Analyzing Global Mental Health and Suicide Rate using Tableau Dashboards

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Abstract

When we talk about patient care, which is something critical and monitored closely until the course of illness, patient's data is regularly collected on their visit to the hospital, this accumulates a large amount of data generated from the hospitals on each given day. In partnership with MIT laboratory for computational physiology all this data is made available by Philips Healthcare named eICU research database. The database consists of a different combination of many critical care units throughout the continental United States. The data in the collaborative database covers patients who were admitted to critical care units in 2014 and 2015 and consists of high granularity data for over 200,000 admissions to ICUs monitored by eICU Programs. This data is de-identified and consists of patient care documentation and their vital sign measurements. Our goals were to utilize various methodologies, tools, and techniques to provide a clear concise over health care records. We have extensively analyzed the database and created a list of metrics which would target stakeholders. To implement these metrics, we decided to draw out output in the form of visualizations that can help to communicate our results most effectively.

Acknowledgements

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Contents

Introduction

In the realm of mental health, it is imperative to comprehensively understand and address the global challenges that individuals face daily. A crucial aspect lies in emphasizing the significance of mental health awareness, shedding light on its impact on individuals and communities alike. A particularly poignant issue is the alarming global suicide rates, where an in-depth analysis reveals disparities between male and female figures, urging us to identify patterns and underlying factors that contribute to this distressing phenomenon. By integrating data from reputable sources like the World Health Organization with survey responses, we can derive data-driven insights to offer a comprehensive overview of mental health trends. The goal of this presentation is not only to inform but to foster deeper discussions, encouraging proactive approaches for mental health improvement. By highlighting the need for effective mental health initiatives, we aim to create a space where understanding and compassion prevail, ultimately contributing to a healthier and more supportive global community.

Problem Statement

Across the world, too many lives are lost to suicide, leaving families shattered. Misunderstanding about mental health creates a barrier, preventing individuals from seeking the support they need. Societal pressure adds to this burden, increasing the struggle for those silently fighting with their mental health. This cycle continues to exist because of lack of awareness, leaving people helpless in their darkest moments.

Dataset

- **Male vs. Female Suicide Rate (WHO, 2019):**

    - Contains global data on suicide rates, separated by gender.

    - Includes information like country, year, age-standardized suicide rates for males and females, population, and continent.

    - Useful for comparing gender differences in suicide rates across different regions and over time.

- **Mental Health Survey:**

    - Comprises survey responses on various aspects of mental health.

    - Includes demographic information like country, gender, age, along with detailed responses to mental health-related questions.

    - Can be used to understand public perception and experiences related to mental health issues.

Methodology

Our approach to this project was to create a comprehensive dashboard that provided an overview of Student Suicide Rate and Mental Health Collaborative Database. To do this, we started by identifying the key metrics and data points that we wanted to include in the dashboard. These metrics included patient demographics, length of stay, diagnoses, medications, and lab results.

Next, we collected the necessary data from the Electronic Survey and the organizations like WHO and IHME. We used different Python libraries like Pandas, NumPy, Matplotlib, Seaborn to perform EDA on the data to understand the data, discover patterns, identify relationships, and gain insights into the underlying structure of the dataset and then imported it into Tableau for analysis and visualization. We also cleaned and processed the data to ensure that it was accurate and consistent.

Once we had the data in Tableau, we used a variety of tools and techniques to create the dashboard. We started by creating a rough layout of the dashboard and deciding on the types of charts and graphs we wanted to use. We then experimented with different visualizations to determine which ones worked best for each metric.
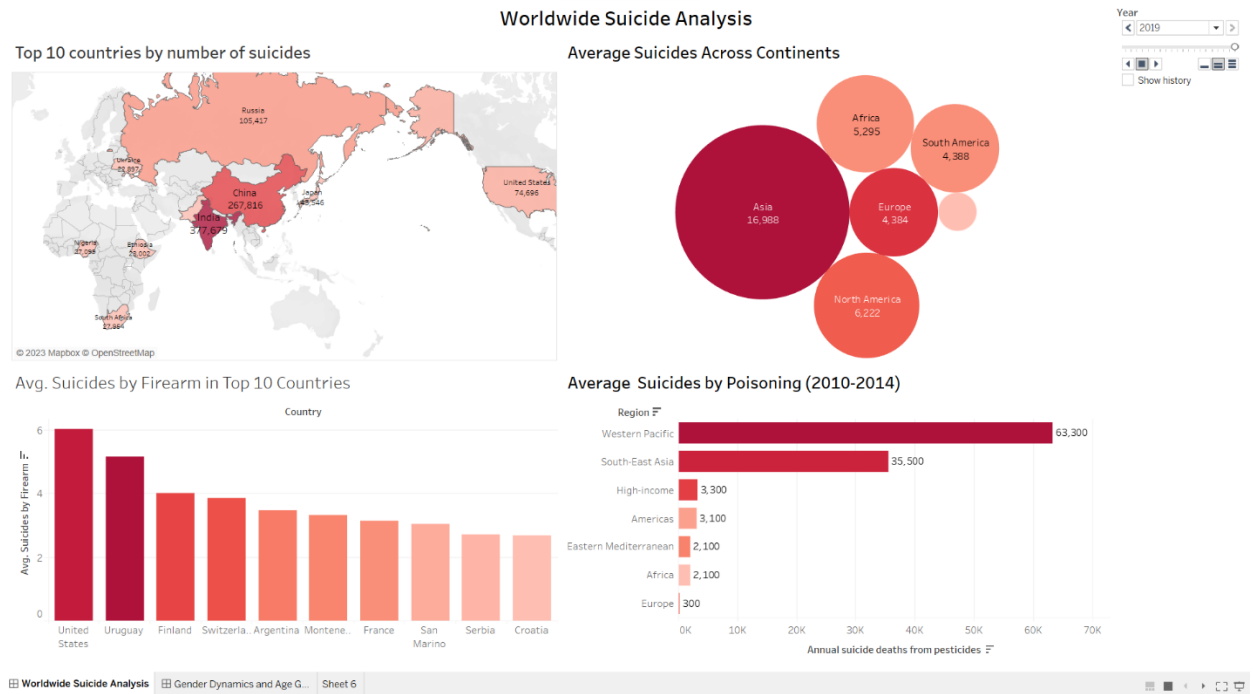
To ensure that the dashboard was user-friendly and easy to navigate, we added filters and drilldowns to allow users to explore the data in more detail. We also included annotations and tooltips to provide additional context and insights.

Overall, our approach to this project was data-driven and user-focused. We used a combination of python libraries, Tableau, and unit testing to develop a comprehensive and effective dashboard for the Student Mental health and Suicide Rate Collaborative Database.

Tableau Dashboards

Worldwide Suicide Analysis

This dashboard reflects information about Top 10 countries by number of suicide and this reflects that India has experienced the greatest number of suicides as compared to the rest of the countries and on the other hand Ukraine is the country with the least suicide rates amongst all. On the other side the graph depicts the information about the average suicide rate across continent which reflects that Asia is the continent with the highest suicide rates and whereas Europe is the continent which has experienced the least suicides as compared to the other continents. Moreover, the rest graphs depicts the top 10 countries experienced suicides with firearms and poisoning.

Worldwide Suicide Analysis

Top 10 countries by number of suicides

Average Suicides Across Continents

Avg. Suicides by Firearm in Top 10 Countries

Average Suicides by Poisoning (2010-2014)

Gender Dynamics and Age Groups in Suicidal Trends

This dashboard depicts the top 5 countries which has the most suicide rates per gender, and this reflects countries like India and China has the greatest number of suicides as compared to the other three and the ratio of male and female suicide rates in these two countries are merely the same. Furthermore, on the other hand the rest three countries have experienced a less suicidal rates for females. Moreover, our dashboard also reflects that there are more Male suicide rates in the past years as compared to the

Female on top of it suicides done by age group of 15-49 is the greatest amongst the rest age groups.

Gender Dynamics and Age Groups in Suicidal Trends: Yearly Averages
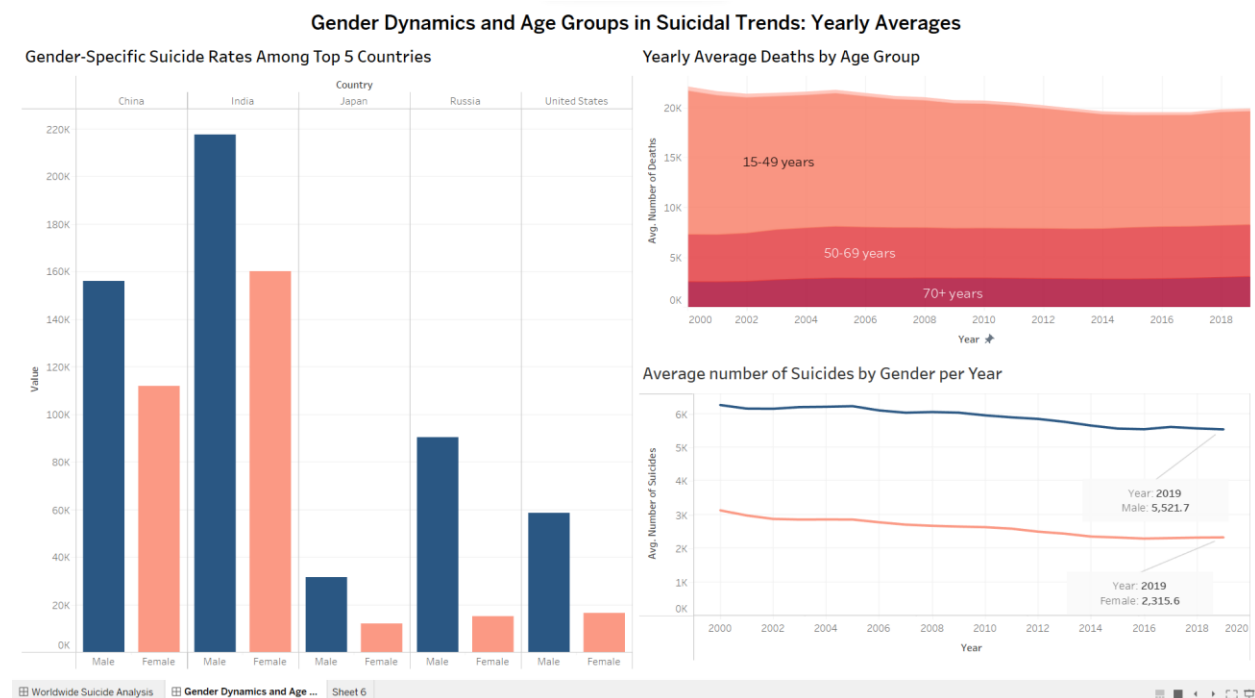
Recommendations and Future work

1. **Data Limitations:** Address challenges related to data comprehensiveness, accuracy, and representativeness.

2. **Cultural Sensitivity:** Recognize the need for culturally sensitive approaches in data interpretation and policy recommendations.

3. **Stigma Reduction:** Highlight the importance of reducing stigma around mental health through education and public awareness.

4. **Policy Recommendations:** Suggest improvements in mental health policies, emphasizing early intervention and accessible healthcare services.

Conclusion

In conclusion, our exploration into mental health encompasses diverse dimensions, revealing intriguing patterns and disparities. The examination of physical activity patterns indicates a substantial divide in lifestyle habits, with a significant portion of respondents engaging in regular physical activity, while others rarely or never partake. This dichotomy suggests potential implications for both mental and physical well-being. The investigation into sleep problems across countries unveils notable variations, with India particularly standing out for a high incidence of sleep issues. This observation prompts consideration of cultural, environmental, or economic factors that may influence sleep quality in distinct regions. Furthermore, the examination of suicide by firearm underscores the impact of governmental policies, as countries legalizing firearms for citizens often experience a higher incidence of suicides involving firearms. Collectively, these insights underscore the intricate interplay between lifestyle, cultural context, and policy decisions in shaping mental health outcomes. To address these challenges effectively, it is crucial to foster a holistic understanding and implement proactive measures that consider the multifaceted nature of mental well-being on a global scale.

Future Work

Longitudinal Study: Conduct a long-term study to observe trends and changes in mental health and suicide rates over time, considering socio-economic, cultural, and geographical factors.

Cross-cultural Analysis: Expand the research to include a wider range of countries and cultures to understand the global diversity in mental health issues and suicide trends.

Policy Impact Assessment: Evaluate the effectiveness of current mental health policies and suicide prevention programs across different regions.

Advanced Data Analytics: Incorporate machine learning and predictive analytics to identify at-risk groups and forecast future trends in mental health and suicide rates.

Collaborative Research: Partner with international mental health organizations to gather more comprehensive data and develop global strategies for mental health improvement.

Public Awareness Campaigns: Explore the impact of educational and awareness programs on reducing stigma and improving mental health outcomes.

References