

Finite Mixture Approach to Identifying Substructures in Population of Inflammatory Bowel Disease Patients

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Abstract

Inflammatory bowel diseases (IBDs) are chronic and relapsing condition that affects the digestive tract which affect individuals of varying age

Introduction

Inflammatory bowel diseases (IBDs) are chronic and progressive inflammatory disorders of the digestive tract, they are progressive in nature and causes disabling conditions which can be life threatening. The most common IBDs occurring in humans are Crohn's disease (CD) which affect only the colon and ulcerative colitis (UC) which affect all of the digestive system Viennois, Emilie et al. , (2016). The main causes of IBDs are unclear but factors such as genetics and disruption of the immune system plays an important role Nhs.uk (2017). Symptoms include recurrent diarrhoea, blood in stools, constipation, fever, abdominal pain and reduced appetite. Treatment of IBDs is aim at reducing inflammation for a long time remission, as there is no cure to IBDs, treatment involves drugs (Anti-inflammatory, Immune suppressor and antibiotics) and surgery (colectomy) mayoclinic.org (2017) due to inability of a single and effective treatment has called for the use of several IBD scoring to characterized IBD patients.

Objectives

The aim is to use finite mixture approach to explore the different components in the mixture , to see how the components are related to the treatment patients received and to the IBD score at baseline. In addition to seeing if patient characteristics completely explain the presence of potential clusters in the outcome.

IBD Activity Score Dataset

The dataset used in this study is from a clinical trial with 291 subjects, divided over four treatment arms: 0: placebo; 1: 1000 mg; 2: 2000 mg; 3: 4000 mg. Subjects are measured during a 7 week period. The outcome of interest is an IBD activity score. The same score is also measured at baseline as well. For the purpose of this study the response of interest is the number of weeks in the period Week 1 through Week 7 in which a value of IBD larger than 100 was observed.

$$Y_i = \sum_j^{n_i} I(IBDsc_{ij} > 100) \quad i = 1, 2, \dots, 291$$

Methodology

Results

Exploratory Analysis

Fitted Mixtures

Accounting for Patients Characteristics

Conclusion

References

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Appendix