

National Sleep Foundation's 2023 Sleep in America® Poll

**The Nation's Sleep Health is Strongly Associated
With the Nation's Mental Health**



March 9, 2023

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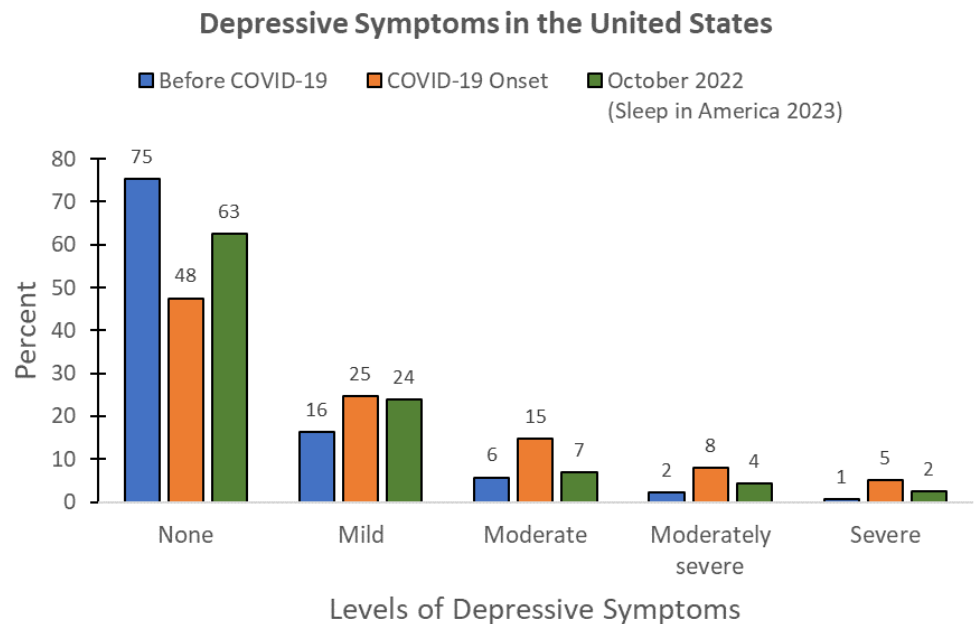
The National Sleep Foundation administered validated measures of sleep health, sleep satisfaction, and depressive symptoms to a nationally representative sample of the US adult population. Results suggest the nation's sleep health is fair (i.e., a 'C' on average), the nation's sleep satisfaction is poor (i.e., a 'D' on average), and the nation's level of depressive symptoms remain elevated when compared to pre-pandemic estimates. Strong associations between sleep health characteristics and depressive symptoms were observed. For example: (1) Half of all individuals who reported less than 7 hours of sleep per weekday night also reported mild or greater levels of depressive symptoms, (2) Nearly 7 out of 10 (65%) people who are dissatisfied with their sleep also experienced mild or greater levels of depressive symptoms, with 31% reporting moderate-severe symptoms, (3) Nearly 2 in 5 people who have difficulty falling asleep (37%) or staying asleep (38%) just 2 days a week also reported mild or greater levels of depressive symptoms, and (4) Over 90% of individuals who scored in the 'A' range for sleep health and sleep satisfaction reported none/minimal levels of depressive symptoms. Importantly, we found that individuals who engaged in higher rates of healthy sleep behaviors, those recommended in the *Best Slept Self*[®] framework, were more likely to experience good sleep health and sleep satisfaction as compared to individuals who engaged in low levels of healthy sleep behaviors. For example, 73% of individuals who earned an 'A' for performing high levels of healthy sleep behaviors also reported above average sleep health. Greater engagement in healthy sleep behaviors was not only associated with sleep health and satisfaction, but also was associated with lower levels of depressive symptoms. Over 90% of individuals who earned an 'A' for their practice of healthy sleep behaviors also reported to be free of significant depressive symptoms. Poll results suggest a strong and compelling link between sleep health and depressive symptoms in the general public, with healthy sleep behaviors demonstrating promise as a potential avenue to promote both sleep and mental health.

The National Sleep Foundation (NSF; theNSF.org) is dedicated to improving health and well-being through sleep education and advocacy. NSF conducts population-level research in the United States through multiple instruments, including its annual *Sleep in America*[®] poll (SIA Poll), which is the premier annual review of public attitudes and behaviors around current sleep topics. The NSF is committed to understanding the associations between sleep health characteristics and mental health in the general population, and we are equally focused on insights and understanding of associations between healthy sleep behaviors and mental health. This year, beyond NSF's customary measures of sleep health and satisfaction, NSF's *Sleep in America*[®] Poll sought to understand depressive symptoms in the general US adult population, results of which were reconciled with three other NSF assessments of the public's sleep.

Background

The United States is in the midst of a mental health crisis. The US Surgeon General, Dr. Vivek Murthy, indicated in an October 2022 interview that the "mental health crisis" was the biggest health challenge facing the United States. The mental health crisis has been exacerbated by the COVID-19 pandemic and

is characterized by heightened levels of depressive symptoms and disorders in the general population. Prior to the onset of the COVID-19 pandemic, population-based estimates of depressive symptoms ranged from 16% for mild depressive symptoms to 0.7% for severe depressive symptoms. These estimates spiked to 25% and 5%, respectively for mild and severe depressive symptoms, during March and April of 2020.¹ In a national, probability-based sample of 1,042 adults collected in October 2022 (NSF’s SIA Poll), the NSF found levels of depressive symptoms to have partially remitted, with 24% of adults reporting mild depressive symptoms and 2% reporting severe depressive symptoms. In the SIA Poll, 12.4% of respondents met clinical criteria for a probable depression diagnosis. As illustrated in the Figure, levels of depressive symptoms are lower than levels recorded at the onset of the COVID-19 pandemic, with the notable exception of mild levels of depressive symptoms being roughly equal to levels observed at the start of the pandemic, but higher than pre-pandemic levels, which is of continued concern.



Approach

Depression is a clinical disorder diagnosed in specialized settings using validated approaches, often including both an interview with a licensed clinician and self-report measures. The use of self-report measures alone are not sufficient to render a clinical diagnosis of a depression disorder. To explore current associations amongst sleep and depressive symptoms, the NSF administered the nine-question Patient Health Questionnaire-9 (PHQ-9)² to a representative sample of the US population. The PHQ-9 is a survey tool developed to initially evaluate and subsequently monitor an individual’s depressive symptoms over time. This tool typically is self-administered and is used to screen depressive symptoms, measure their severity and, when applicable, assess an individual’s response to treatment.

Based on PHQ-9 total score, depressive symptom severity can be categorized in several informative ways, including the traditional scoring framework of: (1) none or minimal (a score of 0-4), mild (5-9), moderate (10-14), moderately severe (15-19) and severe (20-27). Any number of the above-listed five categories can be combined to generate meaningful subgroups. Acknowledging that even mild levels of depressive symptoms place an individual at increased risk for numerous negative outcomes, groups can also be based on the absence of depressive symptoms or the presence of only very minimal depressive symptoms (scores 0-4) versus the presence of mild, moderate, moderate severe, or severe depressive symptoms (scores 5+). The PHQ-9 can also be scored in such a manner as to indicate a probable diagnosis of major depressive disorder or other depressive disorder based on endorsement of specific symptoms. In concert with the PHQ-9, the Sleep Health Index (SHI)³, a validated measure incorporating

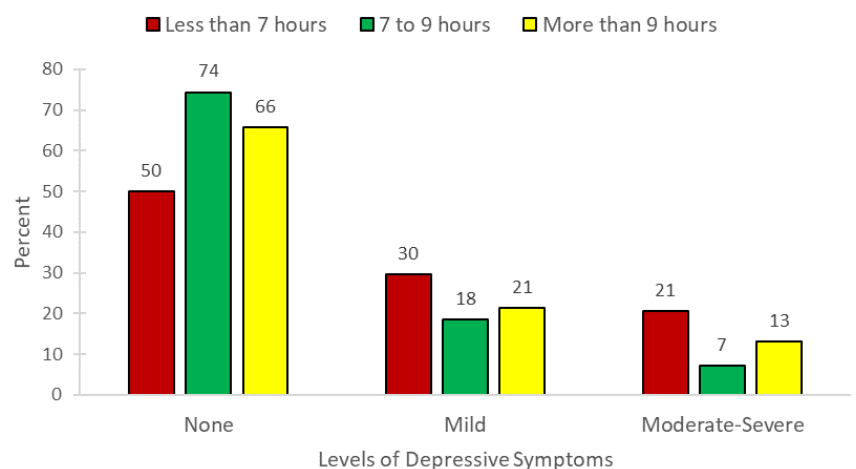
sleep duration, sleep quality and disordered sleep, the Sleep Satisfaction Tool (SST)⁴, a validated index of satisfaction with sleep experiences, and the Best Slept Self[®] questionnaire (BSSQ), a new NSF measure of the frequency with which individuals engage in healthy sleep behaviors, were also administered. Note: all analyses reported herein were conducted on PHQ-9 scores calculated both with and without the single sleep-related item. While results were slightly attenuated when the sleep-related item was not included in the total PHQ-9 score, the general pattern of findings remained unchanged.

Sleep Duration and Depressive Symptoms

Individuals reported their typical sleep durations, which were then categorized by whether they slept for the NSF recommended 7 to 9 hours per night⁵ or more or less than this duration. Rates of depressive symptoms were examined for individuals sleeping less than 7 hours per night, sleeping 7 to 9 hours per night, and those sleeping more than 9 hours per night, separately on both weekdays and weekends. A clear and compelling pattern emerged in which individuals who routinely slept between 7 to 9 hours per weekday night were nearly 50% more likely to not experience elevated levels of depressive symptoms compared to their counterparts who slept less than 7 hours per night. Importantly, half of all individuals who reported less than 7 hours of sleep per weekday night also experienced mild or greater levels depressive symptoms, with 21% reporting moderate-severe symptoms. Other notable results included:

- Adults who slept less than 7 hours per night on weekdays were three times as likely to experience moderate to severe depressive symptoms as individuals who slept the recommended 7 to 9 hours per night.
- Nearly 1 in 5 adults (19%) who habitually sleep less than 7 hours per night meet probable criteria for a depression diagnosis compared to only 7% of adults who sleep between 7 and 9 hours per night.

Weekday Sleep Duration and Depressive Symptoms

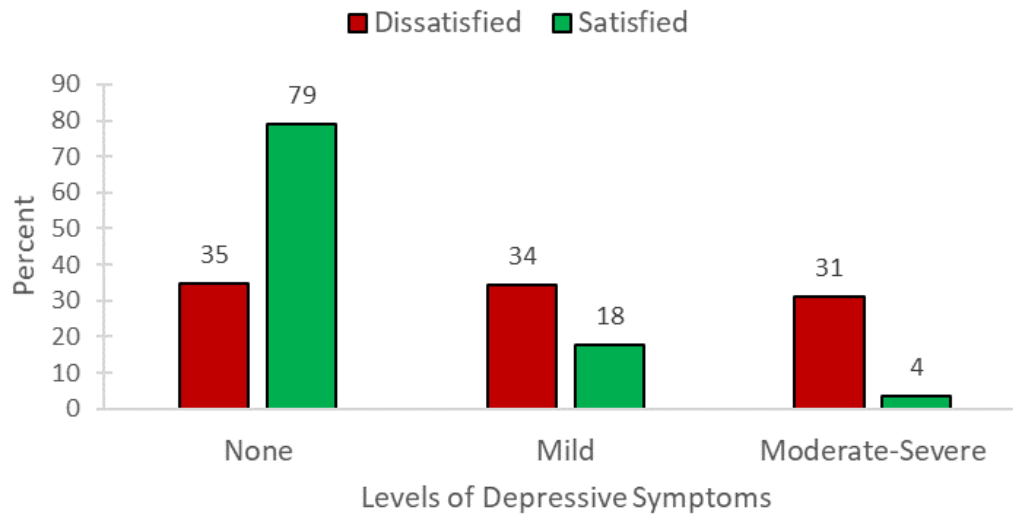


Sleep Satisfaction and Depressive Symptoms

Individuals were asked about their overall sleep satisfaction, with responses grouped into those generally satisfied and those generally dissatisfied with their sleep. Individuals who were satisfied with their sleep were more than twice as likely as their dissatisfied counterparts to not experience significant levels of depressive symptoms. This observation was punctuated by the finding that individuals dissatisfied with their sleep were nearly eight times as likely to experience moderate to severe levels of depressive symptoms as those who were satisfied with their sleep.

- Nearly 7 out of 10 people (65%) who were dissatisfied with their sleep also experienced mild or greater levels of depressive symptoms, with 31% reporting moderate-severe symptoms.
- One in four adults (25%) who were dissatisfied with their sleep also met probable criteria for a depression diagnosis compared to only 5% of those who were satisfied with their sleep.

Sleep Satisfaction and Depressive Symptoms

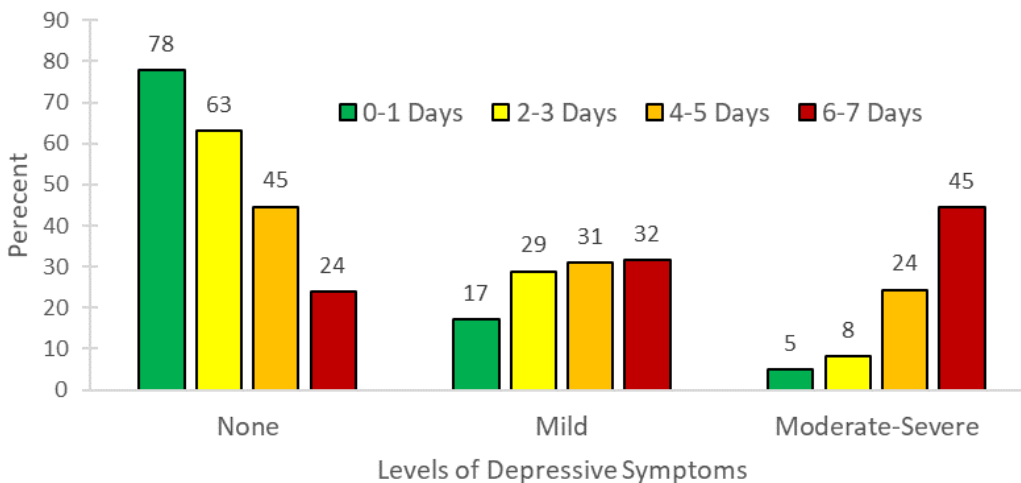


Difficulty Falling Asleep and Depressive Symptoms

Individuals were also asked to report the number of days during a typical week on which they had difficulty falling asleep. Strong linear associations were observed between the frequency of sleep onset difficulties and rates of depressive symptoms, suggesting that as individuals experience more difficulty falling asleep, they also experience increased rates of elevated levels of depressive symptoms. For example, individuals without trouble falling asleep were over three times as likely to not experience depressive symptoms as individuals who experience frequent trouble falling asleep. Conversely, when examining heightened levels of depressive symptoms, a similar, but opposite association emerged, 45% of individuals with nightly trouble falling asleep reported moderate to severe levels of depressive symptoms, nine times the rates observed in individuals without difficulty falling asleep.

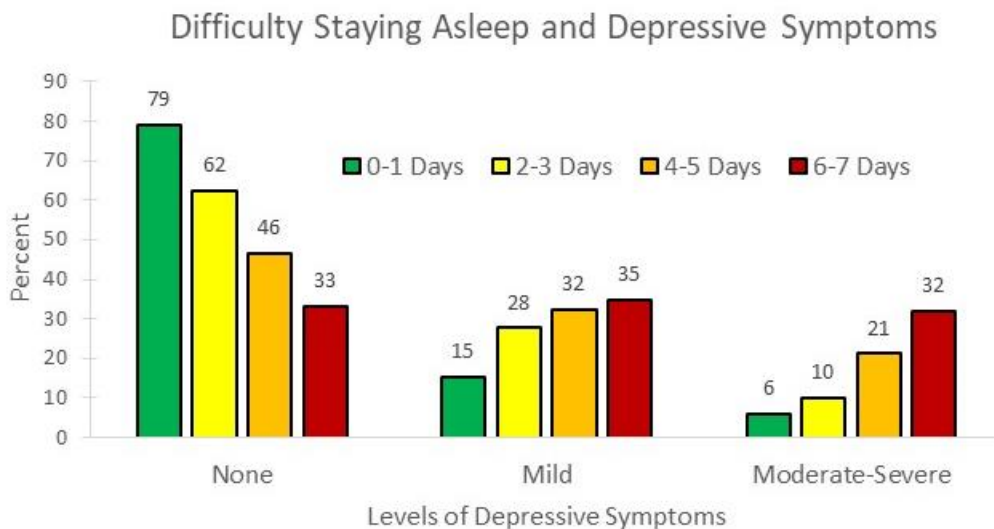
- Nearly 2 in 5 people who have difficulty falling asleep (37%) just 2 night a week also reported mild or greater levels of depressive symptoms.
- Almost 1 in 5 individuals who have 2 or more nights of difficulty falling asleep (19%) also met probable criteria for a depression diagnosis compared with just 6% of people with no or one night difficulty falling asleep.

Difficulty Falling Asleep and Depressive Symptoms



Difficulty Staying Asleep and Depressive Symptoms

Individuals were also asked to report the number of days during a typical week on which they had difficulty staying asleep. Again, strong associations were observed between the frequency of sleep maintenance difficulties and rates of depressive symptoms, suggesting that as individuals experience more difficulty staying asleep, they also experience increased rates of elevated levels of depressive symptoms. An identical pattern as described above for difficulty falling asleep, albeit less pronounced, was observed with regards to trouble staying asleep during the night—individuals without difficulty staying asleep were much more likely to have none/minimal levels of depressive symptoms and individuals with frequent difficulties staying asleep were much more likely to experience moderate to severe levels of depressive symptoms.



- Nearly 2 in 5 people who have difficulty staying asleep (38%) just 2 nights a week also reported mild or greater levels of depressive symptoms, with 10% of these people saying their symptoms were moderate to severe.
- Almost 1 in 5 individuals who have 2 or more nights of difficulty staying asleep (19%) also met probable criteria for a depression diagnosis.

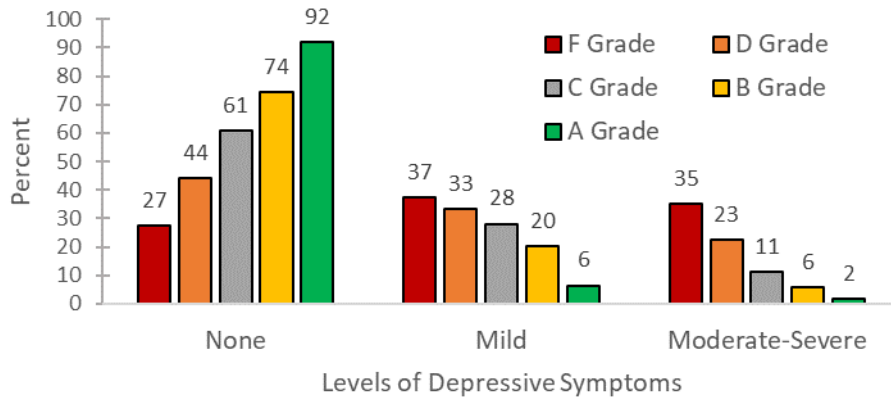
Sleep Health Index and Depressive Symptoms

In addition to the above-described sleep health characteristics, individuals completed the Sleep Health Index (SHI)³. The overall SHI – an average of sleep duration, sleep quality, and disordered sleep scores—was 75 on its 0-100 scale (with 100 being best). The SHI can be scored according to common grading metrics (i.e., F = 0-59; D = 60-69; C = 70-79; B = 80-89; A = 90-100). Clear associations emerged between overall sleep health and depressive symptoms. Over 90% of individuals who scored in the ‘A’ range on the SHI (i.e., individuals with the highest reported sleep health) reported none/minimal levels of depressive symptoms, compared to only 27% of individuals who got an ‘F’ on the SHI (i.e., individuals with the lowest reported sleep health). Likewise, individuals who got an ‘F’ on the SHI experienced moderate to severe levels of depressive symptoms at over 15 times the rate experienced by individuals who received an ‘A’ on the SHI. Put differently, individuals with the worst sleep health are over 15 times more likely to experience moderate to severe depressive symptoms than individuals with the best sleep health.

- Over half of adults (55%) with poor sleep health (i.e., C, D, or F grades) reported mild or greater levels of depressive symptoms (23% experiencing moderate to severe levels) compared to only 18% of adults with good sleep health (i.e., A or B grades).
- One in every five adults, 20%, with poor sleep health met criteria for a probable depression diagnosis compared to only 4% of individuals with good sleep health.

- The correlation between the SHI and PHQ-9 scores was $r = -0.54$ ($p < .001$)—suggesting that as sleep health improves, levels of depressive symptoms decrease.

Sleep Health Index and Depressive Symptoms

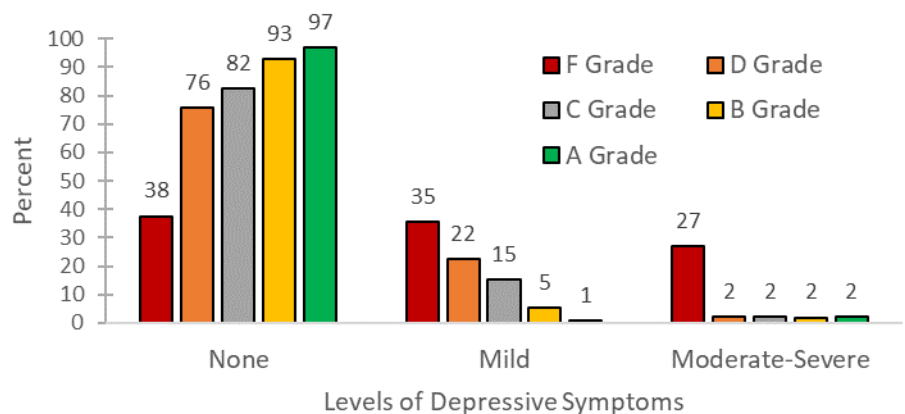


Sleep Satisfaction Tool and Depressive Symptoms

Individuals also completed the Sleep Satisfaction Tool (SST)⁴. The overall average SST score, consisting of nine questions probing about satisfaction with general sleep and with individual components of sleep—was 60 on its 0-100 scale (again, higher being better). Like the SHI, the SST can be scored according to common grading metrics (i.e., F = 0-59; D = 60-69; C = 70-79; B = 80-89; A = 90-100). Clear associations again emerged between overall sleep satisfaction and depressive symptoms. Over 95% of individuals who scored in the ‘A’ range on the SST (i.e., individuals with the highest reported sleep satisfaction) reported none/minimal levels of depressive symptoms. This compared to only 38% of individuals who got an ‘F’ on the SST (i.e., individuals with the lowest reported sleep satisfaction). Likewise, individuals who got an ‘F’ on the SST experienced moderate to severe levels of depressive symptoms at over 10 times the rate experienced by individuals who received an ‘A’ on the SST. Put differently, individuals with the worst sleep satisfaction are over 10 times more likely to experience moderate to severe depressive symptoms than individuals with the best sleep satisfaction.

- Nearly one out of every two adults, 46%, with poor sleep satisfaction (i.e., C, D, or F grades) reported mild or greater levels of depressive symptoms (17% experiencing moderate to severe levels) compared to only 5% of individuals with good sleep satisfaction (i.e., A or B grades).
- Fifteen percent of individuals with poor sleep satisfaction met criteria for a probable depression diagnosis

Sleep Satisfaction Tool and Depressive Symptoms



compared to only 4% of individuals with good sleep satisfaction.

- The correlation between the SST and PHQ-9 was $r = -0.64$ ($p < .001$)—again suggesting that as sleep satisfaction increases, levels of depressive symptoms decrease.

Group Differences in the Associations Among Sleep Health, Sleep Satisfaction, and Depressive Symptoms

SHI scores, SST scores, and BSS scores demonstrated statistically significant negative correlations with PHQ-9 scores (all p 's $< .01$) within groupings based on (1) sex, (2) metropolitan living location, (3) race/ethnicity, (4) employment status, (5) age, and (6) education level—suggesting that as sleep health, sleep satisfaction, and healthy sleep behaviors increased, levels of depressive symptoms decreased. However, the strength of the associations was found to differ in certain circumstances. Notable group differences included:

- Women displayed a stronger negative association between engagement in BSS behaviors and levels of depressive symptoms than men ($z = 1.87$, $p < .05$).
- Individuals living in non-metropolitan areas displayed a stronger negative association between sleep satisfaction and levels of depressive symptoms than individuals living in metropolitan areas ($z = 1.83$, $p < .05$).
- Black individuals displayed a stronger negative association between sleep health and levels of depressive symptoms than either White ($z = 2.48$, $p < .01$) or Hispanic ($z = 2.87$, $p < .01$) individuals.
- Individuals working fulltime had weaker negative associations between sleep health and sleep satisfaction and depressive symptoms than either individuals working parttime ($z = 3.24$, $p < .001$; $z = 2.56$, $p < .005$, SHI and SST respectively) or individuals not working ($z = 1.8$, $p < .05$; $z = 1.88$, $p < .05$, SHI and SST respectively).
- Individuals not working had weaker negative associations between sleep health and levels of depressive symptoms than individuals working parttime ($z = 1.70$, $p < .05$) and had strong negative associations between BSS behaviors and levels of depressive symptoms than individuals working fulltime ($z = 1.65$, $p < .05$).
- Individuals without a high school degree had stronger negative associations between sleep health and levels of depressive symptoms than individuals with a high school diploma ($z = 1.81$, $p < .05$), individuals with some college coursework ($z = 1.79$, $p < .05$), or individuals with a bachelor's degree or more ($z = 2.07$, $p < .05$).
- Individuals with a bachelor's degree or higher had a weaker negative association between BSS behaviors and levels of depressive symptoms than all other education levels (all p 's $< .05$).

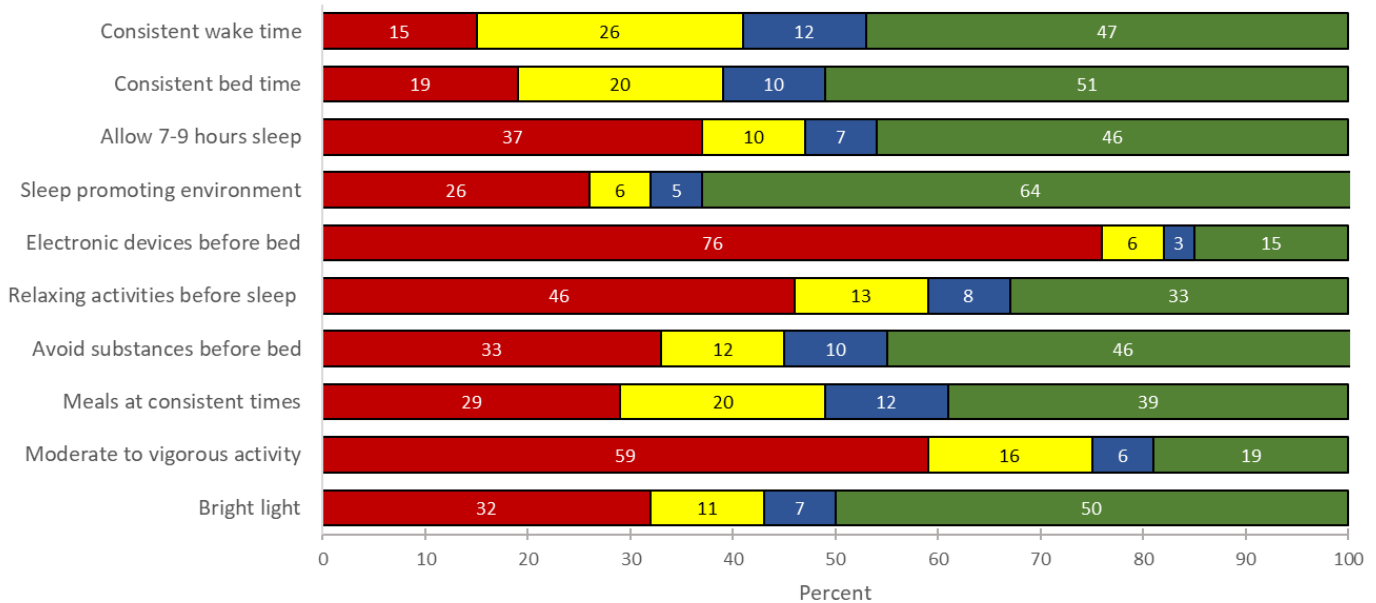
Group differences not reported directly above were not statistically significant at the $p < .05$ level

Best Slept Self®: Small Steps toward Big Outcomes

For general sleep health, the NSF recommends people engage in a small number of basic, healthy sleep behaviors to help be their *Best Slept Self*®. For the first time, the public was polled to examine how frequently people engage in these small sleep-promoting behaviors. A new instrument from the National Sleep Foundation, the Best Slept Self® questionnaire (BSSQ), measures the frequency with which individuals engage in both daytime and nighttime healthy sleep behaviors. The 10-item questionnaire is based on the *Best Slept Self*® framework, which includes six basic areas of focus for healthy sleep.

Percentage of US Adults Performing Best Slept Self Recommendations

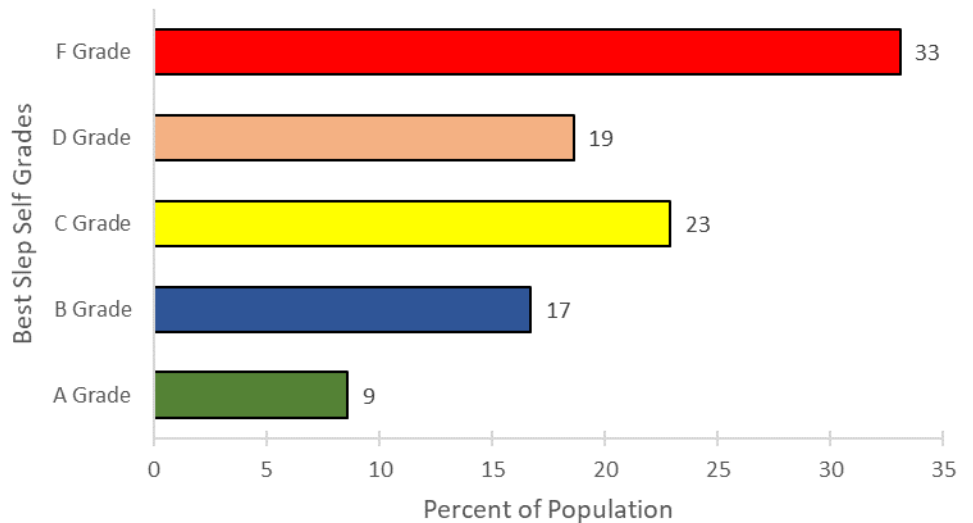
F C B A



The frequency of individual *Best Slept Self*[®] behaviors varied widely. At the top end, Americans reported going to bed and waking up at about the same time on an average of 5.7 days a week; sleeping in a quiet, cool, and dark environment an average of 5.3 days; eating meals at around the same time and spending a least 30 minutes in bright light an average of 5.1 days. People avoided heavy meals, alcohol, caffeine and nicotine before bedtime on 4.9 days; allowed for 7-9 hours of sleep on an average of 4.7 days and did relaxing activities before bedtime on an average of 4.1 days. Getting at least 30 minutes of moderate to vigorous activity was reported on an average of 3.5 days, and people reported putting their electronic devices away an hour before bed on an average of 2.0 days a week.

Like the SHI and SST, the BSSQ can be scored according to common grading metrics based on the percent of possible healthy sleep behaviors one practiced throughout a week (i.e., F = 0-59%; D = 60-69%; C = 70-79%; B = 80-89%; A = 90-100%). Initial results suggests that just over a quarter of Americans earned an ‘A’ or ‘B’ by engaging in 80% or more of possible healthy sleep behaviors. Unfortunately, 1/3 of American adults earned a failing grade by performing less than 60% of possible healthy sleep behaviors.

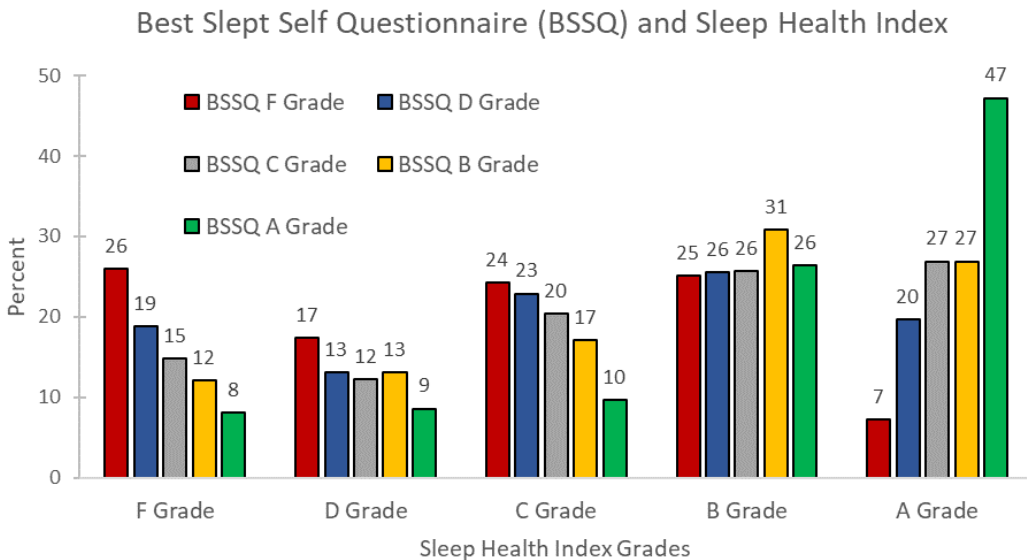
Percent of Population Performing Best Slept Self Recommendations



Best Slept Self[®] and Sleep Health

Clear associations emerged between practicing healthy sleep behaviors as measured by the BSSQ and overall sleep health as measured by the SHI. Only 8% of individuals who engaged in 90% or more of possible of healthy sleep behaviors (i.e., ‘A’ grade) had sleep health in the ‘F’ range, compared to 26% of individuals who engage in low levels of healthy sleep behaviors—more than a threefold increase. At the other end of the sleep health spectrum, nearly 1 in 2 individuals, 47%, who earned an ‘A’ for their engagement in healthy sleep behaviors also earned an ‘A’ for their overall sleep health. This contrasts with only 7% of individuals who engaged in low levels of healthy sleep behaviors earning the top mark for sleep health. Put differently, individuals engaged in high levels of healthy sleep behaviors as recommended by the *Best Slept Self*[®] framework are approximately seven times as likely as those engaged in low levels of healthy sleep behaviors to have the highest sleep health.

- Nearly 2 out of every 3 people (63%) who earned an ‘A’ or ‘B’ for their healthy sleep behaviors also have sleep health in the ‘A’ or ‘B’ range.



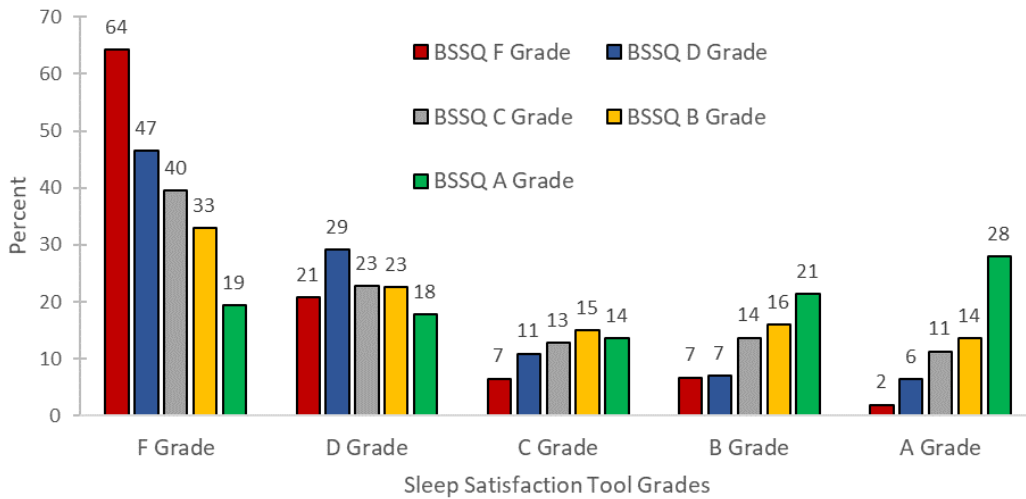
- Almost 3 out of 4, 73%, adults who earned an ‘A’ grade on the BSSQ also reported above average sleep health by earning either an ‘A’ or ‘B’ on the SHI.

- BSSQ scores were positively, and significantly correlated with total SHI scores ($r=.32, p<.001$)—indicating that as healthy sleep behaviors increased, so did sleep health.

Best Slept Self[®] and Sleep Satisfaction

A nearly identical pattern as that described above was observed for the association between engagement in healthy sleep behaviors and overall sleep satisfaction as measured by the SST. Sixty-four percent of individuals engaged in very low levels of healthy sleep behaviors (i.e., ‘F’ grade) also had poor sleep satisfaction, as indicated by a grade of ‘F’ on the SST—over three times the rate observed in individuals who engaged in high levels of healthy sleep behaviors (19%). One in two individuals, 49%, who engaged in high levels of healthy sleep behaviors (i.e., earned an ‘A’ on the BSSQ) were satisfied with their sleep, as indicated by a grade of ‘B’ or ‘A’ on the SST. Again, BSSQ scores were positively, and significantly correlated with total SST scores ($r=.35, p<.001$)—indicating that as healthy sleep behaviors increased, so did sleep satisfaction.

Best Slept Self Questionnaire (BSSQ) and Sleep Satisfaction Tool



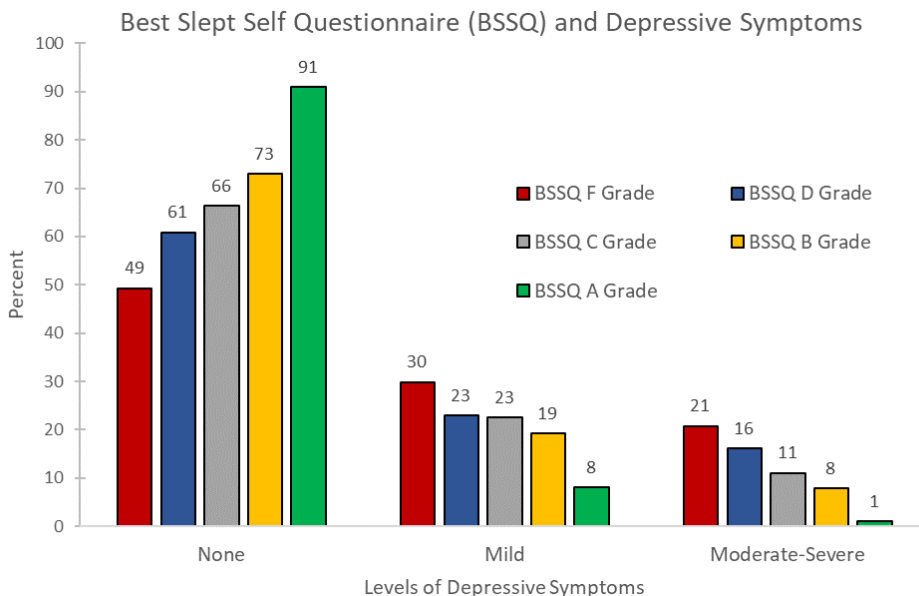
Best Slept Self® and Depressive Symptoms

Engagement in healthy sleep behaviors was not only associated with sleep health and satisfaction, but also was associated with levels of depressive symptoms. Approximately 1 in 2 individuals, 51%, who engaged in very low levels of healthy sleep behaviors reported mild or greater levels of depressive symptoms; however, this compares to less than 1 in 10 individuals, 9%, who engaged in very high levels of healthy sleep behaviors also reporting mild or greater levels of depressive symptoms. Stated another way, individuals who engaged in very low levels of healthy sleep behaviors were over 5 times as likely as individuals who engaged in very high levels of healthy sleep behaviors to report mild or greater levels of depressive symptoms. Over 90% of individuals who earned an ‘A’ for their engagement in healthy sleep behaviors were free of significant depressive symptoms as compared to less than 50% of individuals who earned an ‘F’ for their engagement in healthy sleep behaviors.

- Adult who performed low levels of healthy sleep behaviors as indicated by earning a ‘C,’ ‘D,’ or ‘F’ grade on the BSSQ

reported depressive symptoms likely to be representative of a depression diagnosis 15% of the time, compared to only 6% of individuals who performed high rates of healthy sleep behaviors (i.e., those earning either an ‘A’ or ‘B’ on the BSSQ).

- The correlation between the BSSQ and PHQ-9 scores was $r = -0.29$ ($p < .001$)—suggesting that as engagement in sleep-promoting behaviors increased, levels of depressive symptoms decreased.



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****For anyone experiencing suicidal thoughts, please seek care.****

Contact the Suicide and Crisis Lifeline by calling or texting 988 (extension 1 for Veterans Crisis Line). You will be connected with a trained crisis counselor. 988 is confidential, free, and available 24/7/365.

Call or text the NAMI (National Alliance on Mental Illness) Helpline at 800-950-6264 (M-F 10 am to 10 pm ET).

Appendix A: Survey Methodology

The survey was conducted via the nationally representative Ipsos KnowledgePanel®, in which participants are randomly recruited via address-based sampling to respond to survey questionnaires online. Households without internet connections are provided a web-enabled device and service.

The survey was designed to consist of approximately 1,000 adults. The questionnaire, in English and Spanish, was pretested Oct. 7-10, 2022, and field work was conducted Oct. 10-20. After initial invitations, reminder emails were sent on the third, fifth and seventh days of the field period. Out of 1,809 panel members invited to participate, completed, qualified surveys were provided by 1,064. Participants completed the survey in a median time of 10 minutes.

The 22 panelists who completed the survey in less than a quarter of the median completion time or who skipped more than half of the questions, or any of the wakeup/bedtime questions, were deleted in quality control. The final sample included 1,042 U.S. adults.

Data were weighted via iterative proportional fitting to the following benchmark distributions of adults from the U.S. Census Bureau's 2022 Current Population Survey:

- Gender (male, female) by age (18-29, 30-44, 45-59, 60+)
- Race/ethnicity (white, Black, other and 2+ races, Hispanic,)
- Education (high school or less, some college, bachelor or higher)
- Household income (\$0-\$24,999, \$25K-\$49,999, \$50K-\$74,999, \$75K-\$99,999, \$100K-\$149,999, \$150K+)
- Census Region (Northeast, Midwest, South, West)

The survey has a design effect due to weighting of 1.1, for a margin of sampling error of plus or minus 3.2 percentage points for the full sample. Error margins are larger for subgroups.

A table of unweighted, weighted and benchmark distributions follows.

	Unweighted	Weighted	Benchmark
18-29 Male	6.4	10.0	10.0
18-29 Female	6.7	9.9	9.9
30-44 Male	12.3	12.9	12.9
30-44 Female	11.8	13.0	13.0
45-59 Male	13.2	11.8	11.8
45-59 Female	11.5	12.1	12.1
60+ Male	18.5	14.0	14.0
60+ Female	19.5	16.3	16.3
White, non-Hispanic	69.3	62.1	62.1
Black, non-Hispanic	10.0	12.0	12.0
Other or 2+ races, non-Hispanic	7.8	8.7	8.7
Hispanic	13.0	17.2	17.2

 NATIONAL SLEEP FOUNDATION

High school or less	33.5	38.8	38.8
Some college, no degree	25.6	26.4	26.4
Bachelor's or higher	40.9	34.8	34.8
Less than \$25,000	11.0	12.4	12.4
\$25,000-\$49,999	16.4	16.1	16.1
\$50,000-\$74,999	16.9	15.8	15.8
\$75,000-\$99,999	10.7	12.7	12.7
\$100,000-\$149,999	17.2	18.3	18.3
\$150,000 or more	27.8	24.7	24.7
Northeast	18.5	17.4	17.4
Midwest	20.2	20.6	20.6
South	35.7	38.3	38.3
West	25.5	23.7	23.7