Descriptive Analysis of Patient Demographics, Length of Hospitalization, and Administered Medications within the University of Kentucky Healthcare Inpatient Hospital Population

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INTRODUCTION

Few studies have examined how patient demographics are correlated to length of hospital stay. This provided an opportunity to evaluate how patient characteristics are correlated to length of stay within the UK Healthcare inpatient hospital population. A state-based analysis found data suggesting that length of stay was affected by race, ethnicity, and socioeconomic status.1 Likewise, a multivariate analysis found comorbidities and race to be significant predictors of length of stay.2 Considering research has repeatedly shown that longer hospital stays are correlated to increased patient mortality and morbidity,3 the question arose to explore how patient factors, such as demographics, comorbidities, and medications, are related to length of stay at UK Healthcare. Moreover, as human beings live longer, the risk of developing numerous comorbidities increases, and multiple medications are often enlisted to manage and alleviate patient symptoms. However, it is also known that employing multi-drug regimens increases the risk of drug-to-drug interactions, which can lead to further adverse health outcomes, some of which may be life-threatening. Consider the following provided by the WOJT, “Patients hospitalized due to ADEs have been shown to have longer lengths of stay and increased risk of hospital readmission, both of which are negative quality of care indicators. These outcomes have been shown to be associated with increased morbidity, mortality and economic burden to the healthcare system.”4 In understanding how patient demographics and medications are related to length of stay and patient outcomes, this project will take an analytical approach to describe similar data as it pertains to UK Healthcare inpatient hospitalization.

PURPOSE OF STUDY

The purpose of this descriptive analysis is to examine the relationships between patient demographics, hospital administered medications, and number of medications as compared to hospital length of stay in the University of Kentucky healthcare system.

METHODS

- 5,805 patients between the ages of 65 and 85 that were admitted into the UK healthcare system from January 2017-December 2019 were included
- This is a retrospective analysis by CCTS protocol that examines the relationships between patient demographics, number of medications, and length of stay
- Data was obtained from the UK Healthcare system and extracted from Inpatient Electronic Medical Records
- Regression analysis was used to describe the relationship between these variables
- Function logarithm (log) was used to transform skewed data to symmetric data
- R^2 values were used to describe the significance of the relationships

RESULTS

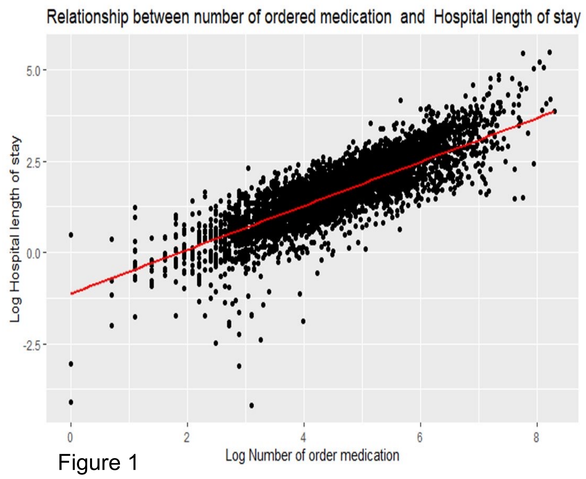

Figure 1

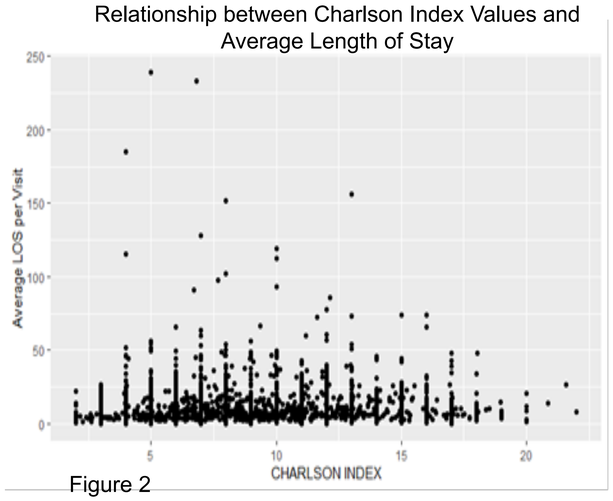

Figure 2

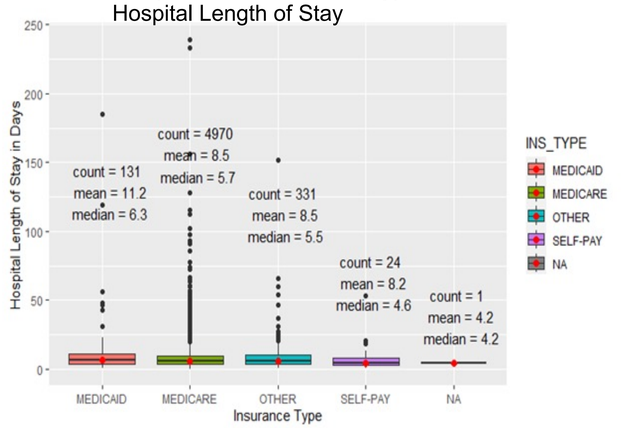

Figure 3

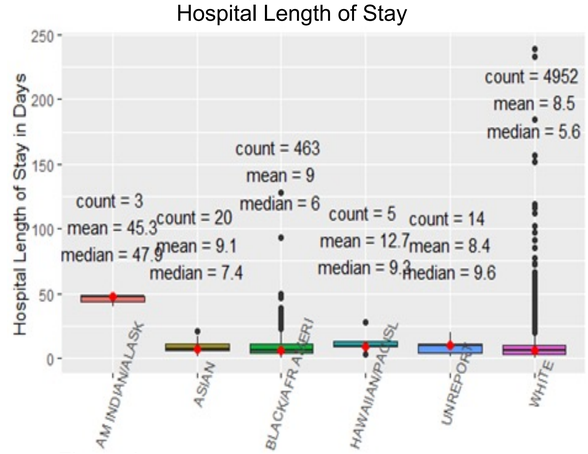

Figure 4

Table 1: Most Prescribed Medications and Associated Length of Stay in UKHC Inpatients between 2017-2019

Order Name	Number of orders	Median Hospital Length of Stay
Albuterol / Ipratropium Inhalation NEB	31479	9.212500
OxyCODONE	26502	12.963194
Pantoprazole	25700	10.004167
Enoxaparin Inj. (PROPHYLAXIS)	21354	10.556250
Heparin Inj.	20952	12.074306
Metoprolol	20368	13.029167
Insulin Lispro (HUMALOG) Inj. 100 units/mL (Correction Factor)	18676	10.863194
Docusate 50 mg-Senna 8.6 mg	18432	14.083333
Piperacillin / Tazobactam Inj.	17706	10.568750
Atorvastatin	17011	11.997222

SUMMARY OF RESULTS

- Figure 1 demonstrates that there is a positive correlation between log number of medications ordered and log hospital length of stay (LOS).
- Figure 2 shows that there is no relationship between insurance type or level of insurance coverage and hospital LOS.
- Figure 3 shows that there is no relationship between the Charlson Comorbidity Index and mean hospital LOS per visit.
- Figure 4 illustrates that there is no relationship between race and hospital LOS. The American Indian/Alaskan race category is considered outlier data due to the significantly low count.
- Table 1 lists the top 10 most ordered medications ordered, the number of medication orders, and the median hospital LOS of patients prescribed those medications.

DISCUSSION

- The positive correlation in Figure 1 demonstrates that there is a relationship between number of medications prescribed and hospital length of stay (LOS). However, this correlation is not predictive, so future research examining this correlation could establish an index predicting the LOS based on the number of medications prescribed.
- Based on the data shown in Figures 2, 3, and 4. factors such as race or insurance status were unlikely to influence hospital LOS. However, the population of this study was limited to the state of Kentucky, and more research exploring different or larger populations is needed for definitive conclusions to be made.
- The information in Table 1 can be used in further research to analyze the diseases that affect Kentuckians most. For example, the relationship between oxycodone prescriptions and the opioid crisis in Kentucky could be explored.

CONCLUSION

This study concluded that there is a positive correlation between administered medications and the patient's subsequent length of stay. It also revealed that there is no statistically significant correlation between demographic data such as race, gender, Charleston comorbidity index, and insurance type as compared to length of stay. However, this lack of statistical significance is arguably paramount in describing that certain demographics do not put a patient at a higher risk for longer hospital stays. The methodology of this study is strictly exploratory in nature. The results described cannot be used to establish cause-effect relationships between data points. It must be considered that the data and results shown are specific to the UK Healthcare system, and do not account for patients admitted to other hospital systems in Kentucky or within the United States. The data is not generalizable to the UK healthcare inpatient population as a whole, nor can we make broad based assumptions using this data on a national or statewide scale.

REFERENCES & ACKNOWLEDGEMENTS

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