Study on the Impact of Sleep Problem

Introduction

Sleep survey questions are survey questions asked to collect information about an individual's sleeping habits and causes of poor sleep. Asking such questions can help the researcher to understand the sleeping patterns of a person, the reasons that influence sleeping habits, and the implications of certain activities that can lead to poor sleep or insomnia. These questions are asked by medical professionals such as doctors, psychiatrists, or mental health professionals. These questions can give you valuable data that can be analyzed and help individuals get better sleep.
For example, an individual is suffering from poor sleep for a long time, impacting his productivity and health as well. In such a case, a medical professional can use a sleep survey or sleep deprivation survey to deduce the reasons that have led to poor sleep. Analyzing the patient's responses can enable the professional to give appropriate treatment and hence suggest corrective actions that can lead to better quality sleep.
In such scenarios, the Data analyst has the main role to analyze each attribute, developing connections among them, and answering all questions that lead to a good business decision that helps economically the medicines and hospitals as well as the person for their treatment. This report is divided into multiple sections. Section 2 is methodology in which I explain the method and techniques used to evaluate the Sleeping problem/Satisfaction rate of sleeping. Section 3 is the results and discussion where I relate the Sleeping issues with the Physical and Mental characteristics of a person. Section 4 is the summary.

Methodology

From our survey data, I am interested in analyzing the Sleeping Problem and Sleep Satisfaction rate which are measures in Nominal and Scale respectively. I have split the Survey data into two main categories, 1) Physical Characteristics, and 2) Mental characteristics of the person. Physical Characteristics consist of the parameters like Gender, Age, Weight & Height, Marital Status, Drinking/Smoking Habits, etc. Although the Mental characteristics are based on the rate of Stressed, Anxiety, Depression, and fatigued. I have also related the Sleeping issues with the aspect of life affected by it e.g, mood, life satisfaction, relationships, etc. All the analyses have been conducted on the PSPP software including plots and a few plots have been generated on Python for more clear visualization of data. I have used Descriptive Statistics, Correlation, T-test, and ANOVA to analyze given parameters. The dependent parameters have been also modeled using Linear Regression.

Results & Discussion

I liked to initiate analysis from our main question, Problem with Sleep named as **Problem**, and Satisfied with Sleep amount (as **satissleep**). Given variables frequencies show a total of 271 people as respondent, out of which 43.5% people have a sleeping problem and 56.5% does not have a problem. Along with the average of 5.5 rating of **Satissleep**. The number of people having the sleeping problem, rate their sleep on average at 4.20, meanwhile, people with no sleeping issues give an average rate of 6.61. According to the Shapiro-Wilk test, the significant values are less than

0.05 means the distribution of the Sleeping Problem is highly skewed. Therefore survey data would have diverse characteristics and relations with different attributes and require closed inspection.

Physical Characteristics & Sleep problem

The descriptive statistics of **Satissleep** on the **Sex** shows that Male has a slightly good quality of sleep than Female, however, the range is similar but the Interquartile range of male is higher toward good sleep. T-test on **Sex** and **Satissleep** shows the variance of **Satissleep** for females is not significantly different than Male and by accepting the Null Hypothesis, the average satisfaction of sleep for the female is the same as for the male. Therefore, we can not distinguish whether either of the genders has a high quality of sleep than the other as shown in Figure 1.

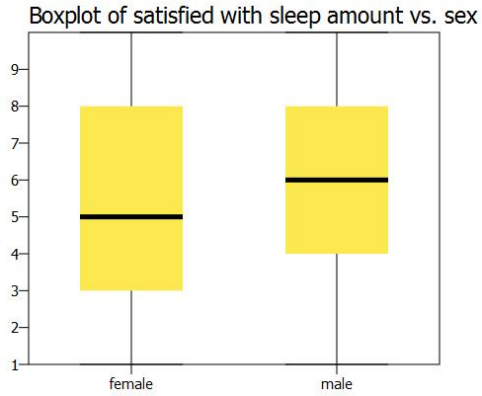

Figure 1: Box Plot of **Satissleep** categories by **Sex**.

Other essential parameters are the age group, and habits. By applying the Pearson Correlation and T-test, I have found that the quality of sleep is independent of the age group as well as the smoking or drinking habits. Although Marital Status has some significant relation with the quality of sleep as shown in Figure 2. We can see the Single and Widowed have a higher rate of good sleep than the Married especially the Divorced people. Shapiro-Wilk test approved that the Divorced and Widowed distributions are Normal so we can rely on the average values. The lowest average sleep rate is about 4.86 for divorced people and the highest is 6.38 for Widowed. Although the average sleep rate is not significantly different for Single and Married people there are uncertainties due to their asymmetric distribution.

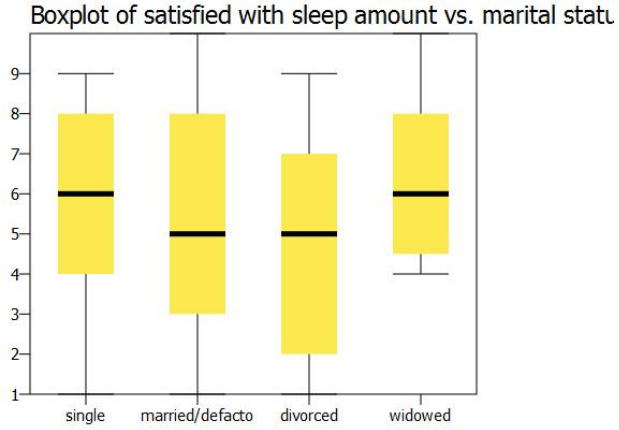

Figure 2: Box Plot of **Satissleep** categories by **Marital**.

Mental Characteristics & Sleep Problem

Mental characteristics are based on the mental health of people that consists of their regular Stress, Anxiety, Depression, and Fatigueness levels. I have found a strong relationship between these parameters with Sleep satisfaction rate. There is a clear inverse relationship between the averaged stress rate over the last month (**stressmo**) and the satisfying sleep (**satissleep**). Since the distribution is skewed, I transformed **Stressmo** into the LOG10 scale to reduce the skewness and the extracted relationship as shown in Figure 3. People with sleeping dissatisfaction have a higher level of stress than people with good quality of sleep. The correlation is not strong since the stress level is highly variated up to 6 rates of sleeping.

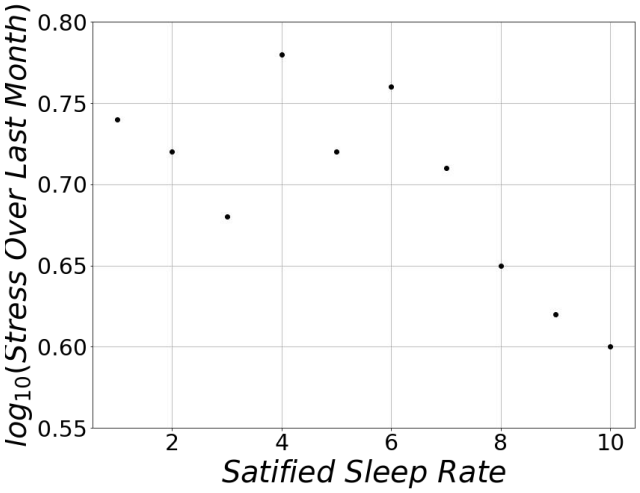

Figure 3: Scatter Plot of the satisfied sleep rate versus the averaged stress over last month transformed into LOG10 scale.

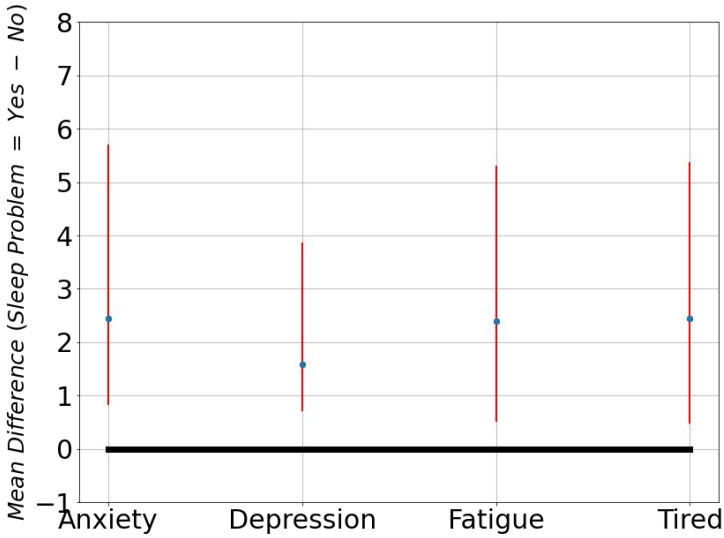

Figure 4: Mean Difference of the rating levels of Anxiety, Depression, Fatigue, and Tiredness grouping by the Sleeping problem (Yes/No). Errorbar represents the 95% confidence interval of mean difference and the solid-line at zero scale shows that there is no relation between sleeping problems and the mental health.

For the other mental health parameters, I have applied a T-test on Anxiety, Depression, Fatigue, and Tiredness grouping by the Sleeping problem (Yes/No). I have found a significant difference on the T-test for equality of means. Here the

(Mean) is the difference between the rating level of mental health of the people having the sleeping problem (i.e., Yes) from the people having no sleeping problem (i.e, No). Therefore the positive values show people having a sleeping problems also have bad mental health. And this relationship is very strong since the 95% confidence interval is also located on the positive side. However, the zero mean difference represents that there is no relation between sleeping health and mental problem as shown in Figure 4. According to the given analysis, we can say that the depression factor is slightly underrated means the depression level does a relatively less effect on Sleeping problems than other mental health parameters.

Life Aspects affected by the Sleeping problem

Till now we have seen that mental health is the main reason for the sleeping problem instead of the physical characteristics of people. Now I would like to analyze how do the different aspects of life affected by the sleeping problem. To evaluate this, we have considered 3 essential life aspects that also impact the people surrounded by the patients i.e., 1) life satisfaction, 2) well-being, and 3) relationships. Now check these parameters on the sleeping satisfaction scale. According to Shapiro-Wilk Test, I have found that 80% of the given parameters data act as Normal Distribution which means we can easily pursue the average values.

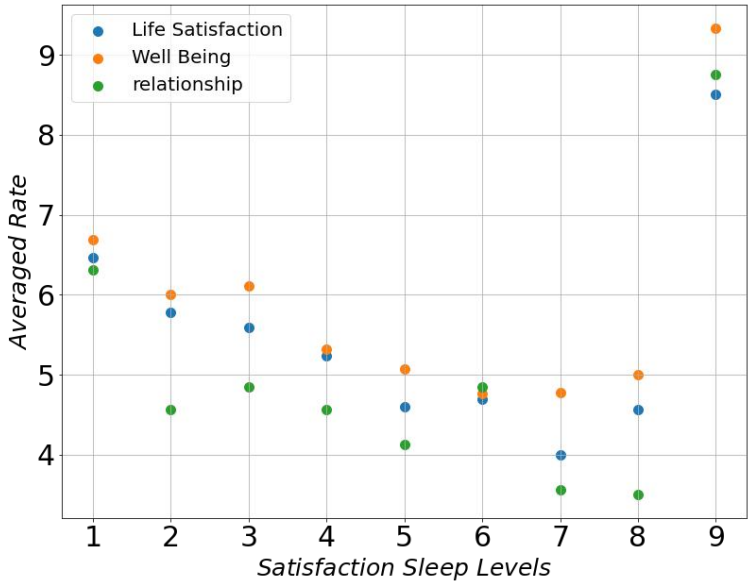

Figure 5: Evalute the scatter relation among three essential life aspects affected by the Sleeping problem.

There is a strong inverse relationship between given life aspect parameters with the Sleep satisfaction level. Higher y-axis values represent (**Great Extent**) and lower values represent (**not at all**). This inverse relationship shows that people having sleep problems also affect their life satisfaction, overall well-being, and their relationships as shown in Figure 5. However, I found extreme discomfort in life aspects to those people having good sleep. These could be considered anomalies. It is better to see the correlation among parameters while excluding extreme good sleep as shown in Table 1.

Table 1: Intercept, Slope and R^2 of life aspect parameters linearly relate with the Satisfaction Sleep.

	Intercept/constant	**Slope/coefficient**	**R^2**
Life Satisfaction	6.4807	-0.3032	0.86
Well Being	6.6568	-0.2643	0.83
Relationship	5.8846	-0.2988	0.68

Conclusion

In this report, I have analyzed the relationship between sleep problems with the Physical and Mental characteristics of a total of 271 respondents. Physical Characteristics consist of data like Gender, Age, Height & Weight, Marital Status, Smoking & Drinking Habits. However Mental characteristics are based on Stress, Anxiety, Depression, Fatigue, and Tiredness. Under my analysis, I have found that physical characteristics of people have no relation to the sleeping disorder although mental health has a high inverse relationship with a sleeping problem. I have also found that people having sleep disorders faced the problem in different life aspects such as life satisfaction goal and their relationships.