

Cross-Sectional Prevalence Studies

Zuber D. Mulla

Objectives

- 1. Appreciate that both exposure and outcome status are measured at the same point in time in a cross-sectional study.**
- 2. Calculate and interpret the prevalence ratio and prevalence odds ratio.**
- 3. List the main advantages and disadvantages of a cross-sectional design.**

Branches of Epidemiology

- **Descriptive**
- **Analytic**

Epidemiology in Medicine by Hennekens & Buring, 1987

Descriptive Epidemiology

- **Concerned with distribution of disease**
- **Propose hypotheses**

Analytic Epidemiology

- **Focuses on causes of diseases**
- **Tests hypotheses**

Overview of Study Designs

- **Descriptive**
 - **Individuals (case series)**
 - **Populations (correlational studies)**
- **Analytic**
 - **Observational studies**
 - **Intervention studies**

- **Analytic**
 - **Observational studies**
 - **Case-control**
 - **Retrospective case-control**
 - **Prospective case-control**
 - **Nested case-control**
 - **Density sampling case-control**
 - **Case-cohort**
 - **Cohort (retrospective or prospective)**
 - **Cross-sectional prevalence survey**

Overview of Study Designs

- **Analytic**

- **Intervention studies**

- **Nonrandomized controlled clinical trial**

- **Randomized controlled clinical trial**

Independent Variable

- **X variable**
- **Exposure**
- **Risk factor**
- **Explanatory**
- **Covariate**
- **Predictor**
- **Regressor**

Dependent Variable

- **Y variable**
- **Outcome**
- **Response**
- **Regressand**
- **Endpoint**

Cross-Sectional Studies

- **Exposure (independent variable) and the outcome (dependent variable) assessed at the same point in time**
- **No follow-up of subjects**
- **(Panel study)**

- **Ideal for chronic diseases**
- **A disease of short duration, in general, not suitable for a cross-sectional study because few individuals would have the disease at any one point in time**

Example

- **You identify a random sample of adults using random digit dialing**
- **Exposure: Obesity (BMI \geq 30)**
- **Outcome: Depression**
- **Does prevalence of depression vary by obesity status?**

Calculating a Prevalence Ratio (PR)

	Depressed	Not depressed	
Obese	A	B	A + B
Not obese	C	D	C + D

**PR = Prevalence of Depression in Obese
divided by Prevalence of Depression in
Non-obese**

$$\text{PR} = \frac{\frac{A}{A + B}}{\frac{C}{C + D}}$$

Interpretation

- **PR=1.30**
- **Obese individuals were 30% more likely than non-obese individuals to have depression.**

Advantage

- **No follow-up**
- **May be quicker to conduct**

Disadvantage

- **Time sequence/Temporality (what came first?) may be not intact: did the exposure really precede the outcome?**
- **For exposures that do not change over time such as race or blood type, no problem.**

What came first?

Obese → **Depression**

Depression → **Obese**

PR vs. Prevalence OR

- You can also calculate an odds ratio from a cross-sectional study.
- Same formula as before: AD / BC
- Logistic regression yields ORs.
- Binomial regression will yield RR for a cohort study and PR for a cross-sectional study

NHANES

- **National Health and Nutrition Examination Survey**
- **www.cdc.gov/nhanes**

Cited Reference

Hennekens CH, Buring JE. Epidemiology in medicine. Boston: Little, Brown and Company, 1987.