



TEAM GRYFFINDOR

SLEEPWELL ANALYTICS

SLEEP HEALTH & LIFESTYLE DATASET

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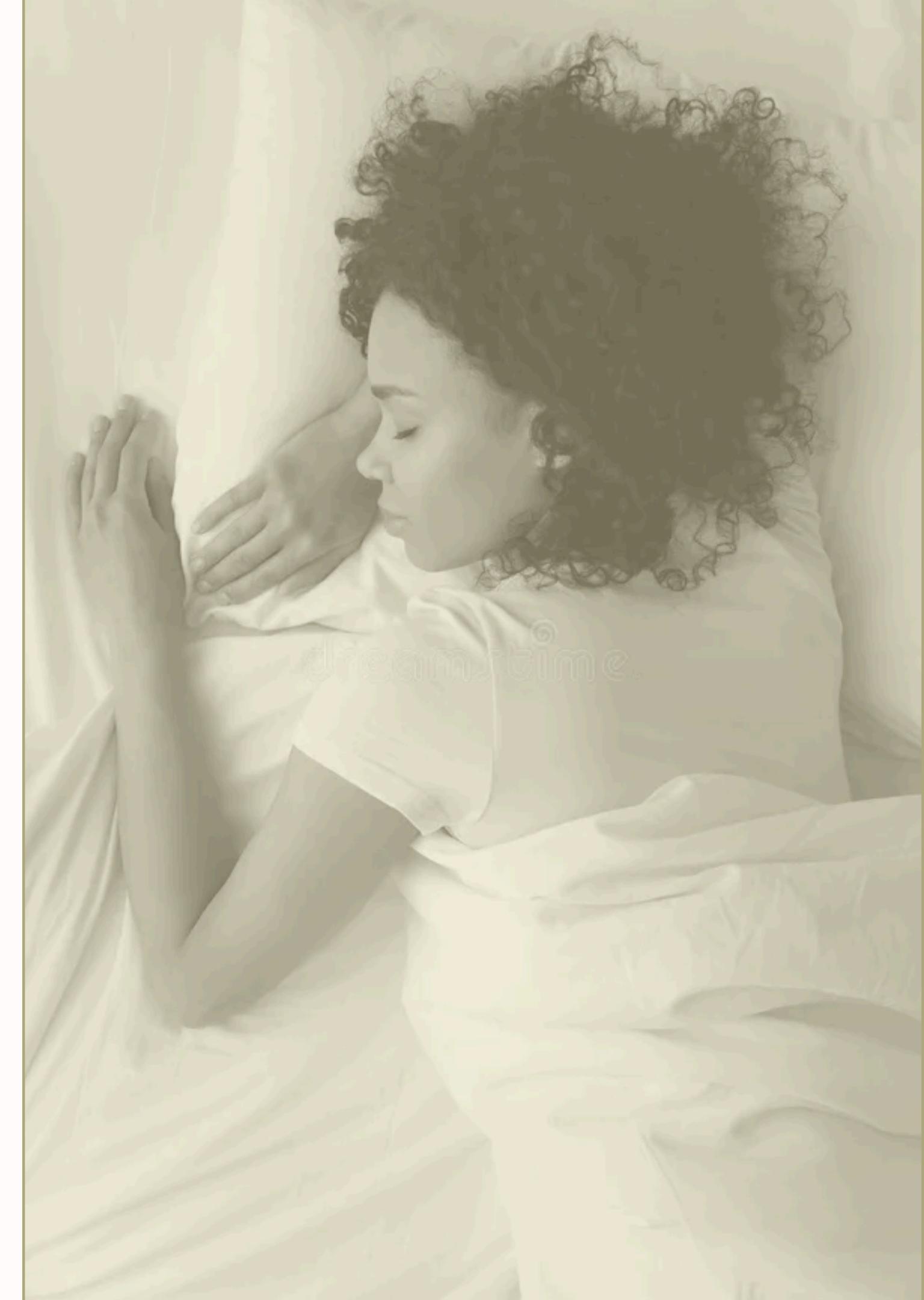
VERONIQUE

Marketing Head

ABOUT US

“Better Sleep, Better Life”

Sleep shapes the way we live, yet most of us barely notice its influence. Our daily routines, habits, and environments all leave subtle marks on how we rest, recover, and perform. This project explores the hidden connections between lifestyle and sleep, uncovering the patterns that quietly define our health and well-being.



HYPOTHESIS

01

INDIVIDUAL FACTORS

- Obesity increases likelihood of sleep apnea.
- Higher stress correlates with insomnia.
- Sleeping <6 hours increases disorder risk.
- Low physical activity (<40 min/day) increases disorder prevalence.
- High heart rate / BP increases apnea risk.

02

AGE EFFECTS

- Older individuals are more likely to develop a sleep disorder.
- Age is more strongly associated with sleep apnea than with insomnia.

03

INTEGRATED MODEL

- Multiple risk factors demonstrate cumulative effects on sleep disorder
- Different risk factor combinations predict different disorder types:
BMI + BP + Older age → Sleep Apnea
Stress + Younger age → Insomnia

WHICH
ATTRIBUTES
CONTRIBUTE TO
SLEEP
DISORDERS?



LOGISTIC REGRESSION

Dep. variable =
has_disorder → binary

| Optimization terminated successfully. | | | | | | |
|---------------------------------------|------------------|-------------------|-----------|-------|---------|--------|
| Current function value: 0.450264 | | | | | | |
| Iterations 7 | | | | | | |
| Logit Regression Results | | | | | | |
| ===== | | | | | | |
| Dep. Variable: | has_disorder | No. Observations: | 132 | | | |
| Model: | Logit | Df Residuals: | 124 | | | |
| Method: | MLE | Df Model: | 7 | | | |
| Date: | Wed, 10 Dec 2025 | Pseudo R-squ.: | 0.3451 | | | |
| Time: | 13:17:59 | Log-Likelihood: | -59.435 | | | |
| converged: | True | LL-Null: | -90.752 | | | |
| Covariance Type: | nonrobust | LLR p-value: | 4.489e-11 | | | |
| ===== | | | | | | |
| | coef | std err | z | P> z | [0.025 | 0.975] |
| const | -25.6230 | 11.470 | -2.234 | 0.025 | -48.104 | -3.142 |
| stress_level | -0.1666 | 0.366 | -0.455 | 0.649 | -0.885 | 0.551 |
| sleep_duration | 0.3203 | 0.794 | 0.403 | 0.687 | -1.236 | 1.877 |
| quality_of_sleep | -0.7737 | 0.586 | -1.320 | 0.187 | -1.922 | 0.375 |
| physical_activity_level | -0.0140 | 0.025 | -0.551 | 0.582 | -0.064 | 0.036 |
| heart_rate | 0.0483 | 0.096 | 0.504 | 0.614 | -0.140 | 0.236 |
| daily_steps | -1.891e-05 | 0.000 | -0.061 | 0.951 | -0.001 | 0.001 |
| systolic | 0.2099 | 0.046 | 4.550 | 0.000 | 0.119 | 0.300 |
| ===== | | | | | | |

R-SQUARED: 0.3451 < 1

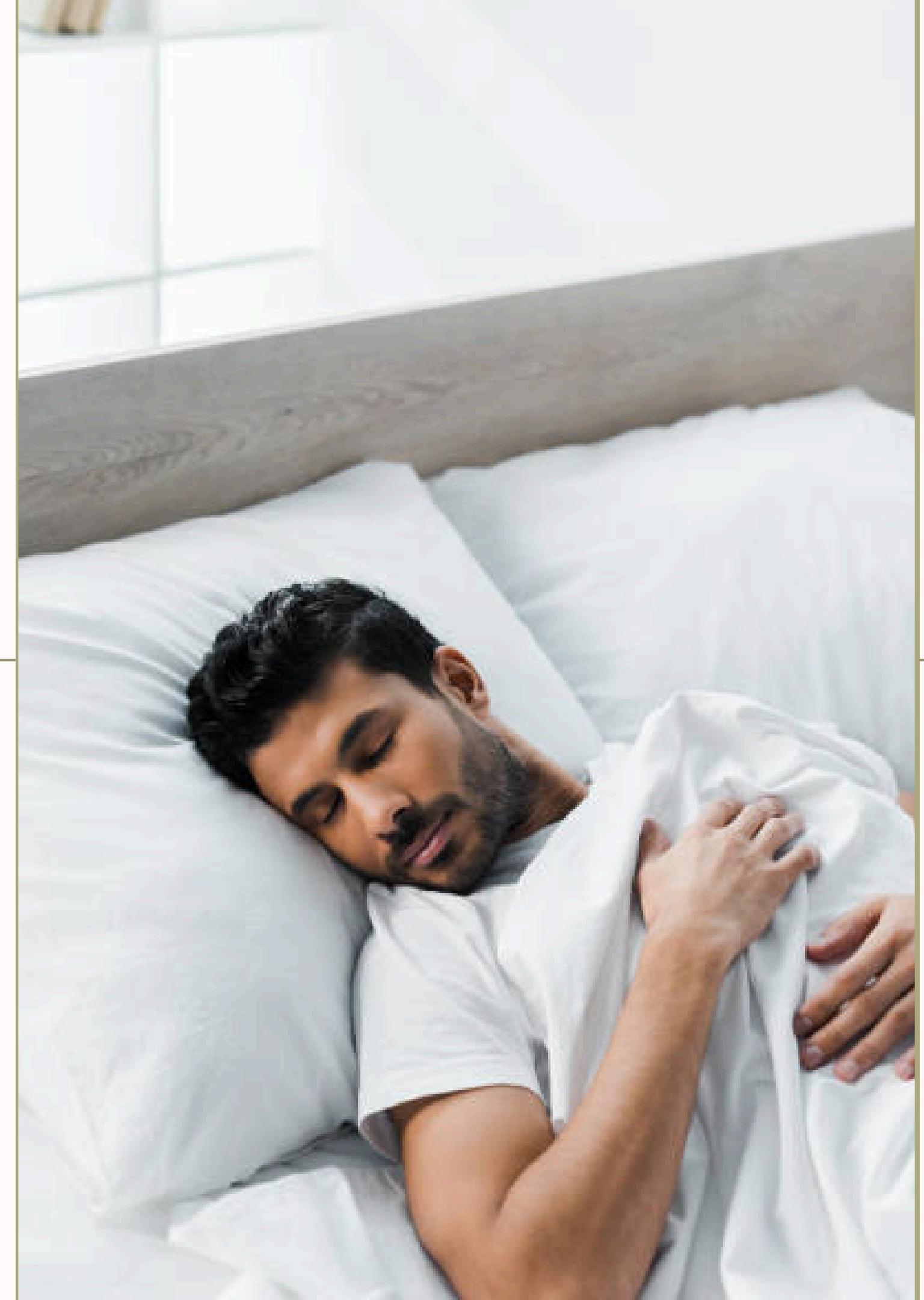
P>|z| VALUES < 0.05

Only the variable systolic provides strong evidence of which attributes drive sleep disorders.

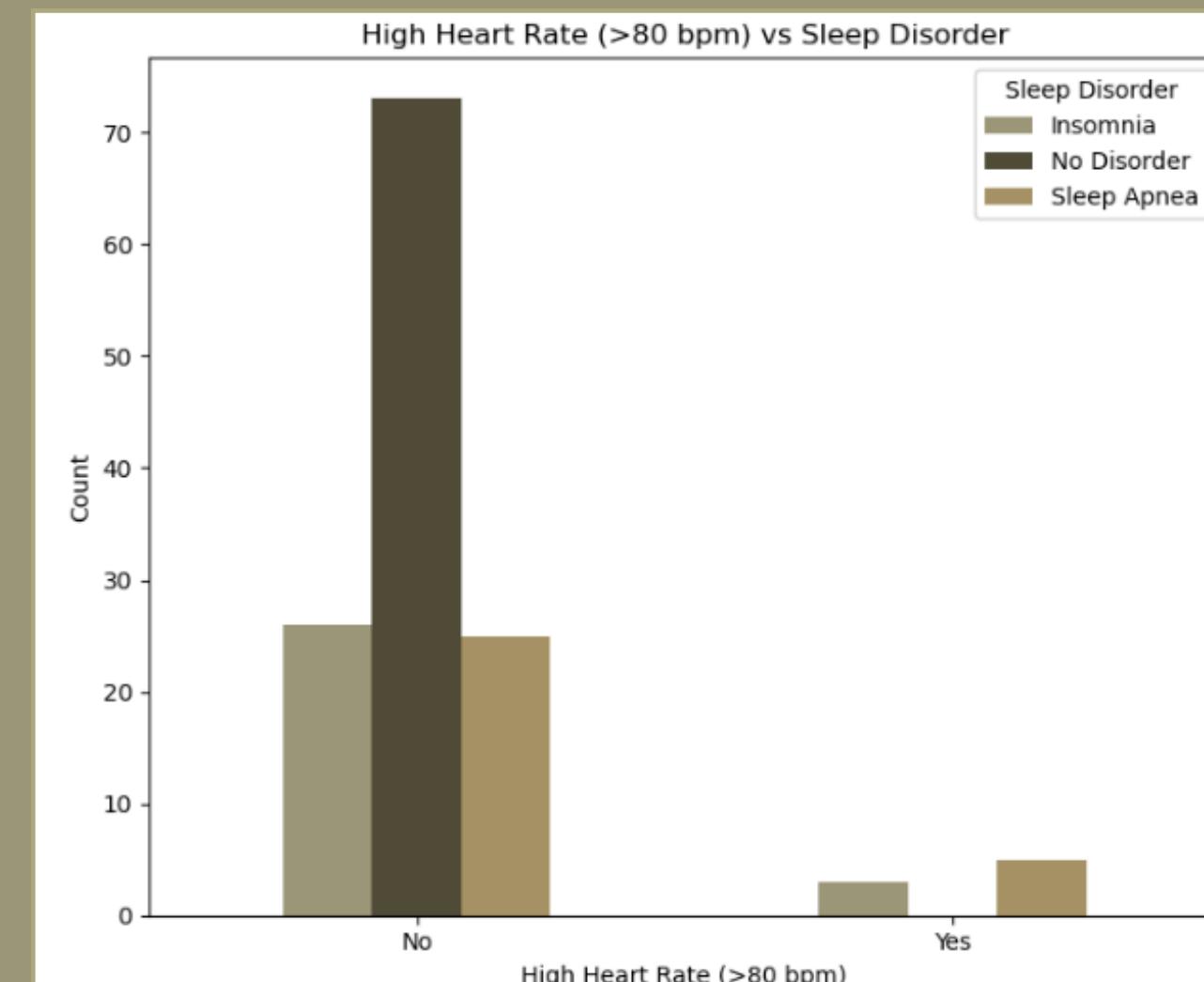
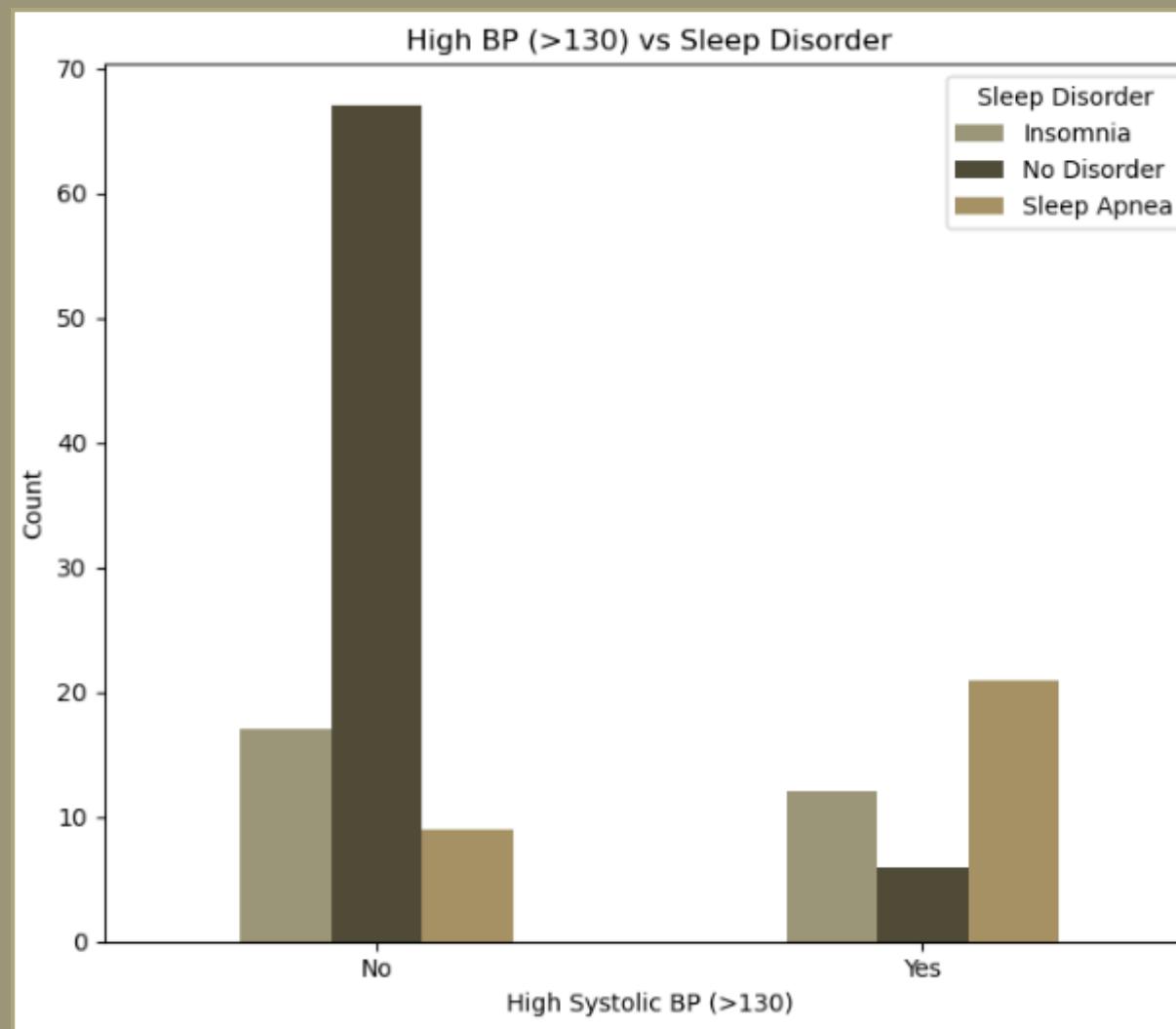
It might be because the sample is too small.

HYPOTHESIS I

INDIVIDUALS WITH HIGH STRESS, HIGH BMI, LOW SLEEP DURATION, AND POOR SLEEP QUALITY ARE SIGNIFICANTLY MORE LIKELY TO HAVE A SLEEP DISORDER.



DOES BLOOD PRESSURE AFFECT SLEEP?



BP > 130:

- 84% disorder rate
- 3x risk elevation

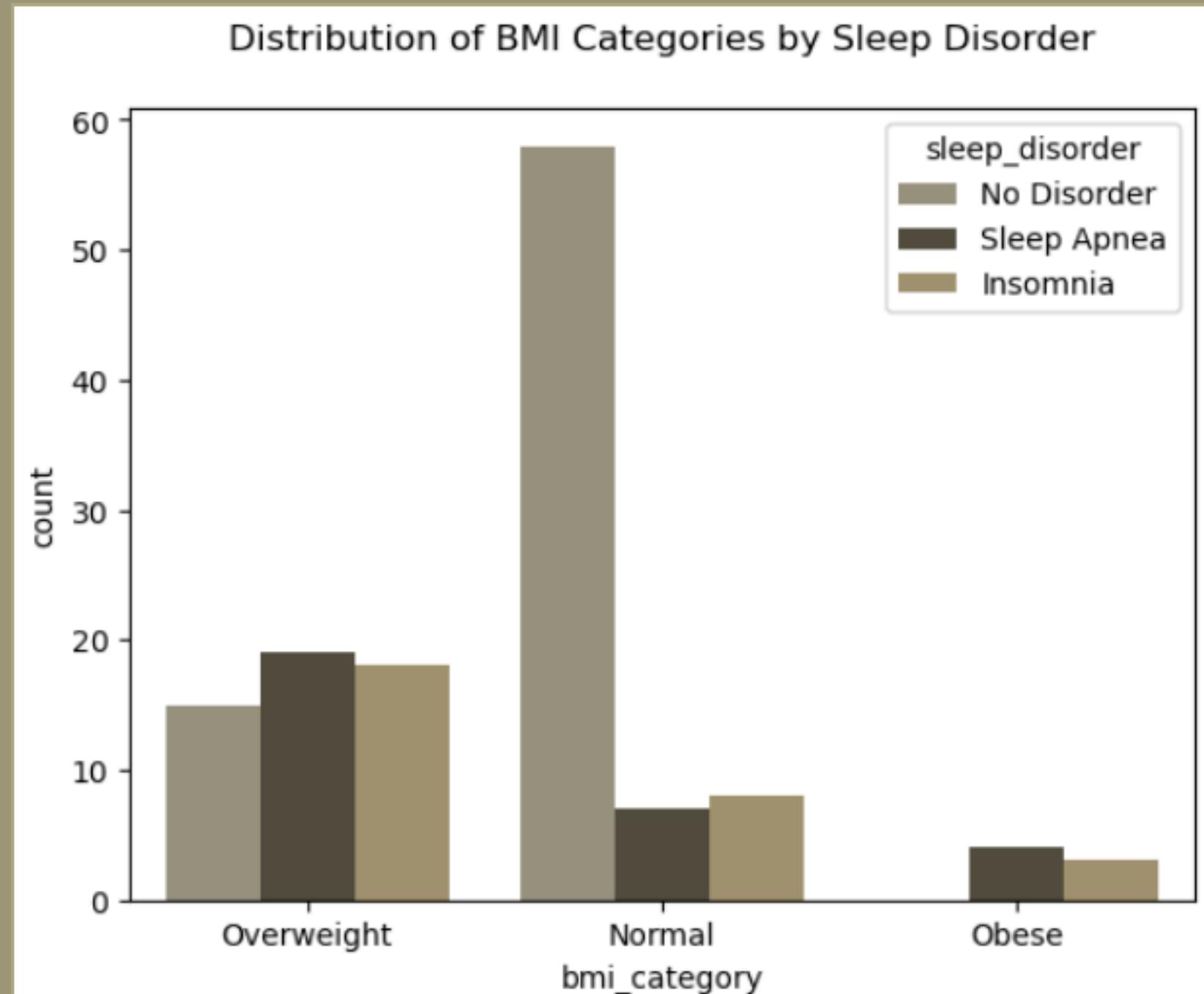
Heart Rate > 80:

- 100% disorder rate
- Small sample (n = 8)

WHY IT MATTERS:

- Easy to measure
- Links cardiovascular + sleep
- Already screened routinely

DOES WEIGHT AFFECT SLEEP?



OBESE (n=7)

- 100% disorders
- 57% Sleep Apnea
43% Insomnia

OVERWEIGHT

- 71% disorders

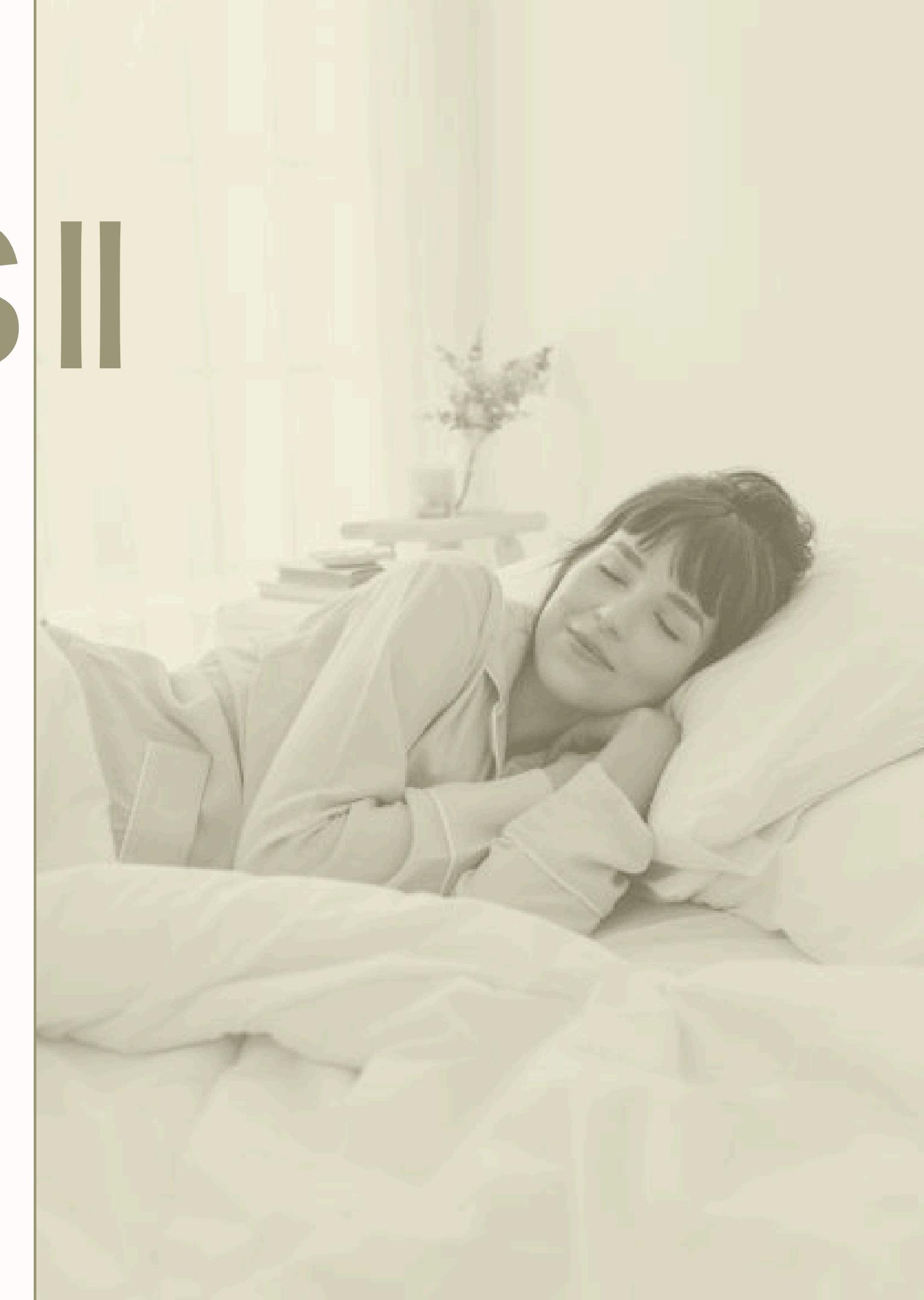
NORMAL

- 21% disorders

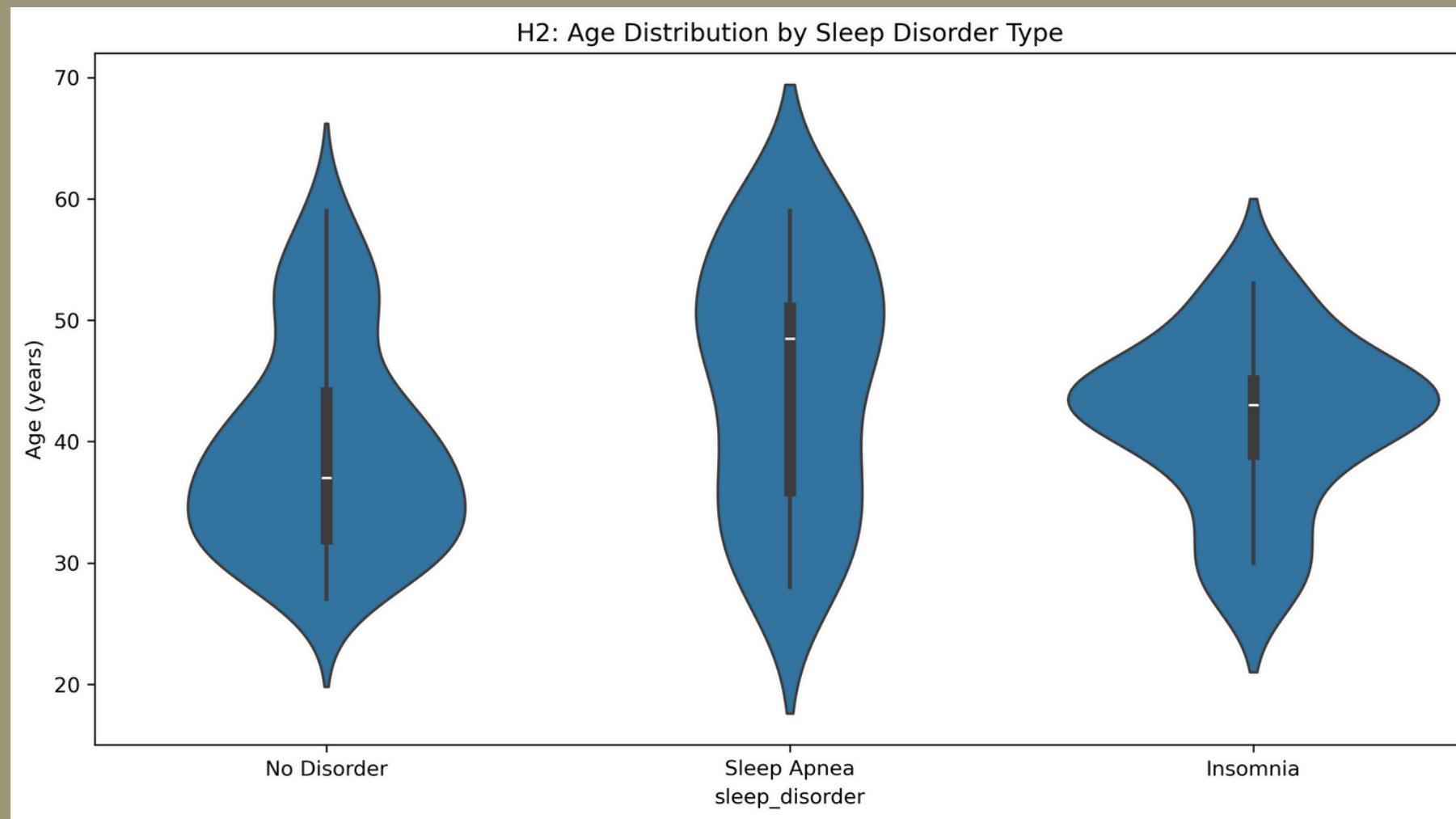
Obesity **increases** the likelihood of sleep apnea

HYPOTHESIS II

AGE SIGNIFICANTLY INFLUENCES BOTH THE LIKELIHOOD AND THE TYPE OF SLEEP DISORDER.



AGE SHOWS MODERATE INFLUENCE



MEAN AGE

- Sleep Apnea: 44.7
- Insomnia: 41.6
- No Disorder: 39.5

Difference: 5.3 years

SURPRISING FINDING

- Older people → MORE sleep ($r=0.348$, $p<0.001$)

INTERPRETATION:

- Working-age sample (27-59) shows lifestyle effects.
- True age decline may occur post-60.

MODERATE EFFECT - USE WITH OTHER FACTORS

HYPOTHESIS III

MULTIPLE RISK FACTORS DEMONSTRATE
CUMULATIVE EFFECTS ON SLEEP DISORDER

INDIVIDUALS WITH MULTIPLE RISK FACTORS
($BMI > 30 + BP > 130 + AGE > 45$) HAVE
SIGNIFICANTLY HIGHER DISORDER
PREVALENCE THAN THOSE WITH SINGLE RISK
FACTORS



CAN WE COMBINE BMI + BP + AGE + HR TO PREDICT RISK?

TWO EXAMPLES:

Each factor gives you points

WEIGHT

- Normal = 0 pts
- Overweight = +1 pt
- Obese = +3 pts

BLOOD PRESSURE

- Normal ≤ 130 = 0 pts
- High > 130 = +2 pts

AGE

UNDER 45 = 0 PTS
45+ = +1 PT

HEART RATE

NORMAL ≤ 80 = 0 PTS
HIGH > 80 = +1 PT

PERSON A

NORMAL WEIGHT (0 PTS)

- ✓ BP: 120 (0 PTS)
- ✓ AGE: 35 (0 PTS)
- ✓ HR: 70 (0 PTS)

0 POINTS
LOW RISK 

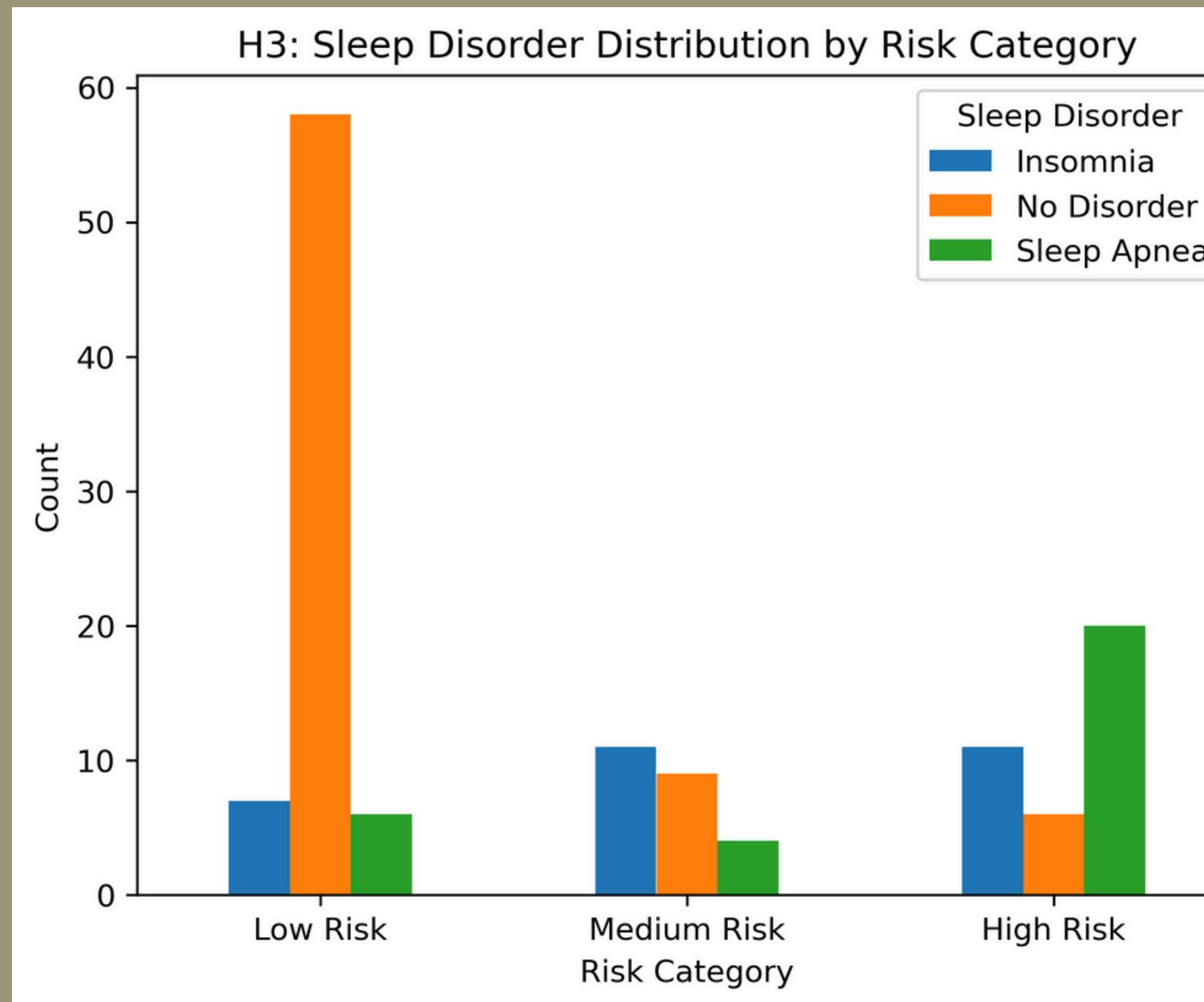
PERSON B

- ⚠ OBESE (+3 PTS)
- ⚠ BP: 145 (+2 PTS)
- ⚠ AGE: 52 (+1 PT)
- ⚠ HR: 85 (+1 PT)

7 POINTS
HIGH RISK 

DOES THE RISK SCORE PREDICT SLEEP DISORDERS?

DISORDER PREVALENCE BY RISK CATEGORY



Low Risk → Majority have no disorder
Medium Risk → Insomnia becomes more prevalent
High Risk → Sleep Apnea becomes dominant

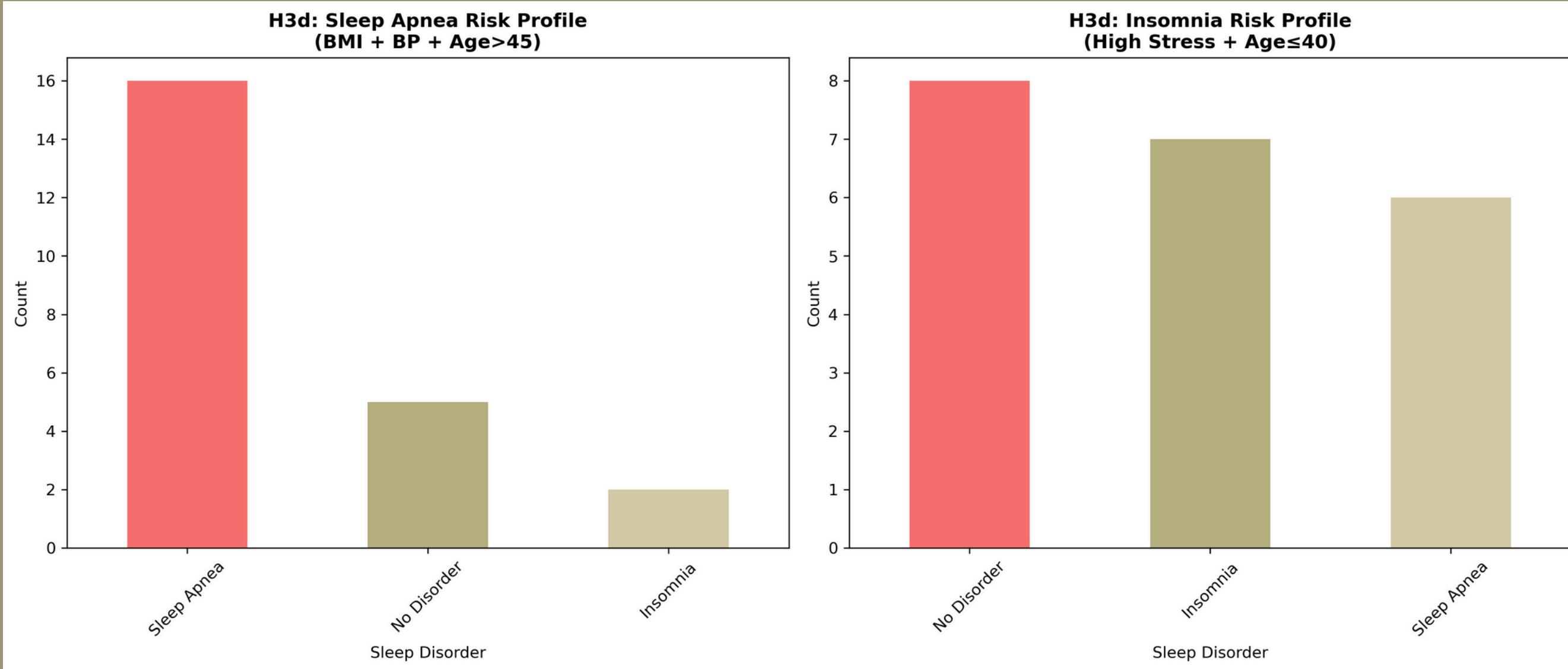
Risk Score Categories correspond strongly to real sleep disorder outcomes

| RISK LEVEL | % POPULATION | DISORDER RATE |
|------------------|--------------|---------------|
| LOW (0-1 pts) | 55% | 18% |
| MEDIUM (2-3 pts) | 17% | 62% |
| HIGH (4+ pts) | 28% | 84% |

Key Finding: Higher risk score = higher disorder rate (18% → 62% → 84%).

CAN WE PREDICT DISORDER TYPE?

APNEA VS INSOMNIA PROFILE



SLEEP APNEA PROFILE

- BMI + BP + Age>45
- 70% Sleep Apnea
- 3x risk elevation
- Ready for deployment

INSOMNIA PROFILE

- High Stress + Young Age
- 33% Insomnia
- 1.5x risk elevation
- Needs behavioral data

TAKEAWAY:

Physiological disorders predictable,
psychological disorders need more variables

OUR FINDINGS

VALIDATED

- Cardiovascular markers (BP, HR) = strongest predictors.
- BMI/Obesity = 100% disorder rate (6x apnea risk).
- Combined risk model = 84% detection in high-risk
- Simple 4-parameter tool = clinically feasible



NOT SUPPORTED

- Stress alone insufficient for insomnia prediction.
- Physical activity showed no relationship.
- Sleep duration <6h (insufficient data, n=4).



LIMITATIONS

- Small sample size (n=132).
- Age range limited to working-age (27-59).



WHAT SHOULD HEALTH CARE DO?

IMMEDIATE (0-3 MONTHS)

- DEPLOY RISK CALCULATOR IN PRIMARY CARE
- PILOT IN 2-3 CLINICAL SITES
- TRAIN PHYSICIANS ON SCORING SYSTEM
- PRIORITIZE HIGH-RISK FOR SLEEP STUDIES

VALIDATE (3-12 MONTHS)

- TEST ON LARGER COHORT ($N=500+$)
- EXPAND AGE RANGE TO INCLUDE 60+
- TRACK REAL-WORLD ACCURACY
- REFINE INSOMNIA PREDICTION

SCALE (12+ MONTHS)

- INTEGRATE WITH ELECTRONIC HEALTH RECORDS
- POPULATION HEALTH PROGRAMS
- EMPLOYER WELLNESS INITIATIVES
- SHIFT FROM REACTIVE TO PREVENTIVE CARE

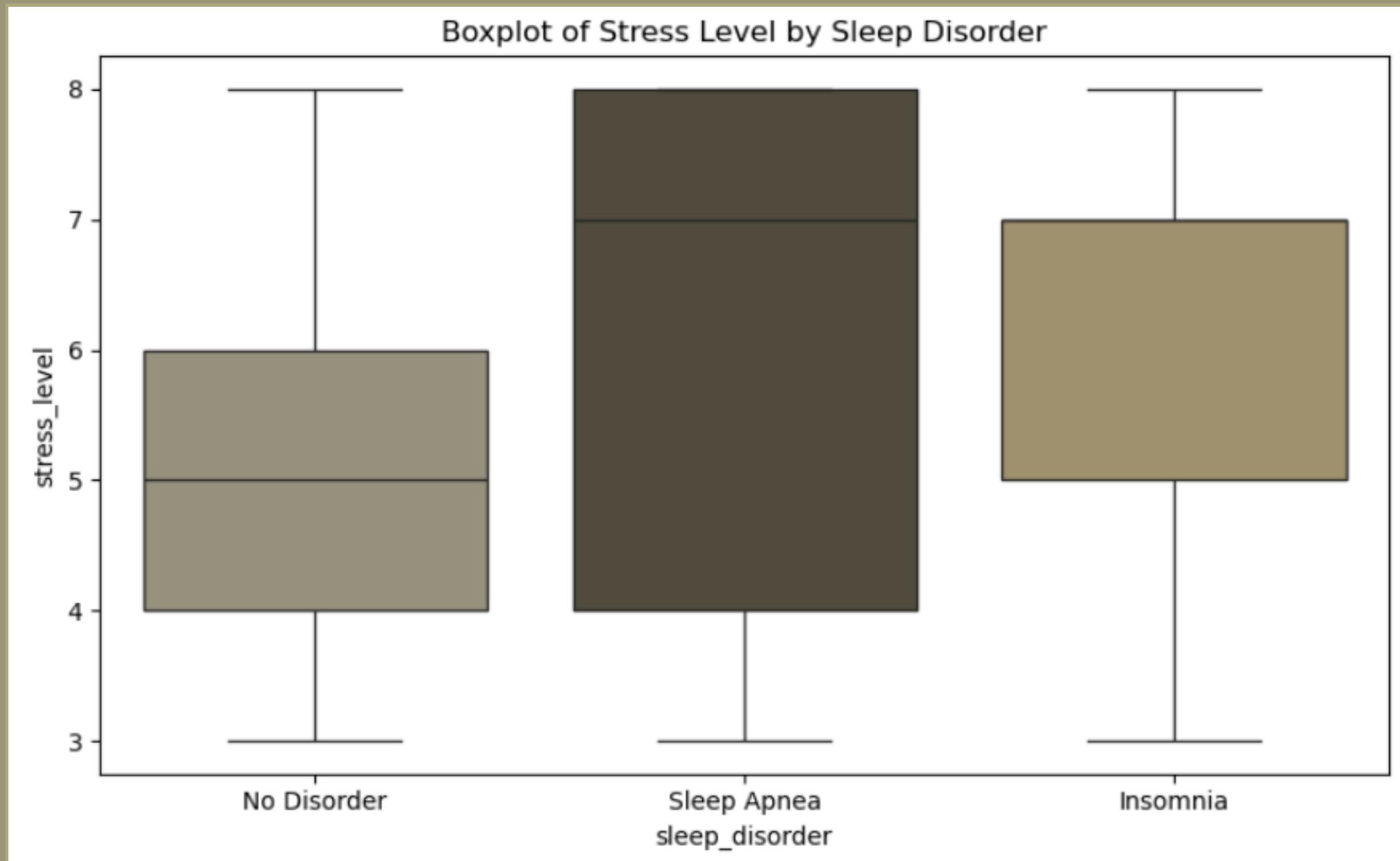


TEAM GRYFFINDOR

THANK YOU
FOR WATCHING!

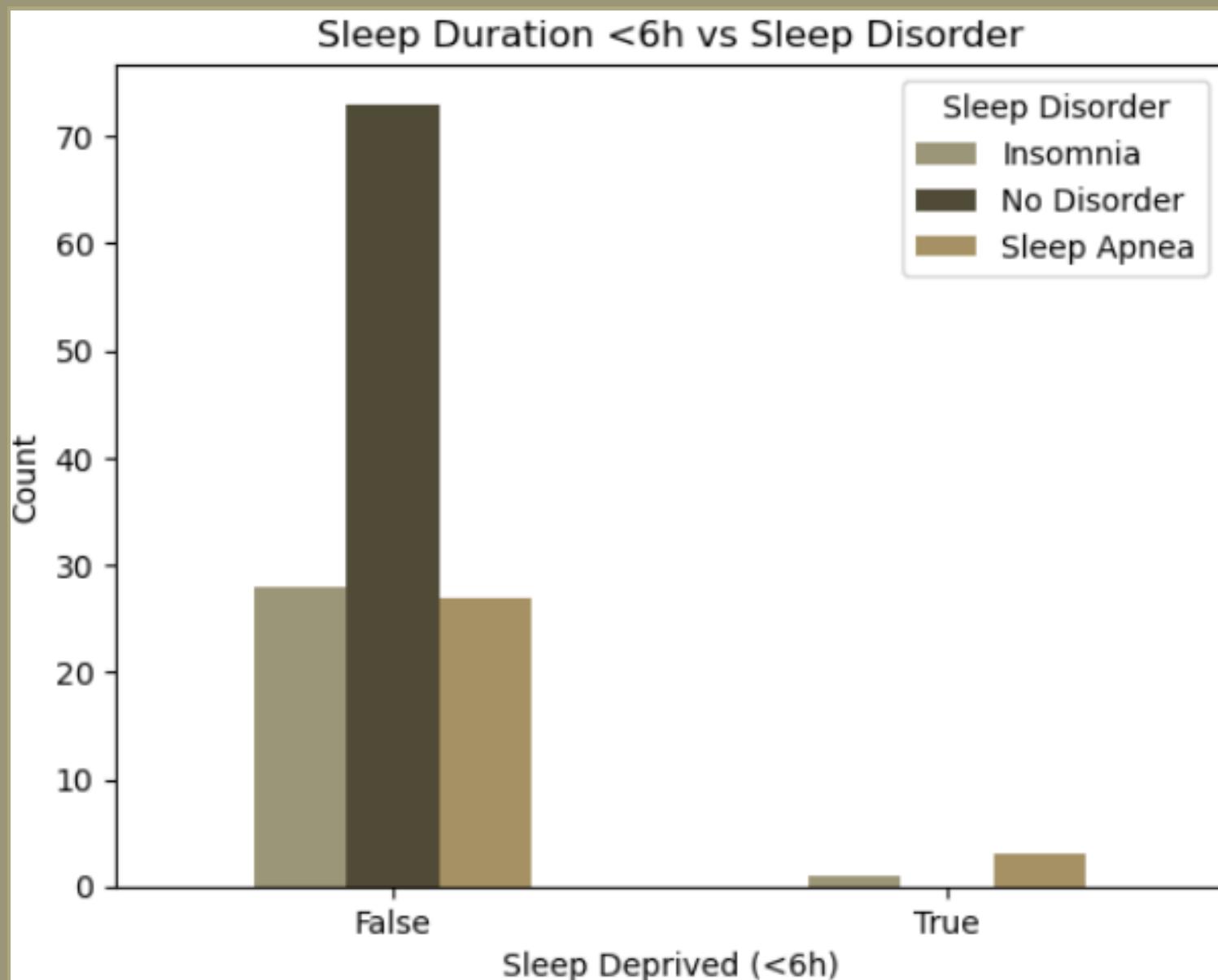
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HIGHER STRESS CORRELATES WITH INSOMNIA



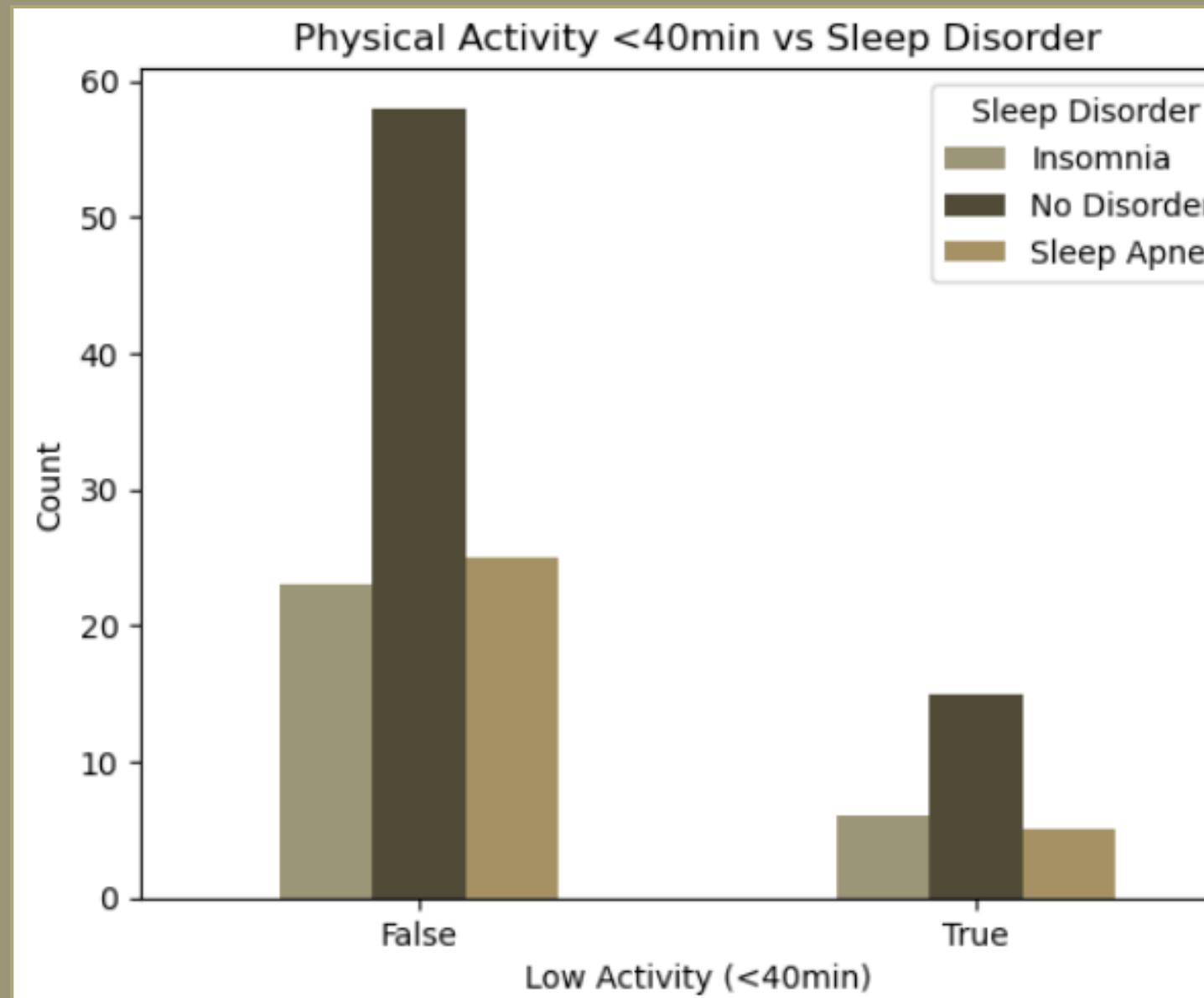
The main finding is that
**higher stress correlates
with insomnia.**

SLEEPING <6 HOURS INCREASES DISORDER RISK



This point supports the general Hypothesis I, which includes **low sleep duration** as a factor making individuals **more likely to have a sleep disorder**.

LOW PHYSICAL ACTIVITY (<40 MIN/DAY) INCREASES DISORDER PREVALENCE.



The primary conclusion is that **low physical activity** (less than 40 minutes per day) **increases the prevalence of sleep disorders**.

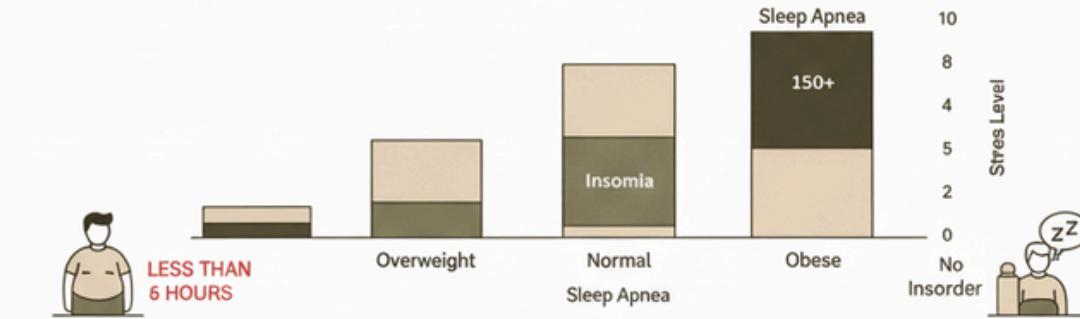
- Low physical activity is explicitly defined as <40 min/day in the document's hypothesis section.
- This finding aligns with Hypothesis I, suggesting that lifestyle factors like activity level are connected to sleep health.

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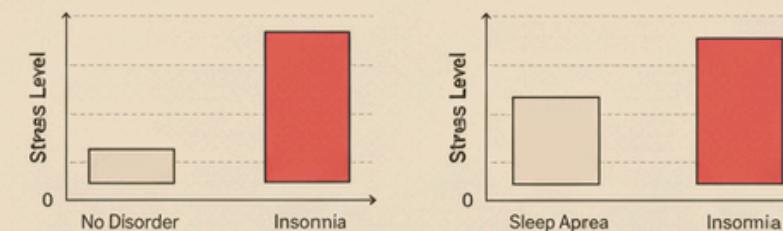
HYPOTHESIS I

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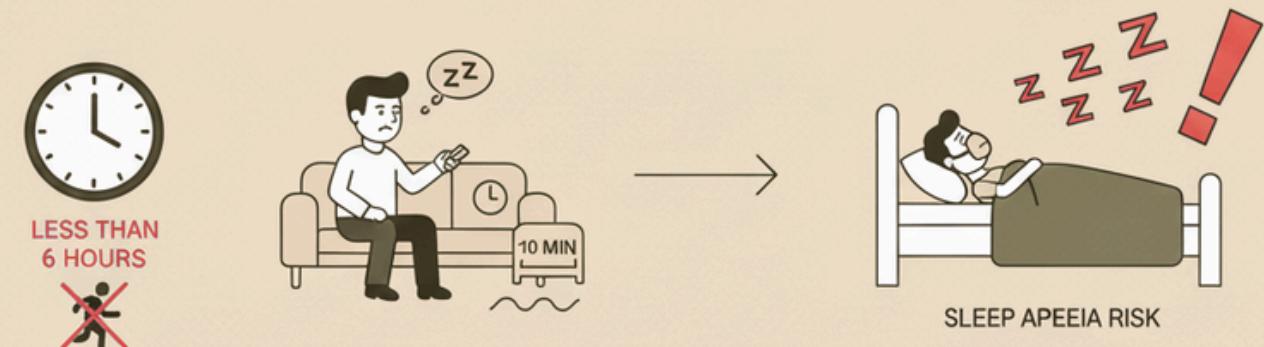
SLEEP HEALTH & LIFESTYLE FACTORS



STRESS LEVEL & INSOMNIA



LOW SLEEP DURATION = HIGHER DISORDER RISK



HIGH HEART RATE → INCREASES APNEA RISK → LOW PHYSICAL ACTIVITY (<40 min/day) INCREASE
INCREASE DISORDER PREVALANCE
SLEEP DISORDERS