Sleep vs Lifestyle Factors — A Data Analysis Case Study

Sleep health plays an important role in overall wellbeing, and long-term physical health. Modern lifestyle patterns including sedentary work, choice of career, and reduced physical activity have had effects on healthy sleep behaviours. Understanding how these factors interact is important for designing effective workplace wellness and preventative health measures. This project explores the relationship between lifestyle behaviours, occupation and sleep outcomes using data analytics techniques to uncover actionable health insights.

Problem Statement

This project analyses how lifestyle behaviours and occupational factors influence sleep health outcomes. The aim is to identify high-risk groups and key lifestyle drivers of poor sleep in order to inform workplace wellness and preventative health measures.

Analytical Questions To Be Answered

- What is the average sleep duration and sleep quality across the population?
- How does physical activity level influence sleep duration and sleep quality?
- Are individuals in sedentary occupations more likely to experience sleep disorders?
- How does stress level relate to sleep outcomes?
- Is BMI category associated with sleep disorder prevalence?

Tools Used

- Power BI
- Power Query
- DAX Functions

Data Source

The dataset used in this analysis was sourced from Kaggle. It was reviewed to ensure it contained variables required to answer the analytical questions.

Quantitative Variables
Age, Sleep Duration, Physical Activity Level, Stress Level, Daily Steps, and Blood Pressure Reading.

Qualitative Variables
Gender, Occupation, BMI Category, Sleep Quality, and Sleep Disorder.

Data Cleaning

Data cleaning and transformation were performed in Power Query. This involved validating data types, standardising categorical values, and creating analytical groupings such as activity and stress bands.

Data Modelling

A flat data model was implemented within Power BI. DAX measures were created to calculate key metrics such as average sleep duration, sleep quality, stress levels, and sleep disorder prevalence.

Key Insights

Upon analysis in alignment with the defined analytical questions, the following insights were identified:

Population Sleep Baseline

The average sleep duration across the population is **7.13 hours**, with an average sleep quality score of **7.31**. This indicates that overall sleep health falls within recommended ranges.

7.13	7.31	5.39	6.82K
Average Sleep Duration	Average Sleep Quality	Average Stress Level	Average Daily Steps
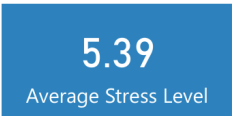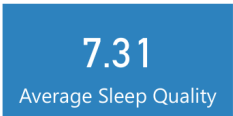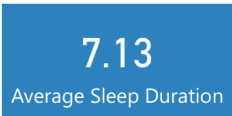
Physical Activity and Sleep Outcomes

While physical activity generally improves sleep outcomes, results show that **moderate activity levels** are associated with the longest sleep duration and highest sleep quality. Highly active individuals reported shorter sleep duration and lower sleep quality, suggesting that excessive physical exertion may negatively impact recovery. Sedentary individuals, despite moderate sleep duration, experienced the poorest sleep quality meaning that sleep quantity does not necessarily equate to sleep quality.

Average Sleep Duration by Daily Steps
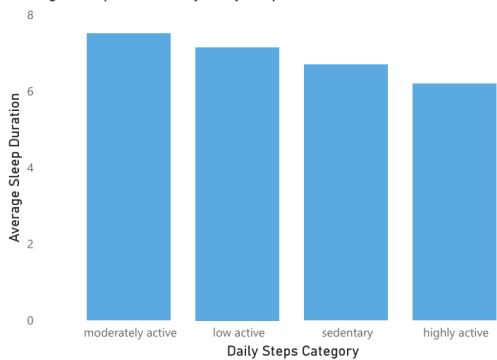
Average Sleep Quality by Daily Steps
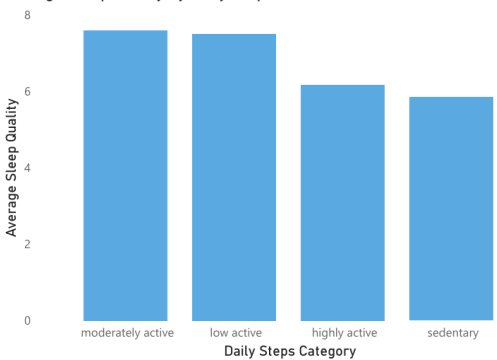
Occupation and Sleep Disorders

Contrary to expectations, individuals in physically active occupations exhibited higher sleep disorder than those in sedentary roles. This may be attributed to shift work, night duty, irregular sleep cycles, physical exhaustion, and occupational stress exposure, especially common among

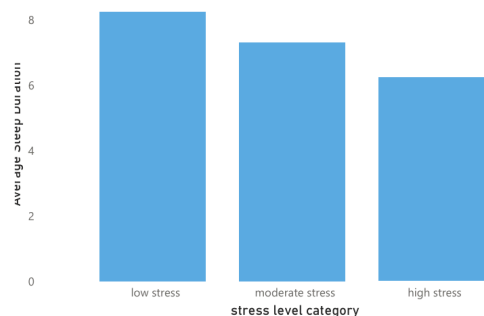nurses, doctors, emergency workers, and field sales professionals.

Total Persons by Occupation category and Sleep Disorder

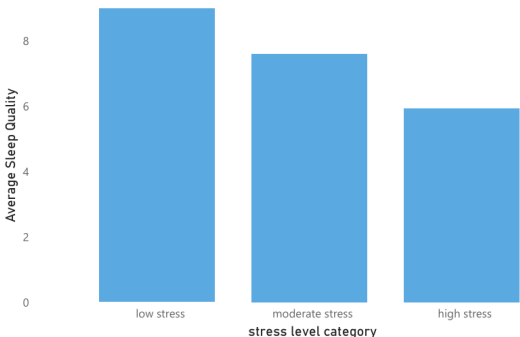**Sleep Disorder** ● Insomnia ● None ● Sleep Apnea
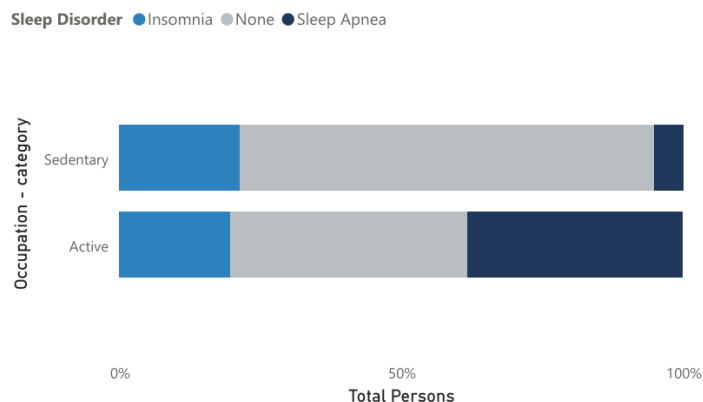
Stress and Sleep Health

Higher stress levels were strongly associated with reduced sleep duration and poorer sleep quality, reinforcing stress as a significant driver of negative sleep outcomes.


BMI and Sleep Disorder Prevalence

The BMI category demonstrated a strong association with sleep disorder prevalence. Obese individuals recorded the highest disorder rates, with sleep apnea accounting for **60%** of cases. Overweight individuals also showed elevated prevalence across both insomnia and sleep apnea. In contrast, **92.5%** of individuals within the normal BMI range reported no sleep disorders. These findings reinforce the link between obesity and sleep health risks, particularly breathing-related conditions such as sleep apnea.

Total Persons by Occupation category and Sleep Disorder

Sleep Disorder ●Insomnia ●None ●Sleep Apnea
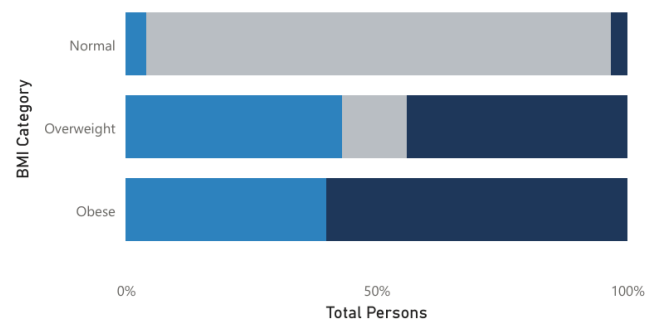
Conclusion & Recommendations

In conclusion, irregular shift patterns, occupational strain, and lifestyle imbalances were found to negatively impact sleep health, which in turn affects general wellbeing and productivity. It is recommended that employers prioritise workplace wellness initiatives, promote physical wellbeing, and implement programs that encourage healthier work-life balance and recovery practices.

References

- World Health Organization -Sleep Health Guidelines
- CDC - Sleep and Sleep Disorders
- American Academy of Sleep Medicine - Sleep Apnea Research
- Harvard Medical School - Stress and Sleep Studies
- Kaggle - Sleep Health and Lifestyle Dataset