# Validating Biological Research: Role of Statistics

Academic achievements have never been an easy task. The Medical Council of India, the apex body, controlling medical education and research, has laid down specific guidelines for appointments and promotions of faculty in medical institutions of India. Among the criteria used for promotions, the publication of research papers is an essential requirement, along with appropriate experience, for different faculty positions.

Statistics is repeatedly misunderstood in medical science because of paucity of knowledge about statistical methods. Statistics provides an objective basis for making decisions in the presence of uncertainty. In any field of research, the role of a statistician is in the study design, sample size calculation, protocol development, data analysis, interpretation, and reporting.

Nowadays, a massive amount of information is being collected from the field of health science due to the computerization of data collection. We are living in the first quarter of the 21st century, which is touted as the "Era of numeric information" and is energizing to reflect on the role of the statistics in the field of medical research.

There are a plethora of developed theories available in the existing medical literature on how to analyze the data from health science, but many medical professionals and research learners still get puzzled before analyzing the data as to whether the statistical methodology used to analyze the data is appropriate for the type of data and whether the assumptions underlying the methodology hold for the data or not. This is essential for valid inferences drawn from the statistically analyzed data. In the present informative era, without proper understanding of data handling and appropriate data collection plan, one may be misled to the application of an inappropriate statistical method for the analysis of the data.

Conventionally, the scope of statistics could be divided into two broad fields of application: Descriptive Statistics and Inferential Statistics. The rise of statistics in the 19th century was mainly concerned by the need for understanding and describing data numerically or graphically. In descriptive statistics, data are analyzed to trace the pattern for the validity of an investigative method, a treatment, or a diagnosis for a disease.

Before analyzing any type of data first, we should know about the basic nature of the data and, keeping the behavior of the data in the view, organize it accordingly for the application of appropriate statistical methods. In the statistics, data are mainly classified into two streams: Quantitative and Qualitative

Biostatistics is an upcoming field with applications in many areas, such as epidemiology, medical sciences, health sciences, and educational research.

It is a very common practice among research learners to stay away from biostatistical tools, because they just want to reach to a conclusion, even without knowing, that the data which they have obtained and tests applied are appropriate for that study or not. The inappropriate test will lead to invalid conclusions. This article is written with the basic idea to enable medical research learners to have an understanding to critically analyze and interpret their study data and also try to establish a strong relationship between medical research learners and biostatisticians. We conclude with the thought that in any research project , principal investigator and statistician, should understand each other very carefully and cohesively.

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