Study Designs: Ecologic, Cross-Sectional, Case-Control

LEARNING OBJECTIVES

By the end of this chapter the reader will be able to:

• define the basic differences between observational and experimental epidemiology
• identify an epidemiologic study design by its description
• list the main characteristics, advantages, and disadvantages of ecologic, cross-sectional, and case-control studies
• describe sample designs used in epidemiologic research
• calculate and interpret an odds ratio

Study Questions

Instructions: Fill in the blanks with the terms below. Some of these terms may be used more than once.

2 by 2 analytic studies community interventions medical interventions
case-control ecologic fallacy manipulation
 descriptive studies observational
 case-control studies odds ratio
 clinical trial quasi-experimental
 clinical trial randomization
1. **Controlled** of the study factor means that the exposure of interest is controlled by the investigator, a government agency, or even nature, and not by the study subjects. (p. 281)

2. **Random** of study subjects refers to a process in which chance determines the likelihood of subjects’ assignment to exposure conditions. (p. 281)

3. In comparison with quasi-experimental and observational studies, **quasi-experimental** studies maintain the greatest control over the research setting. (p. 282)

4. From the perspective of epidemiology, one common experimental design is a **randomized**, used primarily in research and teaching hospitals for several purposes. (p. 283)

5. **Cluster** are types of experimental designs that greatly enhance the potential to make a widespread impact on a population’s health. Examples of issues addressed are smoking cessation, control of alcohol use, weight loss, establishment of healthy eating behaviors, and encouragement of increased physical activity. (p. 283)

6. **Non-randomized** studies involve manipulation of the study factor but not randomization of study subjects; thus, in some respects they may be thought of as natural experiments. (p. 283)

7. Much of epidemiologic research is relegated to **observational** studies, which entail neither manipulation of the study factor nor randomization of study subjects. (p. 284)

8. The two main subtypes of observational studies are **case-control** and **cohort**. (p. 284)

9. The **case-control** table is an important tool in evaluating the association between exposure and disease. (p. 285)

10. In **case-control** studies, the unit of analysis is the group. (p. 287)

11. The term **ecological** is defined as “The bias that may occur because an association observed between variables on an aggregate level does not necessarily represent the association that exists at an individual level.” (p. 293)

12. The **case-control** study seeks to identify possible causes of the disease by finding out how the two groups differ with respect to an exposure. (p. 303)
13. The objective of ____________ is to identify differences between groups of cases and controls in frequencies of exposure; these differences might be associated with one group having and the other group not having a disease of interest. (p. 309)

14. The ____________ literally measures the odds of exposure to a given disease. (p. 310)

**Calculation Problems**

15. a. Define and give the formula for an odds ratio (OR).
   b. Calculate the OR for the following 2 by 2 table.
   c. Interpret the results in your own words.

<table>
<thead>
<tr>
<th>Student Manual Table 6–1</th>
<th>Number of Cases in a Case-Control Study</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exposure Status</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Yes</td>
<td>64</td>
</tr>
<tr>
<td>No</td>
<td>27</td>
</tr>
</tbody>
</table>