Simultaneous Descriptors of Research Design

Chittaranjan Andrade

ABSTRACT

Many students are not aware that research design can be simultaneously described in many different ways; for example, a drug trial may be described as being prospective, longitudinal, randomized, double-blind, and placebo-controlled, all at the same time. This article provides examples to explain how studies can be simultaneously prospective and cross-sectional, prospective and longitudinal, retrospective and cross-sectional, and retrospective and longitudinal. The term prospective indicates that the study data are newly collected, whereas the term retrospective indicates that the study data already exist in records and merely need to be extracted for study. The term cross-sectional indicates that the study subjects are studied on a single occasion; that is, at a single point in time. The term longitudinal indicates that the study subjects are followed up and that there is almost always more than one time point at which the subjects are assessed. This article also describes unusual designs, such as cross-sectional randomized controlled trials and retrospective studies with prospective data ascertainment.

Keywords: Research design, cross-sectional study, longitudinal study, prospective study, retrospective study, randomized controlled trial

A n earlier article in this column explained how research design can be simultaneously described in up to a dozen different ways. It is important to understand that these descriptors, or ways of classification, are not necessarily mutually exclusive. For example, studies can be described as prospective or retrospective, as cross-sectional or longitudinal, as randomized or nonrandomized, as open label or blinded, and as uncontrolled or controlled. So, using these five categories, one may describe a drug trial as being prospective, longitudinal, randomized, double-blind, and placebo-controlled, all at the same time. It is not necessary, though, for all the descriptors to be used; if authors state that they conducted a randomized controlled trial (RCT) to evaluate the efficacy of a new drug, it is implicit that their study was also prospective, longitudinal, and (almost always) double-blind. This article explains simultaneous descriptors of research design with special reference to retrospective and prospective cross-sectional and longitudinal studies.

I can randomize volunteers to receive oral diazepam or placebo and, one hour later, under double-blind conditions enquire who feels or does not feel sleepy. This RCT is a prospective study because the study data are newly collected. It is also cross-sectional because the study subjects are assessed on a single occasion (one hour after dosing). If I use a rating scale to assess how sleepy the volunteers are at the time of dosing and readminister the scale one hour later, this study becomes longitudinal because there is a follow-up assessment, even though the follow-up happens just one hour later.

The previous paragraph provides an example, each, for prospective cross-sectional and prospective longitudinal studies. As an additional example, if I assess knowledge about and attitudes towards electroconvulsive therapy (ECT) in a newly recruited batch of postgraduate students, this is a prospective cross-sectional study, and if I show these students an educational video about ECT and then reassess their knowledge and attitudes a month later, it becomes a prospective study.
longitudinal study. The difference between these studies and the studies described in the previous paragraph is that these studies are prospective, single-group (uncontrolled), cross-sectional and longitudinal studies, whereas the studies described in the previous paragraph are prospective, parallel group, cross-sectional, and longitudinal RCTs.

In prospective studies the data are newly collected; in contrast, in retrospective studies the data already exist and are extracted from case records or from healthcare or insurance databases. If I assess sociodemographic and clinical predictors of duration of untreated psychosis (DUP) by extracting data from medical records, this is a retrospective cross-sectional study. It is retrospective because the data already exist in the medical records, and it is cross-sectional because sociodemographic and clinical variables, as well as DUP, were all ascertained and recorded at a single point in time, that is, when the patient entered into treatment. However, if I, instead, examine the medical records to determine whether a longer DUP predicts worse clinical outcomes, this is a retrospective longitudinal study. It is retrospective because already existing data are extracted from records, and it is longitudinal because the patients are followed up, albeit only in the charts, to determine whether they did or did not improve with treatment.

There can be unusual situations. For example, consider a hypothetical cohort that was specifically defined and recruited 10–12 years ago to formally study the course and outcome of schizophrenia. Patients in this cohort were methodically assessed on a large number of variables at baseline and, again, annually thereafter. Thus, the data were newly collected for use in research. If we now extract the already existing data from the study records to compare 5-year relapse rates with different antipsychotic drugs, this would be a retrospective longitudinal study but with prospective data ascertainment. This latter qualifier is important because prospective ascertainment implies that the methods of data ascertainment are likely to be reliable and valid; in contrast, data that are recorded with no a priori intention of being used in research may be inaccurate and unreliable. Authors of such retrospective studies sometimes state that they studied a prospective cohort; this is confusing until one realizes that the word prospective describes the cohort and not the study.

Finally, returning to an earlier example, if I studied predictors of DUP in newly recruited patients, this would be a prospective cross-sectional study; and if I were to follow these patients to determine whether a longer DUP predicts worse outcomes, this would be a prospective longitudinal study.

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ORCID iD
Chittaranjan Andrade https://orcid.org/0000-0003-1526-567X

Reference
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