Content from different reference book suggested by Dr. Anita Morey Mam and mentioned in CDA Syllabus file, Presentations, Notes provided in 2023

NOTES ON BASIS OF CDA PPT OBSERVATIONAL SAMPLING 15 slides

Observational Sampling Design Notes:

1. Observational Studies vs. Experiments:
- Observational studies collect data by monitoring events, while experiments involve researchers assigning variables.
- Causal conclusions from experiments are usually reasonable, but from observational data, they can be treacherous and not recommended.
- Observational studies generally show associations rather than causation.

2. Confounding Variable:
- Confounding variables (lurking variables) are correlated with both explanatory and response variables.
- Making causal conclusions from observational studies requires identifying and accounting for confounding variables.

3. Prospective and Retrospective Studies:
- Prospective studies collect data as events unfold; e.g., Nurses Health Study.
- Retrospective studies collect data after events have occurred, e.g., reviewing medical records.
- Data sets may contain both prospectively and retrospectively collected variables.

4. Implied Randomness and Sampling Techniques:
- Statistical methods rely on implied randomness in observational data.
- Three random sampling techniques: simple random, stratified, and cluster sampling.

5. Simple Random Sampling:
- Each case in the population has an equal chance of being included in the sample.
- Useful for unbiased representation in diverse populations.

6. Stratified Sampling:
- Divides population into groups (strata) with similar cases.
- Simple random sampling is then employed within each stratum.
- Useful when cases within strata are very similar regarding the outcome of interest.

7. Cluster Sampling:
- Population is divided into clusters, and a random sample of clusters is selected.
- Within each selected cluster, a simple random sample is taken.
- Economical when there's case-to-case variability within clusters but clusters are similar.

8. Cluster Sampling Example:

- If neighborhoods represent clusters, this method works best when neighborhoods are diverse but cases within each neighborhood are similar.

9. Choosing a Sampling Method:
- The choice of sampling method depends on the characteristics of the population and the research goals.

10. Example: Estimating Malaria Rate:
- Cluster sampling might be a good choice when there are similar villages and the goal is to test individuals for malaria.

These notes summarize key concepts from the provided text regarding observational sampling design, confounding variables, types of studies, and sampling techniques.
Observational Sampling Design

1. Introduction
- Observational studies collect data by monitoring events or phenomena without intervention.
- Experiments involve researchers assigning explanatory variables to subjects.
- Causal conclusions are often reliable from experiments but can be treacherous from observational studies.

2. Associations vs. Causation
- Observational studies generally show associations, not causation.
- Example: Sunscreen use and skin cancer association doesn't imply causation.

3. Confounding Variables
- Confounding variables are correlated with both explanatory and response variables.
- Sun exposure can confound the sunscreen-skin cancer association.
- It's difficult to account for all confounding variables.

4. Types of Observational Studies
- Prospective studies track individuals and events over time.
- Retrospective studies collect data after events have occurred.
- Example: The Nurses Health Study follows nurses over years to assess behavior's impact on cancer risk.

5. Randomness in Observational Studies
- Statistical methods rely on implied randomness.
- If observational data isn't collected randomly, statistical methods aren't reliable.

6. Random Sampling Techniques
- Simple random sampling: Each case has an equal chance of being included.
- Stratified sampling: Divide population into strata, sample within each stratum.
- Cluster sampling: Divide population into clusters, sample clusters, then within each cluster.
- Cluster sampling can be economical and useful for diverse clusters.

7. Cluster vs. Stratified Sampling

- Cluster sampling samples whole clusters, stratified sampling samples within strata.
- Cluster sampling might be more economical, while stratified sampling provides stable estimates within subpopulations.

8. Example: Choosing a Sampling Method
- Estimating malaria rate in a tropical portion of Indonesia.
- Simple random sampling might be expensive due to diverse villages.
- Stratified sampling could be challenging, so cluster sampling is a good choice.

These notes summarize the content about observational sampling design, explaining concepts like associations, confounding variables, types of observational studies, randomness, and different random sampling techniques. It also provides insights into when to use cluster vs. stratified sampling and illustrates a practical example of choosing a sampling method.