**COVID-19 and Factors Relating to Healthcare Attrition**

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**1. Introduction**

Since 2019, the coronavirus has been infecting the world. Years later the U.S. is still dealing with the symptoms of high turnover and poor retention rates across the healthcare industry. Is the job market still in recovery?

The COVID-19 pandemic has had profound and lasting effects on the healthcare sector, particularly in the United States. Healthcare institutions continue to grapple with issues such as high turnover, reduced job satisfaction, and an increased workload for remaining staff. Nurses, as a cornerstone of the healthcare workforce, have been disproportionately affected.

This study analyzes trends in **job satisfaction**, **income**, and **overtime hours** by comparing data from **2018** (pre-pandemic) and **2022** (post-pandemic). By identifying key factors contributing to healthcare attrition, this research aims to provide actionable insights for improving retention and addressing burnout among healthcare workers. In this project, we are using 2022 Healthcare Employee Attrition[[1]](#footnote-1) dataset to find emerging trends after the pandemic to see the changes for nurses using national report data, we obtained from 2018 National Sample Survey of Registered Nurses Nursing Solutions Inc (NSI)[[2]](#footnote-2).

**2. Data**

The first data source we will use in this project is Employee Attrition for Healthcare dataset from Kaggle, derived from 2022 NSI National Health Care Retention Report. This data shows survey data from the previous year, 2021, from 272 hospitals across 32 states. This survey covers 589,901 healthcare workers, and 166,087 Registered Nurses. We plan to use Python to transform the commas separated file to a pandas data frame to find valuable and relevant trends relating to the attrition rates for nurses.

We also plan to scrape data from the 2018 National Sample Survey of Registered Nurses Nursing Solutions Inc, found in the National Library of Medicine. This contains the same metrics found in the other dataset and we will compare metrics to the previous years. In the report response data will be gathered from 43,937 Registered Nurses.

Given the different time and lingering effects of COVID-19, we will compare nurse staffing data after covid to most recent reports. By looking at data from post pandemic, we will collect any trends or changes and figure out what factors might be influencing nurses to stay or leave. Using info from national healthcare surveys and data, we can find potential improvements the healthcare industry can make.

*Table 1: Data Dictionary from Kaggle*

|  |  |  |  |
| --- | --- | --- | --- |
| **Column** | **Type** | **Source** | **Description** |
| Age | Numeric | Kaggle | Age of Employee. |
| Attrition | Text | Kaggle | Whether the employee has left the organization. |
| Gender | Text | Kaggle | Gender of the employee. |
| Job\_Satisfaction | Numeric | Kaggle | Satisfaction with the job. |
| Marital\_Status | Text | Kaggle | Marital status of the employee. |
| Income | Numeric | Kaggle | Yearly income of the employee. |
| OverTime | Text | Kaggle | Whether the employee works overtime. |

*Table 2: Data Dictionary from webscrape*

|  |  |  |  |
| --- | --- | --- | --- |
| **Column** | **Type** | **Source** | **Description** |
| age | Numeric | Survey | Age of the respondent |
| job\_dissatisfied | Numeric | Survey | Number of respondents dissatisfied with their job |
| job\_satisfied | Numeric | Survey | Number of respondents satisfied with their job |
| female | Numeric | Survey | Number of female respondents |
| male | Numeric | Survey | Number of male respondents |
| married | Numeric | Survey | Number of married respondents |
| married | Numeric | Survey | Number of married respondents |

*Table 3: Data Dictionary from Merge*

| **Column** | **Type** | **Source** | **Description** |
| --- | --- | --- | --- |
| job\_dissatisfied\_2018 | Numeric | Both | Number of respondents dissatisfied with their job in 2018 |
| job\_satisfied\_2018 | Numeric | Both | Number of respondents satisfied with their job in 2018 |
| female\_2018 | Numeric | Both | Number of female respondents in 2018 |
| male\_2018 | Numeric | Both | Number of male respondents in 2018 |
| married\_2018 | Numeric | Both | Number of married respondents in 2018 |
| single\_2018 | Numeric | Both | Number of single respondents in 2018 |
| overtime\_2018 | Numeric | Both | Number of respondents working overtime in 2018 |
| individual\_income\_2018 | Numeric | Both | Individual income of the respondents in 2018 |
| job\_dissatisfied\_2022 | Numeric | Both | Number of respondents dissatisfied with their job in 2022 |
| job\_satisfied\_2022 | Numeric | Both | Number of respondents satisfied with their job in 2022 |
| female\_2022 | Numeric | Both | Number of female respondents in 2022 |
| male\_2022 | Numeric | Both | Number of male respondents in 2022 |
| married\_2022 | Numeric | Both | Number of married respondents in 2022 |
| single\_2022 | Numeric | Both | Number of single respondents in 2022 |
| overtime\_2022 | Numeric | Both | Number of respondents working overtime in 2022 |
| individual\_income\_2022 | Numeric | Both | Individual income of the respondents in 2022 |

**3. Analysis**

This project aims to analyze the effects COVID-19 had on employment in healthcare with job satisfaction, environment ratings, pay and other ratings. We want to discover reasons for quitting and ways healthcare industries can improve. Our research analysis includes:

**Does income impact healthcare worker job satisfaction?**

Correlation analysis showed a positive relationship between income and job satisfaction across both years. However, the correlation was stronger in 2018 than in 2022.

A graph with a red line

Description automatically generated

A graph with a red line

Description automatically generated

While income remains a contributing factor to job satisfaction, the pandemic has amplified other issues, such as work-life balance, stress, and job demands, reducing the influence of income alone. Comparing both, the correlation is a lot stronger and clearer in 2018.

**We should now examine the p value and correlation using Pearson.**

There is high correlation but the p values suggest that both years are not statistically significant. We would like to note that the correlation was stronger in 2018 compared to 2022.

2018:

A close-up of words

Description automatically generated

2022:

A close-up of a white background

Description automatically generated

**How has job satisfaction changed since COVID-19?**

The 2018 dataset exhibited a higher and more widely distributed level of job satisfaction, with notable outliers (up to ~35,000). In contrast, the 2022 dataset shows a significant decline in job satisfaction, with data points tightly concentrated around lower values.

Post-pandemic job satisfaction dropped due to factors such as:

• Increased workload and stress during the pandemic.

• Emotional and physical toll on nurses.

• Persistent staffing shortages.

A graph of a job satisfaction

Description automatically generated

**How have overtime hours changed between 2018 and 2022?**

The overtime analysis highlights a significant reduction in overtime hours in 2022 compared to 2018. The 2018 data reveals a broad distribution, including extreme outliers (~12,000 hours), whereas overtime in 2022 is both lower and more concentrated.

The decline in overtime hours may result from:

* Burnout limiting nurses’ ability to work extended hours.
* Staffing shortages making it unsustainable to rely on overtime.
* Organizational changes in workload distribution and resource

A graph of a graph showing the time of a year

Description automatically generated with medium confidence

**How does the relationship between overtime hours and individual income impact employee attrition rates between 2018 and 2022?**

Overtime:

The number of employees working overtime decreased significantly from 2018 to 2022.

Individual Income:

There was a slight decrease in individual income from 2018 to 2022.

A graph of a bar chart

Description automatically generated with medium confidence

* Overtime: The reduction in overtime hours in 2022 might indicate a shift in company policies or a decrease in workload. This could be a positive trend for employee well-being and work-life balance, potentially leading to lower attrition rates.
* Individual Income: The slight decrease in individual income could be attributed to various factors, including economic conditions, changes in compensation strategies, or a shift in the workforce composition. While a modest decrease in income might not be a significant driver of attrition, it could contribute to dissatisfaction, especially if combined with other factors like increased workload or reduced benefits.

**Additional Considerations:**

* It's important to note that this data demonstrates correlation, not causation. While the decrease in overtime and income may be related to lower attrition, other factors could be influencing these trends.

**4. Conclusion**

This study investigated the impact of COVID-19 on healthcare worker job satisfaction, income, and overtime hours, ultimately affecting employee attrition rates. By analyzing data from 2018 (pre-pandemic) and 2022 (post-pandemic), we identified key trends and potential contributing factors.

**Key Findings:**

* **Job Satisfaction:** Job satisfaction in the healthcare sector declined significantly post-pandemic. This decrease is likely due to factors such as increased workload, stress, and staffing shortages.
* **Income and Job Satisfaction:** While income remains a factor in job satisfaction, the correlation weakened post-pandemic. This suggests other factors, like work-life balance, have become more significant.
* **Overtime Hours:** Overtime hours decreased considerably in 2022 compared to 2018. This could be attributed to burnout, staffing shortages, or changes in workload distribution.

**Implications:**

* The decline in job satisfaction highlights the need for healthcare institutions to prioritize employee well-being. Initiatives promoting work-life balance, stress management, and adequate staffing can help improve employee retention.
* While income may not be the sole driver of job satisfaction, it remains important. Fair compensation strategies that acknowledge the demanding nature of healthcare work are crucial.
* The decrease in overtime hours may be a positive sign for employee well-being, but it also suggests potential staffing challenges. Strategies to address workload distribution and attract new nurses are essential.

**Limitations:**

* This study relied on publicly available datasets, which may have limitations or biases.
* Correlation does not imply causation. Further research is needed to determine the specific causal factors influencing job satisfaction and attrition.

**Future Research:**

* Analyzing data on specific job roles within healthcare can provide more targeted insights.
* Qualitative studies exploring the experiences of healthcare workers could provide deeper understanding of their concerns and motivations.
* Longitudinal studies can track trends over time and assess the effectiveness of interventions aimed at improving employee retention.

By addressing the challenges identified in this study, healthcare institutions can create a more supportive work environment and improve employee retention. This, in turn, will benefit the quality of patient care and the overall health of the healthcare system.

1. <https://www.kaggle.com/datasets/jpmiller/employee-attrition-for-healthcare?resource=download> [↑](#footnote-ref-1)
2. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10742910/#healthcare-11-03173-t001> [↑](#footnote-ref-2)