Bayesian Estimation of parameters for Survival models using the Cox Proportional model

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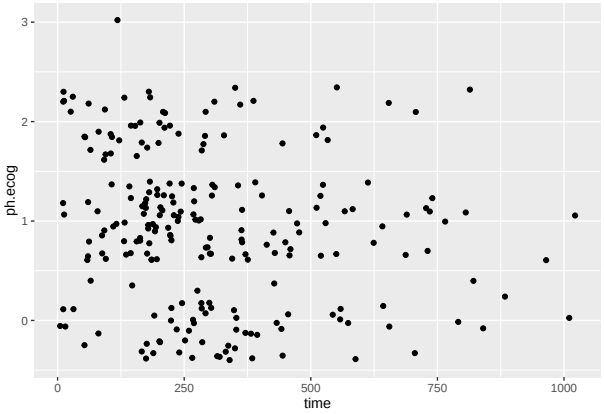
Introduction

The primary aim of our study is examine the mortality and survival of the people from African countries.

Specifically, to estimate survival time and probability, to identify predictive factors, and to describe causes and circumstances of deaths.



Methods

Study Population

Many countries don't have good registries management on government institutions and thus they don't have a good record of important events such as population deaths, the Demographic and Health Surveys (DHS) facilitates multiple datasets containing data collected from questionnaires performed in households from a large list of countries.

In our study we will consider the Individual Women's data, which consist of questionnaires performed to womens. they were asked about wherever they had siblings, their survival status, age and death date (in case they have died).

Data sources

The primary data source was the Demographic and Health Surveys (DHS) Individual Recode (IR) where each row consist of a woman and their responses on multiple questions.

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Basic concepts

Survival analysis

Survival analysis is a collection of statistical methods for studying the time to methods to study the time to occurrence of an event* (also known as survival the occurrence of an event* (also known as failure time analysis or survival analysis). (also known as failure time analysis or survival analysis). The name survival is because these methods are generally used to study time-to-death to study times to death, some fields of application of survival analysis of survival analysis include: Health sciences, engineering, social sciences, economics, epidemiology, among others. Survival data must face an (often unavoidable) problem called censorship. censoring occurs when you have some information on a patient's survival time but do

not have the survival time of a patient but the exact time of failure is not known.

Let T be a random variable denoting the survival time of a unit or person. of a unit or person. The survival function, which is denoted $S(t)$ gives the probability that a unit or person will survives beyond some specific time t. i.e,

$$S(t) = P(T > t)$$

The survival function $S(t)$ is fundamental in the SA because for different values of t it provides crucial information. different values of t provides crucial information of the survival data

In some situations it may be of greater interest to quantify the risk of failure at a given instant than to estimate survival; one function of interest in survival analysis that allows this to be done is the Hazard function.

The hazard function usually denoted as $h(t)$ or $\lambda(t)$ is given by:

$$h(t) = \lim_{\Delta t \to 0} \frac{P(t \leq T + \Delta t | T \geq t)}{\Delta t}$$

The numerator represents the conditional probability of the event occurring in an infinitesimal interval $[t, t+\Delta t]$ (as $\Delta t \to 0$) given that the unit has survived to t ($T > t$). survived until t (T>t).

Censorship

An observation in a random variable T is said to be right-censored if all that is known about of T is that it is greater than some value c. In AS, T refers at the time of occurrence of some particular event and a case is considered right-censored if it stops observing before for the event to occur.