

Causal Inference in Hybrid Intervention Trials Involving Treatment Choice

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Randomized allocation of treatments is a cornerstone of experimental design, but has drawbacks when a limited set of individuals are willing to be randomized, or the act of randomization undermines the success of the treatment. Choice-based experimental designs allow a subset of the participants to choose their treatments. We discuss here causal inferences for experimental designs where some participants are randomly allocated to treatments and others receive their treatment preference. This paper was motivated by the "Women Take Pride" (WTP) study (Janevic et al., 2001), a doubly randomized preference trial (DRPT) to assess behavioral interventions for women with heart disease. We propose a model for inference about preference effects for a DRPT and develop an EM algorithm to compute maximum likelihood estimates of the model parameters. The method is illustrated by analyzing treatment compliance of the WTP data. Our results show that there were strong preference effects in the WTP study, that is, women assigned to their preferred treatment were more likely to comply. We also expand these methods to handle a broader class of designs, and discuss alternative designs from the perspective of the strength of assumptions required to make causal inferences.