

## Question bank on research methodology and biostatistics

1. Define **hypothesis**. Discuss the **types of hypotheses** and their importance in biomedical research.
2. Describe different **types of study designs in epidemiological research** with suitable examples.
3. Explain randomized controlled trials (RCTs). Discuss their design, advantages, and limitations.
4. Define sampling. Explain the various sampling techniques used in biomedical research.
5. Describe the **process of formulating a research question** using **FINER criteria**.
6. Discuss **ethical principles in biomedical research** and the role of **Institutional Ethics Committee (IEC)**.
7. Explain the **process of writing a scientific research paper** including the **IMRAD format**.
8. What is **evidence-based laboratory medicine (EBM)**? Discuss the **hierarchy of evidence**.
9. Describe **systematic review and meta-analysis** and their importance in medical research.
10. Define probability and explain its applications in biomedical research.
11. Explain **measures of central tendency** (mean, median, mode) with their advantages and limitations.
12. What is sampling error and bias? Discuss the different types of bias in research.
13. Explain Type I and Type II errors with examples.
14. Explain correlation and regression analysis with examples from biomedical research.
15. Write short notes on the **following statistical tests**:
  - a) Student's t-test
  - b) Chi-square test
  - c) ANOVA
16. Write a long note on big data analysis with the help of AI and ML.
17. Statistical software used in biomedical research.