household income, n (%)			
<$50,000	68 (41.7)	135 (41.4)	
$50,000 to <$100,000	49 (30.1)	96 (29.4)	0.976
$100,000+	40 (24.5)	83 (25.5)	
Insurance type, n (%)			
Commercial	80 (49.1)	163 (50.0)	
Medicaid	37 (22.7)	67 (20.6)	0.083
Medicare	22 (13.5)	44 (13.5)	
VA/CHAMPUS, TRICARE, or not sure	10 (6.1)	24 (7.4)	
Uninsured	14 (8.6)	28 (8.6)	
Smoking status, n (%)			
Current smoker	45 (27.6)	89 (27.3)	
Former smoker	37 (22.7)	74 (22.7)	0.997
Never smoker	81 (49.7)	163 (50.0)	
Days exercised vigorously for ≥20 minutes within past month, mean (SD)	7.0 (8.5)	7.6 (9.1)	0.465

[a]Full-time employment, part-time employment, or self-employment.
SD, standard deviation.

- After matching, no differences in the selected matched variables were observed between the two cohorts
  - Adults with idiopathic hypersomnia received a physician diagnosis of their condition a mean (SD) of 11.8 (12.0) years before they completed the NHWS

Table 2. BMI Values and CCI Scores Were Higher Among Adults With Idiopathic Hypersomnia Than Among Matched Non–Idiopathic Hypersomnia Controls

	Idiopathic Hypersomnia Cohort (n=163)	Matched Non–Idiopathic Hypersomnia Control Cohort (n=326)	*P*
BMI, kg/m², mean (SD)	29.01 (8.57)	27.33 (7.23)	0.030
CCI, mean (SD)	1.43 (2.26)	0.34 (1.03)	<0.001
CCI score category			
0	86 (52.8)	276 (84.7)	
1	18 (11.0)	15 (4.6)	<0.001
2	25 (15.3)	26 (8.0)	
3+	34 (20.9)	9 (2.8)	

BMI, body mass index; CCI, Charlson Comorbidity Index; SD, standard deviation.

- Relative to matched non–idiopathic hypersomnia controls, US adults with idiopathic hypersomnia had greater comorbidity burden, including higher BMI, higher CCI, and higher proportion of CCI scores ≥3

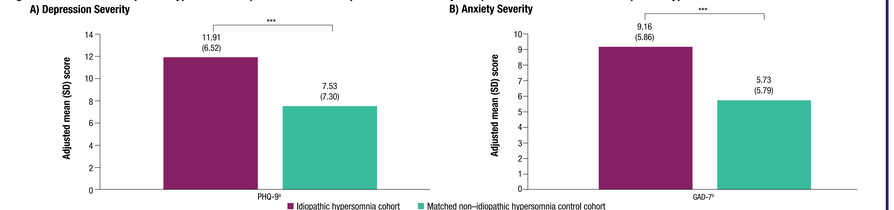
Table 3. Comorbidity Burden Was Higher Among Adults With Idiopathic Hypersomnia Than Among Matched Non–Idiopathic Hypersomnia Controls

Condition, n (%)	Idiopathic Hypersomnia Cohort (n=163)	Matched Non–Idiopathic Hypersomnia Control Cohort (n=326)	*P*
Any autoimmune disorder[a]	69 (42.3)	39 (12.0)	**<0.001**
Any cancer/tumor	32 (19.6)	29 (8.9)	**<0.001**
Arthritis conditions[b]	27 (16.6)	15 (4.6)	**<0.001**
Chronic pain[c]	106 (65.0)	96 (29.4)	**<0.001**
Digestive conditions[d]	41 (25.2)	29 (8.9)	**<0.001**
Emotional/mental health conditions			
Attention-deficit disorder, attention-deficit/hyperactivity disorder	59 (36.2)	27 (8.3)	**<0.001**
Anxiety	91 (55.8)	87 (26.7)	**<0.001**
Bipolar disorder	31 (19.0)	22 (6.7)	**<0.001**
Depression	99 (60.7)	100 (30.7)	**<0.001**
Generalized anxiety disorder	81 (49.7)	54 (16.6)	**<0.001**
Obsessive-compulsive disorder	33 (20.2)	8 (2.5)	**<0.001**
Panic disorder	38 (23.3)	17 (5.2)	**<0.001**
Posttraumatic stress disorder	49 (30.1)	21 (6.4)	**<0.001**
Social anxiety disorder	40 (24.5)	25 (7.7)	**<0.001**
Schizophrenia	7 (4.3)	3 (0.9)	**0.013**
Liver conditions[e]	20 (12.3)	8 (2.5)	**<0.001**
Neurological conditions			
Epilepsy	6 (3.7)	10 (3.1)	0.719
Multiple sclerosis	2 (1.2)	3 (0.9)	0.751
Muscular dystrophy, Parkinson disease	2 (1.2)	1 (0.3)	0.219
Restless legs syndrome[f]	32 (19.6)	9 (2.8)	**<0.001**
Infectious diseases: AIDS/HIV infection	8 (4.9)	0 (0.0)	**<0.001**
Kidney conditions[g]	4 (2.5)	3 (0.9)	0.178
Endocrine/metabolic conditions			
Gestational diabetes	10 (6.1)	1 (0.3)	**<0.001**
Type 1 diabetes[h]	8 (4.9)	7 (2.1)	0.095
Type 2 diabetes	19 (11.7)	21 (6.4)	**0.047**
Heart or blood conditions			
Angina	6 (3.7)	0 (0.0)	**<0.001**
Arrhythmia/atrial fibrillation	21 (12.9)	7 (2.1)	**<0.001**
Atherosclerosis	1 (0.6)	1 (0.3)	0.616
Congestive heart failure	6 (3.7)	1 (0.3)	**0.003**
Deep vein thrombosis	7 (4.3)	5 (1.5)	0.063
Heart attack	6 (3.7)	3 (0.9)	**0.032**
High blood pressure	45 (27.6)	54 (16.6)	**0.004**
High cholesterol	45 (27.6)	49 (15.0)	**<0.001**
Mini-stroke/transient ischemic attack	3 (1.8)	3 (0.9)	0.384
PAD/poor circulation or PVD	8 (4.9)	1 (0.3)	**<0.001**
Pulmonary embolism	4 (2.5)	4 (1.2)	0.313
Stroke	3 (1.8)	1 (0.3)	0.076
Unstable angina/chest pains	6 (3.7)	1 (0.3)	**0.003**
Respiratory conditions			
Asthma	35 (21.5)	27 (8.3)	**<0.001**
Chronic bronchitis, COPD, emphysema	28 (17.2)	13 (4.0)	**<0.001**
Sleep conditions			
Insomnia	63 (38.7)	46 (14.1)	**<0.001**
Sleep apnea	50 (30.7)	15 (4.6)	**<0.001**
Other sleep difficulties[i]	38 (23.3)	16 (4.9)	**<0.001**
Other conditions			
Alcoholism	10 (6.1)	11 (3.4)	0.156
Connective tissue disease	11 (6.7)	2 (0.6)	**<0.001**
Sjögren syndrome	4 (2.5)	4 (1.2)	0.313
Thyroid condition	28 (17.2)	24 (7.4)	**<0.001**

[a]Includes rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis, lupus, celiac disease, inflammatory bowel disease (Crohn disease or ulcerative colitis), type 1 diabetes, multiple sclerosis, restless legs syndrome,[f] connective tissue disease, and Sjögren syndrome.
[b]Includes rheumatoid arthritis, psoriatic arthritis, and ankylosing spondylitis.
[c]Includes lupus, osteopenia, osteoporosis, diabetic neuropathic pain, fibromyalgia, headache and migraine, and pain.
[d]Includes celiac disease, inflammatory bowel disease (Crohn disease and/or ulcerative colitis), and/or irritable bowel syndrome.
[e]Includes chronic liver disease, cirrhosis, nonalcoholic fatty liver disease, and/or nonalcoholic steatohepatitis.
[f]Autoimmune–related or suspected autoimmune condition.
[g]Includes chronic kidney disease and moderate or severe renal or kidney disease.
[h]Type 1 diabetes or latent autoimmune diabetes.
[i]Excluding idiopathic hypersomnia, insomnia, narcolepsy, and sleep apnea.
AIDS, acquired immunodeficiency syndrome; COPD, chronic obstructive pulmonary disease; HIV, human immunodeficiency virus; PAD, peripheral arterial disease; PVD, peripheral vascular disease.

- Compared with matched non–idiopathic hypersomnia controls, US adults with idiopathic hypersomnia had a higher prevalence of cardiovascular, cardiometabolic (eg, arrhythmia, type 2 diabetes, high cholesterol, high blood pressure) and psychiatric (eg, depression, anxiety) comorbidities

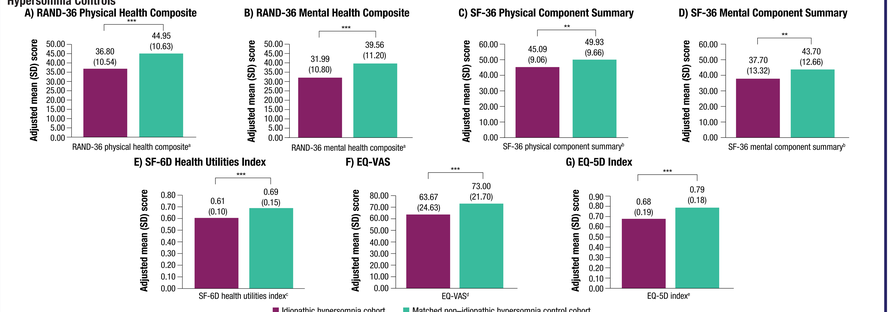
Figure 2. Adults With Idiopathic Hypersomnia Experienced Worse Depression and Anxiety Compared With Matched Non–Idiopathic Hypersomnia Controls



***P<0.001.
[a]PHQ-9 score range is 0–27. Higher scores indicate more severe depression. Scores of 5, 10, 15, and 20 represent cutoffs for mild, moderate, moderately severe, and severe depression, respectively. A 5-point decline represents a clinically significant improvement in PHQ-9.[19] [b]GAD-7 score range is 0–21. Higher scores indicate more severe general anxiety disorder. Scores of 5, 10, and 15 represent cutoffs for mild, moderate, and severe anxiety, respectively. Minimal clinically important difference for GAD-7 total score was 3.8, resulting in change scores of 4 or greater to reflect clinically relevant change in individual patients over course of treatment.[18]
GAD-7, 7-item Generalized Anxiety Disorder assessment; PHQ-9, 9-item Patient Health Questionnaire; SD, standard deviation.

- Adults with idiopathic hypersomnia reported higher levels of depression and anxiety than matched non–idiopathic hypersomnia controls

Figure 3. Adults With Idiopathic Hypersomnia Experienced Worse Mental Health, Physical Function, and Health-Related Quality of Life Compared With Matched Non–Idiopathic Hypersomnia Controls



**P<0.01. ***P<0.001.
[a]RAND-36 score range is 0–100 (50 represents population mean; 10 represents population SD). Higher scores indicate better health-related quality of life. Differences of 3–5 points on norm-based component summary scores are clinically meaningful.[17]
[b]SF-36 scores are standardized. Score range is 0–100 (mean score, 50 for general population mean; SD, 10). Higher scores indicate better health-related quality of life. MID values for groups with mean T-scores of 30–40 were proposed for SF-36v2 components and scale mean scores (2 for physical health composite; 3 for mental health composite); for higher T-score ranges, MID values tend to be higher.[17]
[c]SF-6D Health Utilities Index derived from SF-36v2 using interval scoring; score range is 0.29–1.00. Higher scores indicate better overall general health. Differences of 0.041 point on health utility scores are clinically meaningful.[14,15]
[d]EQ-VAS score range is 0–100 (0, worst imaginable health state; 100, best imaginable health state). Higher scores indicate better self-rated health. Range of reported MCID and MID values for EQ-VAS is 6.5–11.[16,22]
[e]EQ-5D index score range is −0.59 to 1.00, with 1.00 representing "full health" and 0 representing death. Higher scores indicate better health state. Negative EQ-5D scores represent certain health states valued as worse than death. MID for EQ-5D index is considered to be ~0.074 point.[15]
EQ-VAS, EQ visual analog scale; MCID, minimal clinically important difference; MID, minimally important difference; RAND-36, 36-item RAND Short Form Survey Instrument; SD, standard deviation; SF-36, 36-item Short Form Health Survey; SF-36v2, 36-item Short Form Health Survey version 2; SF-6D, Short Form Six-Dimension.

- Adults with idiopathic hypersomnia reported poorer mental health and physical function and worse health-related quality of life than matched non–idiopathic hypersomnia controls

Conclusions

- This study, building on prior work using administrative claims databases,[21,22] underscores the substantial comorbidity and health-related quality-of-life burden experienced by adults with idiopathic hypersomnia
- The strengths of this study include use of patient-reported outcomes to directly capture patients' perspectives and use of a sample of community-dwelling adults with idiopathic hypersomnia, as opposed to a clinical trial population, which allows for greater generalizability
- The limitations of this study may include reliance on self-reported data, which can be subject to recall bias; inability to infer causation from cross-sectional data; and underrepresentation of individuals who lack internet access or are uncomfortable using the internet
- The increased burden of cardiovascular, cardiometabolic, and psychiatric comorbidities among individuals with idiopathic hypersomnia is substantial and needs to be taken into consideration while evaluating treatment options[21]

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Presented at Psych Congress 2024; October 29–November 2, 2024; Boston, MA, USA