Estimating Treatment Effects in Longitudinal Clinical Trials with Missing Data

A Preprint

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Abstract

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Keywords Missing Data · Longitudinal Data · Randomized Clinical Trial · Real World Data Analysis

1 Introduction

2 Project Aims

3 Background

Missing data in clinical research

Missing data mechanisms

Missing data mechanisms are important to consider when choosing which sort of missing data handling method to use. There are three mechanisms which missing data can follow:

- Missing Completely At Random (MCAR)
- Missing At Random (MAR)
- Missing Not At Random (MNAR)

Although they may appear similar at first glance, handling missing data without considering these mechanisms may result in biased estimates and inaccurate conclusions.

3.1 Missing Completely At Random

3.2 Missing At Random

3.3 Missing Not At Random

4 Data

4.1 Acupuncture for chronic headache in primary care: large, pragmatic, randomised trial (Vickers et al., 2004)

4.2 The Effects of Vitamin D and Marine Omega-3 Fatty Acid Supplementation on Chronic Knee Pain in Older US Adults: Results From a Randomized Trial (MacFarlane et al. 2020)

5 Methods

5.1 Complete Case Analysis

5.2 Single Imputation

5.3 Maximum Likelihood

5.4 Multiple Imputation

6 Result

7 Discussion