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A Tutorial on Quasi-Experimental Designs

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Dear Editor,

A main step in answering a scientific hypothesis in an epidemiological study is deciding which type of study is suitable to be undertaken, considering methodology, practical considerations and budget and time limitations. Basically, epidemiological studies can be divided into two broad types: observational and interventional studies (experimental studies). In contrast to observational studies which no attempt is made to affect the outcome, to determine the effect of an exposure to the intervention on the natural course of events, a deliberate intervention is made on some or all samples in interventional studies. Depending on whether the units involved in a study are individuals or communities, there are two main types of experimental studies: (i) controlled clinical trials and (ii) community trials (1).

In practice, there are particular circumstances in which the researcher goal is to demonstrate a causal relationship between an independent and dependent variable while the random allocation of the intervention may not be feasible for ethical or practical constraints (2). To response this need, Quasi-experimental designs (QEDs) are increasingly employed.

There are various types of QEDs with different strengths, weaknesses and applications including: interrupted time series designs, designs with control groups, and designs without control groups (3). Quasi-experiments are included in observational studies class which combine some of the advantages of controlled trials with those of non-experimental.

Comparison of QED and randomized controlled trials

QEDs generate evidence faster with less cost and resources compared with true experimental designs. Similar to randomized controlled trials (RCTs), QEDs is a tool to infer the casual treatment effects, but, contrary to RCTs, patients or clusters of patients self-select into one of several different treatment groups in QEDs (4,5). Although lack of random assignment decreases internal validity and also increases potential for bias, or confounding, QEDs are the best and most valid designs available when random assignment is difficult, unethical or impossible. It can be also applied to validate treatment methods or establish new associations for true experimental designs (6). QEDs have higher external validity compared to RCTs and are pragmatic because they evaluate the

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real-world efficacy of an intervention in non-laboratory conditions (3). Another difference between RCTs and QEDs is that in QEDs, true control group is not needed and instead, experiment group can be compared with a group which receives a different experimental treatment (7).

In some clinical research, due to some ethical and practical reasons, the causal effects of an intervention cannot be explored through RCTs. So, in order to answer the research question in such circumstances, investigators should choose the strongest design which is feasible as well. QEDs are suggested to address this shortage.

Author's contribution

R.S and F.M. conceived of the presented idea. R.S. wrote the manuscript with support from F.M., R.S., and F.M. read the manuscript and verified it.

Conflict of interest

The author had no conflict of interest.

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