

Biostatistics: definition and uses

People are not all the same in terms of vulnerability to disease and mortality. Patients have different background characteristics; they might present different signs and symptoms and vary in terms of disease severity and outcome. Variation, therefore, is a rule health and disease. Sources of this variation could be due to biological factors, life conditions, chance and error in measurement. Statistics allows us to make sense of these variations. Statistical methods allow health professionals to understand the nature and source of these variations. This is why basic skills in statistics is essential for health professionals.

What is statistics?

Statistics deals with numbers and data. Oxford Dictionary of Statistics defines statistics as “science of collecting, summarizing, presenting and interpreting data and using these data to test hypothesis.” The main tasks of statistics are therefore collection, analysis, presentation and interpretations of data about a particular subject, issue or problem.

What is biostatistics?

Biostatistics is statistics applied on the living world. When the statistical methods are used to collect, analyze and interpret information about a living organism or some aspect of the living world it is called biostatistics. When we use statistical methods in health sciences we are dealing with biostatistics.

Depending on how and to what purpose we use statistical methods, statistics and biostatistics can be divided to descriptive and inferential statistics.

Descriptive Statistics

Descriptive statistics only describes the data in relation to the sample from which it is derived. We describe and present the data and limit our conclusions and interpretation to the dataset i.e. to the individuals from which it is derived without extending our conclusions to the bigger population. The way in which data is described depends on the data type. Data may be simply summarized, presented in a table or displayed graphically.

Inferential Statistics

When we use statistical methods that allow us to expand our interpretations and conclusion beyond the dataset, this is called inferential statistics. Inferential statistics allows us to make conclusions about the bigger population depending on analysis of a dataset from a sample of the population. Inferential statistics is more powerful and useful in health sciences.

Uses of statistics

A basic understanding of biostatistics and its methods is essential for health professionals. Whether we work in clinical practice, planning, management or public relations in the health sector, biostatistics will be useful to our work.

1. **Organizing information:** Statistics is a way of organizing existing information on health situation of the population and various health-related problems and programmes on a more solid and reliable basis than anecdotes and histories. For example biostatistics allows us to collect and organize the age distribution of the Kurdistan population which can be used later for different purposes.

2. Measurement: Measurement means measuring or calculating different characteristics of the population and different diseases and health-related states. For example we measure the systolic blood pressure of adults in order to estimate the average blood pressure of the adult population. We collect information on all deaths in Kurdistan (measure deaths by death certificates) in order to calculate mortality rate in the Kurdish population.
3. Comparison: one of the main tasks of statistics is to compare different subgroups in the population or different populations in relation to certain characteristics in order to search for causes of this variation. Comparison of population characteristics and health-related states provides better understanding of the health situation and individual diseases. There is a great deal of variation in mortality and morbidity amongst different subgroups of the population. The same disease may present in various ways and different individuals might have different degrees of vulnerability to diseases. Statistics can provide a better understanding and description of these variations.
4. Evidence-based medicine: sound clinical practice nowadays has to be based on evidence gathered from the experience of other professionals. Personal judgment about success of a particular method in clinical practice is not enough. Previous evidence has to be analyzed by statistical methods in order to provide an objective opinion on the advantages of a particular approach in clinical practice. Statistics is essential to find and present this evidence.
5. Advocacy: advocacy is formulating arguments to present to the decision makers in order to make a case about a particular issue such a health problem. When our arguments are supported by statistical figures, they become more convincing to people. Statistics can help draw attention of decision makers to important health problems and in this way encourage them to take action to address the problem. In the same way it can encourage individuals to take actions from their side to protect themselves from the problem.