Does Remote Work have an Impact in Mental Health?

Introduction and Objective

Despite the flexibility and convenience that remote work offers, its impact on employees' mental health remains a critical area of investigation. This study aims to analyze the effects of remote work on mental health by examining various factors such as work interference, family history of mental illness, treatment status, and workplace support. Using data from a comprehensive survey, we explore correlations and apply statistical methods, including Chi-Square tests, t-Tests, and Logistical Regression analysis, to understand the relationship between remote work and mental health outcomes.

Methodology

1. **Data Preparation and Preprocessing:**
   - Explored the dataset to understand its structure and content.
   - Handled missing values by filling with placeholders or removing irrelevant columns.
   - Encoded categorical variables into numerical codes.
   - Removed redundant or unnecessary features to streamline the dataset.
2. **Exploratory Data Analysis (EDA):**
   - Analysis of key variables and their distributions using descriptive statistics.
   - Visualization of data through histogram plots, bar plots, heatmaps, and boxplots to identify patterns and relationships.
   - Usage of the Spearman correlation matrix to examine the relationships between variables and visualize them using a heatmap.
3. **Chi-Square Test:**
   - Application of the Chi-Square test to categorical variables to test for independence between pairs of variables.
     - Null Hypothesis (H0): The variables are independent.
     - Alternative Hypothesis (H1): The variables are not independent.
4. **t-Test:**
   - Execution of an independent samples t-Test to determine whether there is a significant difference between the mean ages of individuals who sought treatment and those who did not.
     - Null Hypothesis (H0): The mean Age of individuals who sought Treatment is equal to the mean age of those who did not seek treatment.
     - Alternative Hypothesis (H1): The mean Age of individuals who sought Treatment is not equal to the mean age of those who did not seek treatment.
5. **Logistic Regression:**
   - Development of logistic regression models to predict the likelihood of seeking mental health Treatment based on multiple predictors.
   - Two models were compared:
     - Model 1: Excluded the "remote_work" variable to assess the significance of other predictors.
     - Model 2: Included the "remote_work" variable to examine its impact on the likelihood of seeking treatment.
   - This approach helped isolating the effect of remote work on mental health treatment-seeking behavior and evaluate the influence of other factors.

Results

1. Exploratory Data Analysis

Bar plots revealed that:
- Most individuals who sought for Treatment have a Family History of mental health issues.
- Individuals who reported that Work Interfered "sometimes" with their mental health had the highest Treatment rates.
- Remote Work showed a slightly higher number of individuals who sought Treatment.
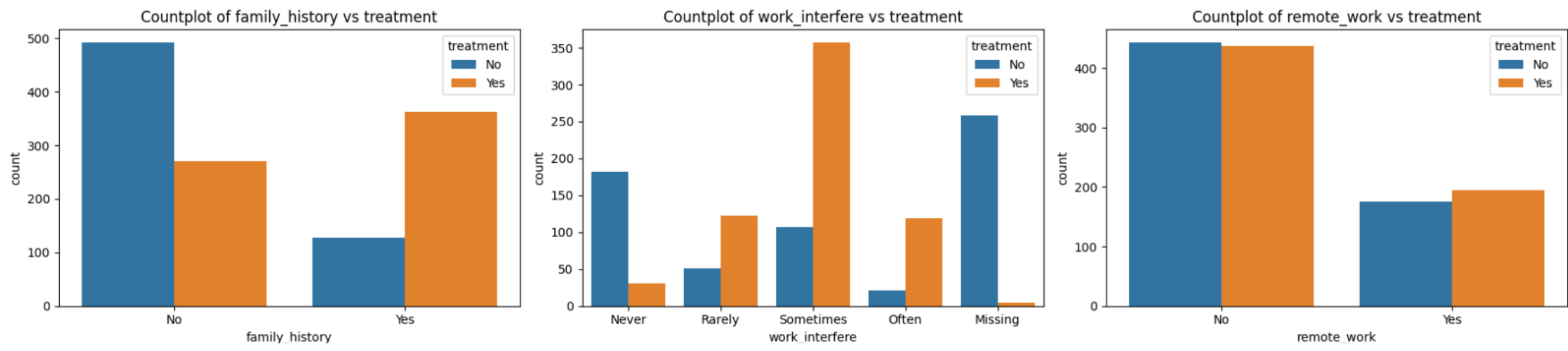
Heatmap revealed that a significant number of individuals who sought Treatment have access to Mental Health Benefits and Care Options in their workplace.
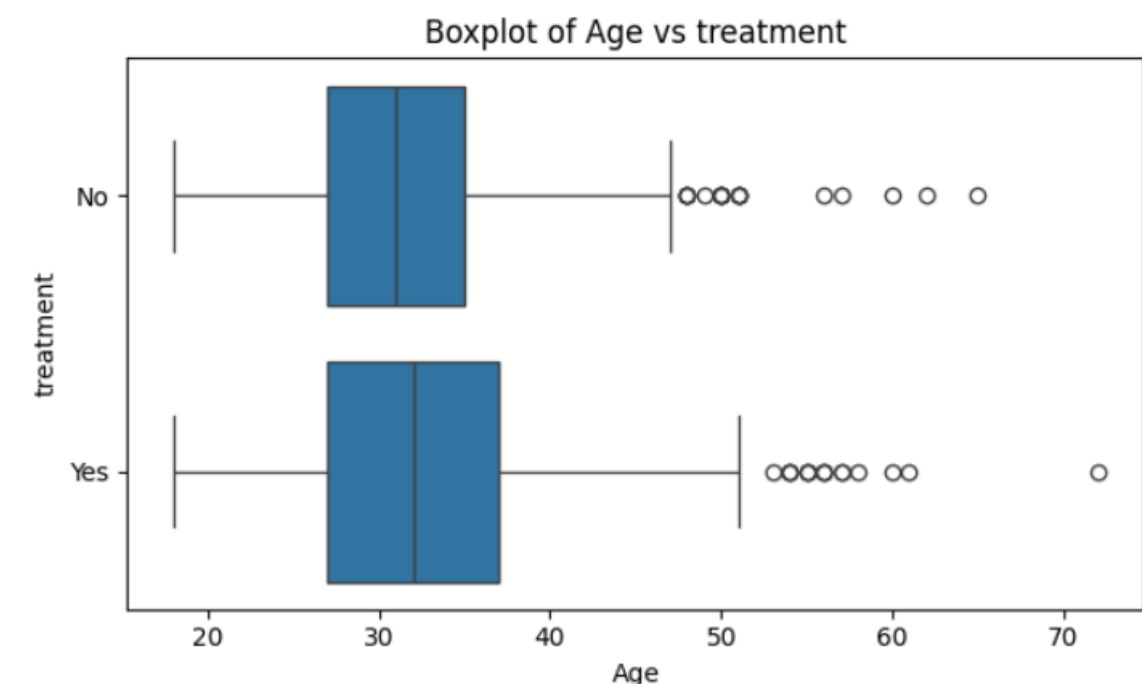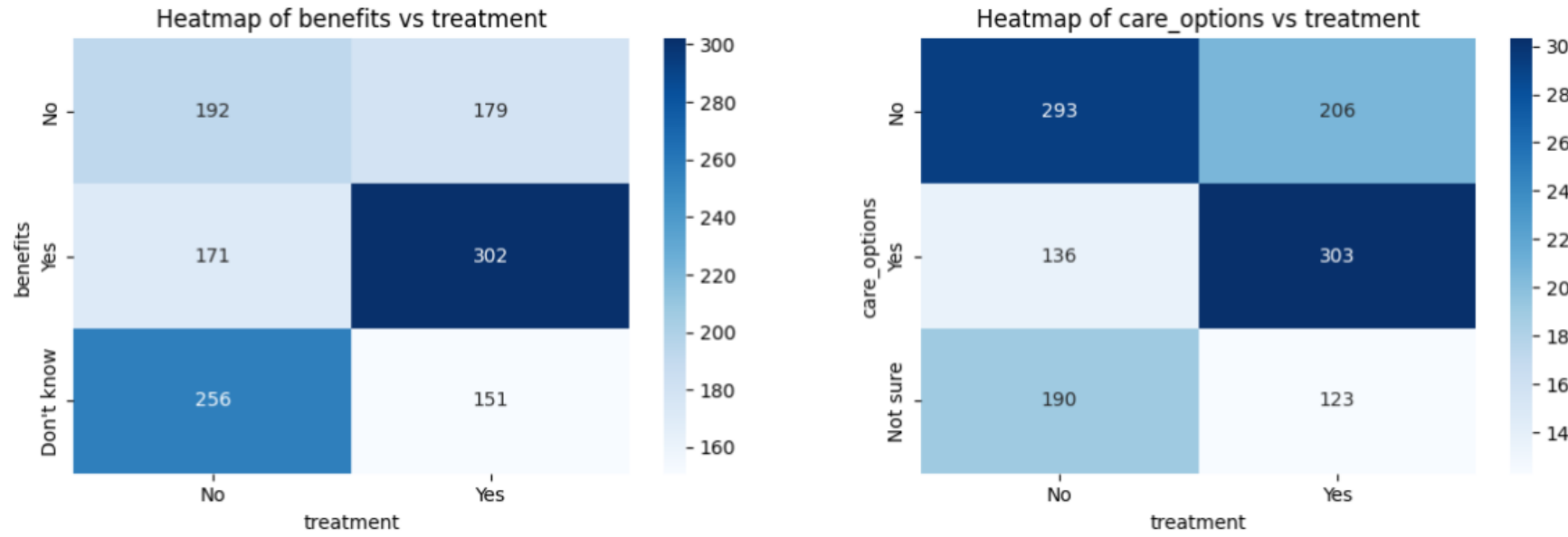
Boxplot showed that both groups (those who sought Treatment and those who did not) have a similar median age, around 30. However, the group that sought treatment includes more older individuals, with outliers extending up to age 70.

Spearman Correlation Matrix revealed:
- Workplaces offering Mental Health Care options are likely to provide Mental Health Benefits as well (0.48).
- Access to Wellness Programs in the workplace encourages individuals to Seek Mental Health support (0.46).
- Individuals experiencing Work Interference due to mental health issues are more likely to Seek Treatment (0.46).
- Those with a Family History of mental health issues are also more likely to Seek Treatment (0.38).

Based on the exploratory data analysis, we identified key features likely influencing mental health treatment: Age, Family History, Work Interference, and Remote Work status. Therefore, we decided to focus our further analysis on these factors.

2. Chi-Square Test revealed:
- No significant association between Remote Work and Treatment (p-value: 0.381).
- Significant association between having a Family History of mental health issues and seeking Treatment (p-value: 3.70e-40).
- Significant association between Work Interference due to mental health issues and seeking Treatment (p-value: 7.51e-126).

```
Results for remote_work:
Chi-square statistic: 0.77
P-value: 3.81e-01
Degrees of freedom: 1
Expected frequencies:
[[435.43 444.57]
 [183.57 187.43]]
```

```
Results for family_history:
Chi-square statistic: 175.96
P-value: 3.70e-40
Degrees of freedom: 1
Expected frequencies:
[[377.04 384.96]
 [241.96 247.04]]
```

```
Results for work_interfere:
Chi-square statistic: 587.59
P-value: 7.51e-126
Degrees of freedom: 4
Expected frequencies:
[[104.9  107.1 ]
 [ 85.6   87.4 ]
 [229.59 234.41]
 [ 69.27  70.73]
 [129.64 132.36]]
```

3. t-Test indicates:
There is a significant difference between the Age means of individuals who sought mental health Treatment and those who did not (p = 0.0091). Although the mean and median ages are close (32.6 years and 32.0 years for those who sought treatment, and 31.5 years and 31.0 years for those who did not), the difference is statistically significant. This suggests that older individuals are slightly more likely to seek mental health treatment.

```
Treatment Category: Yes
Sample Size: 632
Mean Age: 32.61
Median Age: 32.00
```

```
Treatment Category: No
Sample Size: 619
Mean Age: 31.53
Median Age: 31.00
```

```
T-test results:
T-statistic: 2.611
P-value: 0.0091
Degrees of Freedom: 1244.43
```

4. Logistic Regression
- Included predictors such as Age, Family History of mental illness, Work Interference due to mental health issues, and Remote Work status.
  Model 1: $logit(P(Y=1|X)) = \beta 0 + \beta 1.Age + \beta 2.family\_history + \beta 3.work\_interfere$
  Model 2: $logit(P(Y=1|X)) = \beta 0 + \beta 1.Age + \beta 2 \cdot family\_history + \beta 3.work\_interfere + \beta 4.remote\_work$

Aspect		Model 1	Model 2
Pseudo R^2 Value		0.3957	0.3961
Age	Coefficient	0.0293	0.0307
	P-value	0.005	0.004
Family History	Coefficient	1.1344	1.1353
	P-value	< 0.001	< 0.001
Work Interference	Coefficient	1.3022	1.3063
	P-value	< 0.001	< 0.001
Remote Work	Coefficient	-	-0.146
	P-value	-	0.399

- **Interpretation:**
  - Pseudo R^2 Values: The small difference (0.3957 vs. 0.3961) suggests that including the "remote_work" variable does not significantly improve the model's fit.
  - Remote Work: The "remote_work" variable is not significant in Model 2 (p-value: 0.399), indicating it does not impact the likelihood of seeking mental health treatment.
  - Age, Family History, and Work Interference: These variables are significant predictors in both models, highlighting their importance in predicting mental health treatment-seeking behavior.

Conclusion

Our comprehensive analysis indicates that Remote Work status alone does not significantly impact the likelihood of seeking mental health Treatment. Instead, other critical factors play a more substantial role in influencing treatment-seeking behavior. These factors include Age, Family History of mental health issues, and Work Interference due to mental health challenges.
- Key Insights:
  - **Age**: Older employees are slightly more likely to seek mental health treatment.
  - **Family History**: Individuals with a family history of mental health issues are significantly more likely to pursue treatment.
  - **Work Interference**: Employees experiencing significant work interference due to mental health issues are much more likely to seek treatment, highlighting the impact of mental health on job performance.

While Remote Work status itself does not directly affect mental health treatment-seeking behavior, the findings emphasize the critical role of workplace support systems and personal circumstances. Organizations should focus on providing robust mental health resources and support, particularly for those facing work-related mental health challenges and those with a family history of mental health issues. By doing so, employers can foster a healthier, more supportive work environment that encourages employees to seek the help they need.

References

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- Survey dataset on mental health in tech professionals from open sourcing mental health surveys (2017–2021)