Comparison of Two Epidemiological Study Designs

Introduction

Epidemiological studies are research conducted on humans to investigate possible causal relationships between an intervention or exposure to a substance and its health-related outcomes. They measure the risk of an adverse health outcome in a population that is exposed to a given variable as compared to a population that isn't exposed to that variable (Zaccai, 2004). This paper aims to discuss two epidemiological study designs – randomized controlled trial and cross-sectional survey analyses – and compare them with respect to the study objectives and methodologies.

Overview of the Two Studies

The first study has been published by Bowen et al. (2014) which uses a randomized, controlled, non-inferiority trial to test the effects of benzathine benzylpenicillin with co-trimoxazole or only co-trimoxazole for the treatment of impetigo in children. The inclusion and exclusion criteria were developed based on the study objectives and stringently followed, and the participants were classified into two categories based on severity of the disease. The participants were randomly assigned to one of two groups, and the total number of sores along with their severity was recorded after 7 days of the treatment.

The second study has been published by Longman and Passey (2013) which analyses a national cross-sectional survey to investigate the relationship between rurality, smoking status in households, and second-hand exposure to smoke in children residing in these households. It is a cross-sectional study which investigates results from different households across Australia. The selection of household data for analysis in this study was randomized based on certain inclusion and exclusion criteria and the prevalence of household smoking in rural and urban communities was investigated. The data from the surveys was quantified using multivariate logistic regression analysis.

Comparison of Study Designs

Both randomized controlled trials as well as cross-sectional survey analyses used respectively in the above two studies are quantitative by nature as they both represent the study outcomes numerically. The point where they differ is the design of the study – Bowen et al. (2014) has used a practical approach whereas Longman and Passey (2013) has used a desk approach for addressing their objectives. The choice of study design majorly depends on the objectives of the study. Randomized controlled trials are used to provide irrefutable evidence for clinical practice (Bhide et al., 2018), whereas cross-sectional survey analyses are used to

determine the frequency of a particular variable in a pre-defined population at a particular point in time (Wang and Cheng, 2020).

Comparison of Data Collection Methods

Survey analyses are observational studies that observe and analyse data that is already available from a population dataset. These are typically performed using questionnaires, face-to-face interviews, and group discussions, and the data is recorded qualitatively. Later, based on the specific objectives of the study, the relevant data is used for quantitative analyses and significant associations between outcomes and exposures are identified (Barriera-Viuret et al., 2006). In contrast, randomized controlled trials are interventional studies where specific pre-defined interventions are administered to patients based on their clinical status and response to the study criteria. In these studies, the outcomes too are predefined and their measurement will depend on the type of outcome that has been chosen for the study; for instance, a laboratory test or a photograph of a wound (Thiese, 2014).

Comparison of Timelines of the Studies

Another difference between these two types of studies is the time horizon in which the studies are conducted. Survey analyses are often cross-sectional, which means that data from a given population is studied at a single point in time, akin to observing a group of people at the same time. These types of studies typically do not involve any follow-up with the participants. On the other hand, randomized controlled trials are mostly longitudinal where an intervention is administered to the participants, and the effects of the intervention are tested and analysed after a specific time period. Therefore, randomized controlled trials follow the same group of participants for one or more rounds of follow-up as opposed to cross-sectional studies (Rindfleisch et al., 2008).

Critical Appraisal of the Two Studies

The critical appraisal checklists formulated by Joanna Briggs Institute (JBI, 2020) were used to perform a comprehensive appraisal of both the studies. In both cases, it was found that the subjects or participants of the study along with their inclusion and exclusion criteria were well-defined. The variables were also well-defined in both cases and the methods used for measurement of these variables were explicitly described. However, the confounding factors were not identified in either of the studies. In both papers, the results presented a comprehensive description of the acquired values thereby justifying the hypotheses of the studies.

Conclusion

In conclusion, two epidemiological study designs – randomized controlled trial and cross-sectional survey analyses – were chosen for comparison in this paper. Randomized controlled trials are generally used to prove (or disprove) the efficacy of a treatment regimen and they are used to inform evidence-based clinical practice. These studies are interventional and longitudinal, wherein the effect of a variable on a given population is studied over a period of time. In contrast, survey analyses are observational and cross-sectional as they analyse a pre-existing dataset of a given population at a single timepoint. These types of studies are preferred when researchers are investigating the relationship between two or more variables and their possible outcomes in a population.

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