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Statistical methods in R to ensure fair comparisons between treatment groups in observational studies

Randomised clinical trials (RCTs) are considered the gold standard for studying the effectiveness of interventions or treatments because randomization ensures similar baseline characteristics and eliminates confounding variables. Observational studies do not use randomization, leading to differences between groups in measured or unmeasured characteristics that could confound the association between the exposure and the outcome being studied.

Several statistical methods have been developed to control for confounding in observational studies. Multi-variable regression is the traditional method and propensity score (PS) methods are an alternative. The range of methods that use the PS to correct for baseline differences between groups includes using the PS as an adjustment covariate in a regression model, propensity score matching (PSM), and inverse probability weighting (IPW).

When examining differences in mortality between waves of COVID in Catalonia, we need to make the waves comparable in terms of baseline covariates to ensure fair comparisons. We will illustrate how these methods can be applied in this scenario using different R packages: MatchIt and WeightIt to apply PSM and IPW; cobalt to check covariate balance after matching or weighting; survey to fit models with weights obtained from IPW, and forestplot to graphically compare the results of the four techniques.

We will compare the results of the four methods, present arguments for and against each one of them, and make recommendations for comparing treatment groups in observational studies.

¿Presentas la comunicación a premio?

Premio estudiante (grado, máster, doctoral)

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