

Investigating factors that may influence COVID-19 survival

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Abstract

OBJECTIVE To investigate, amongst a set of probable prognostic factors, which factors may influence coronavirus 19 disease survival probabilities. **DESIGN** Prospective cohort study; ongoing. **SETTING** The International Severe Acute Respiratory and Emerging Infections Consortium (ISARIC) World Health Organization (WHO) Clinical Characterisation Protocol UK (CCP-UK) study, which enrolls in-patients at at-least 260 Englnd, Scotland, and Wales hospitals; the ISARIC Coronavirus Clinical Characterisation Consortium (ISARIC 4C) conducts the study. The investigation’s patients are patients enrolled in a participating England hospital between 10 February 2020 and 5 July 2020. **PARTICIPANTS** Each study enrollee has a confirmed SARS-CoV-2 infection, or a high infection likelihood. The investigation’s patients are members of age groups 30 - 39, 40 - 49, and higher. **OUTCOME** Patient survival. **RESULTS** Inconclusive. **CONCLUSIONS** Insufficient spectrum of factors.

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Introduction

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A list

- Item 1
- Item 2

Here are two sample references: [1,2].

Methods

Exploratory Data Analysis

- Relationships
- Correlations

Missing Data

Most of the data's variables have missing values. Prior to deciding how to address missing values, it is important to understand the missing values patterns [3]. Rubin [4] outlines three fundamental missing data mechanisms

- missing completely at random (MCAR) / administrative errors, accidents
- missing at random (MAR) / missing data associated with known patient characteristics [independent variables], or the outcome
- missing not at random (MNAR) / missing data associated with missing values of the factor/predictor in question or with unobserved predictors

If the missing values of a data set in question are *missing completely at random* then complete case analysis will suffice because the complete case excerpt is akin to a random sample from a complete population. If MCAR does not hold, e.g., data is *missing at random*, then the complete case excerpt is not representative of the underlying population, therefore population inference is not possible via complete case analysis. [3]

Herein, missing data mechanisms analysis is via logistic regression. Almost all the independent variables have missing values patterns that violate MCAR; addressed via multiple imputation in-line with the advice and protocols of [6] & [3].

Null Survival Curve

- Complete Case
- Imputation Case

Uni-variate Analysis

- The table ... Cox

Adjusted Analysis via Restricted Mean Survival Time

The proportional hazard assumption does not hold ...

Results

Discussion

Within a missing values setting, there are 2 options w.r.t. predictor effect analysis [3]

- complete case analysis for the uni-variate analysis, and complete case predictors & imputed confounding variables for adjusted analysis.
- uni-variate and adjusted analysis after imputation of all missing values.

The investigation opted for the latter, especially because ...

Bias

Possible bias points

- By virtue of the study's design pre-study-admission differences between hospitals is possible due to the ambiguity of the study's patient recruitment terms, and this might lead to post-study differences. In a nutshell, the study is susceptible to selection bias. [Trochim]
- Missing data [6]

Conclusion

The analysis of missing values hints at flaws in data collection.

References

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