

MATH11188 Statistical Research Skills
Assignment 3 - Individual Executive Summary
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1 Problem Statement

The Scottish government is conducting a comprehensive assessment of healthcare services, with a primary focus on early physiotherapy interventions following heart surgery to expedite the recovery process. With budget constraints in mind, there's a critical need to gather robust evidence on the effectiveness of early physiotherapy in post-cardiac surgery rehabilitation. This evaluation aims to provide crucial insights into the impact of early physiotherapy on hospital stay duration post-cardiac surgery, informing policy decisions aimed at optimizing healthcare investments in Scotland.

2 Data Synopsis

The dataset, sourced from hospitals H1 and H2 in Scotland, comprises records of patients post-cardiac surgery. These patients have undergone successful surgery and consented to physiotherapy. It includes key variables such as demographic factors (**sex**, **age**), physiotherapy duration (**PT hours**), days until the start of physiotherapy (**Days to First PT**), and days until discharge post-surgery, offering insights into the timing and duration of post-heart surgery physiotherapy and its impact on patient recovery.

3 Key Insights

With appropriate modeling of the data, key features include age, number of hours of physiotherapy performed, and number of days until physiotherapy initiation. The research underscores the pivotal impact of early physiotherapy (**PT**) commencement in expediting recovery, with delayed onset correlating directly with prolonged hospital periods, particularly notable in older patients. Furthermore, higher PT intensity levels appear to be directly proportional to reduced treatment duration, suggesting potential efficacy in accelerating recovery. These findings emphasize the critical importance of timely PT initiation and tailored intensity levels in optimizing patient outcomes and minimizing hospital stays.

4 Limitations and Further Research

The absence of key variables such as ICU stay duration, extubation timing, post-operative complication rates, and functional capacity assessments like the 6-minute walking test hinders a thorough assessment of early physiotherapy (**PT**) success. These indicators are vital for evaluating patient outcomes and the effectiveness of PT interventions post-cardiac surgery. Incorporating these missing variables is essential for a comprehensive evaluation of early PT effectiveness and for informing evidence-based clinical practices.

5 Conclusion

Based on data analysis and literature findings, early initiation of physiotherapy following cardiac surgery is strongly recommended. Implementing the Enhanced Recovery After Surgery (**ERAS**) protocol as a benchmark is suggested. Early physiotherapy post-cardiac surgery highly correlates with earlier patient discharge, resulting in improved outcomes and cost savings for hospitals. This approach not only accelerates patient recovery but also fosters higher patient satisfaction while optimizing resource utilization within healthcare facilities.