**Hospital Readmission Analysis**

* **Problem & Background:**

**Problem Statement:**

High readmission rates present a critical challenge for healthcare institutions, impacting patient care quality, hospital resource allocation, and regulatory compliance. Identifying the underlying causes of readmissions is essential for developing targeted interventions that improve patient outcomes and reduce healthcare costs. By addressing these factors, hospitals can enhance care delivery, optimize resource utilization, and align with healthcare regulations, ultimately leading to better patient experiences and financial sustainability.

**Background:**

Recently, the hospital has seen a spike in readmission rates, raising concerns about rising costs and quality of care. The administration is prioritizing the analysis of admission data to identify key factors contributing to these readmissions, with a focus on improving patient outcomes and protecting the hospital's reputation.

**Why this problem need to solve?**

Solving the problem of high readmission rates is important because it directly impacts patient care quality, hospital costs, and regulatory compliance. Reducing unnecessary readmissions can lead to better patient outcomes, lower healthcare costs, and more efficient use of hospital resources. It also helps maintain the hospital’s reputation and ensures adherence to healthcare standards, which are critical for both patient trust and financial sustainability.

* **Solution:**

In response to reducing readmission rate, we propose an integrated solution that combines data analysis, data-driven insights, and stakeholder engagement.

**Data Analysis:**

* Conduct in depth analysis of readmission rate according to patient age,race,gender and disease types.
* Use Excel for Store data, analyze reasons of readmission rate,make require tables/pivote tables for more insights.
* Utilize excel for making dashboards which can be help for visualize readmission data for identify insights easily.

**Data Driven Insights:** Using the insights gained from data analysis to identify the factors that are driving increase in readmission rate in hospital.

* To reduce readmissions, develop targeted strategies based on age-related patterns. For example, if data shows high readmission rates among older patients due to emergencies, implement age-specific interventions such as enhanced post-discharge follow-ups, emergency response plans, and closer monitoring for seniors. Tailor care to the needs of different age groups to prevent readmissions effectively.
* If data analysis reveals that patients are readmitted because of combroid conditions or multiple times medication or treatment change then more personalized patient care planning and resource allocation is required.

**Stakeholder Engagement**

**Internal stakeholders**

* Engage Hospital Board of Directors/Trustees for strategy, finances, and overall hospital performance.
* Department Heads & Managers who are responsible for managing specific departments (e.g., Surgery, Nursing, Radiology).
* Doctors and nurses, with their significant influence on patient care flow and quality, make a multitude of critical care decisions that directly impact patient outcomes.

**External stakeholders**

* Patients:Gather their experiences and outcomes are key metrics. Analyse patients reviews to identify common complaints and areas for improvement.
* Families and Caregivers: Deeply involved in a patient's care plan and support system.So,their feedback also important.
* Insurance Companies/Payers: Fund the care provided, greatly influencing financial operations.
* Suplliers should provide equipment, pharmaceuticals, and other necessary supplies.It should be clinically tested.
  + Suppliers: Provide equipment, pharmaceuticals, and other necessary supplies.
  + Community: The hospital is often a major employer, economic driver, and source of health services for the community.
* **Project Scope:**
* To analyze hospital readmission data and identify key factors driving readmissions, with the goal of improving patient outcomes, reducing healthcare costs, and ensuring compliance with healthcare regulations.
* Identify high-risk patient demographics and conditions.
* Evaluate discharge procedures and post-discharge follow-up effectiveness.
* Develop targeted interventions based on data analysis.
* Report on findings, data visualizations, actionable recommendations, and a predictive model for high-risk patients.
* Track when and why patients are readmitted to identify common trends or triggers (e.g., certain conditions, timing post-discharge).
* Examine how staffing levels and care quality affect readmission rates, especially during peak times.
* **Methodology**
* Data Resources: - Hospital provides the data source, which consistsof tables with data in an Excel format.
* Data wrangling: - Identifying the data, formatting the data, looking for outliers, and checking for null or blank cells.
* Data Analysis:- Get data provided by hospital in excel, analyze the distribution of readmission rates by demographics, conditions, and treatment types.Identify patterns and correlations within the data.We will create pivote tables in same excel to identify more insights.This will help to analyze readmission count according to patient age,race,gender,combroid condition etc.
* Data Visualization: - In the end, we'll produce a dashboard that provides all the suggested analysis in a simple to understand manner. The dashboard will give users a thorough overview of the data and allow them to base their judgements on the analysis's key findings.
* **Goals & KPI’s**

Goals:

* Reduce Overall Readmission Rates
* Identify High-Risk Patients
* Improve Patient Outcomes
* Optimize Resource Allocation
* Increase Patient Satisfaction

KPI’s:

* Readmission Rate
* Patient Satisfaction Scores
* Time to Readmission
* Preventable Readmissions
* Quality of care
* **Technical Processes**
* Formula used: - Count, Average, Pivot table, VLOOKUP, Max, Min,Charts, Graphs, filter etc.
* Tools used: - Excel for Cleaning, analyzing, Data visualizations.
* **Business Concepts Used**
* Market Understanding

Analyze local healthcare trends, patient preferences, and competitor practices to identify best practices in reducing readmissions. Understanding the overall healthcare market can help the hospital position itself as a leader in patient care quality.

* Customer Demographic

Collect and analyze demographic data to understand which groups are more likely to be readmitted. This information can guide targeted interventions and care plans tailored to specific demographics, such as elderly patients or those with chronic conditions.

* Patient Behavior

Use data analytics to observe behaviors that lead to readmissions, such as medication non-adherence or missed follow-up appointments. Understanding these behaviors helps develop strategies to improve patient engagement and compliance.

* Customer(patient) Retention

Focus on enhancing the patient experience through effective discharge planning and follow-up care. Implementing patient engagement strategies, such as regular check-ins and personalized care plans, can improve retention and reduce readmission rates.

* New Customer Acquisition

While the primary focus is on reducing readmissions, marketing efforts can highlight the hospital’s commitment to quality care and patient outcomes. Positive word-of-mouth from satisfied patients can lead to new patient acquisition, especially if readmission rates are lowered and overall patient satisfaction improves.

* **Recommend analysis:**

1.What is the distribution of readmission rates across different age groups?

The **70-80 age group** has the highest number of readmissions, accounting for approximately **26.59%** of total readmissions.The **60-70 age group** also has a significant share at **22.30%**.Younger age groups ([0-10) and [10-20) have the lowest rates of readmissions, indicating that older patients are more likely to be readmitted.

2.Analyze the average length of hospital stays by medical specialty. Which specialties have the longest and shortest average stays?

Anesthesiology speciality have shortest stay. Pediatrics speciality have shortest stay.

3.What proportion of patients with diabetes were readmitted within 30 days?

Approximately **79.9%** of patients with diabetes were readmitted within 30 days.

4.Is there a significant difference in readmission rates between patients with changes in diabetic medication and those without?

Readmission Rate with Medication Change: Approximately 46%.Readmission Rate without Medication Change: Approximately **54%.**

5.Analyze the effect of comorbid conditions (presence of multiple diagnoses) on the length of hospital stay and readmission rates.

The data indicates a clear trend where the complexity of a patient's health condition, as indicated by the number of diagnoses, correlates with longer hospital stays. This highlights the need for more resources and personalized care plans for patients with multiple comorbidities to manage their extended hospital stays effectively.

* **Conclusion**

The analysis of hospital readmission rates has revealed critical insights into patient demographics, health factors, and systemic issues that contribute to high readmission rates.

The data indicates a significant number of readmissions within 30 days, particularly among certain demographic groups. Continued monitoring and analysis of readmission trends are essential. Further research should be conducted to explore the underlying causes of disparities in readmission rates and to assess the effectiveness of implemented strategies.

* **PROJECT OWNER**

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