# Statistics : Descriptive and Inferential

## Meaning

Statistics is a branch of mathematics dealing with the collection, analysis, interpretation, and presentation of masses of numerical data. It is basically a collection of quantitative data. Statistics plays a main role in the field of research. It helps us in the collection, analysis and presentation of data. Statistics can be divided into two parts 'Theoretical' and 'Applied' statistics and descriptive and inferential statistics falls under applied statistics.

In simple terms 'Descriptive statistics' describes data (for example through a chart or graph) and inferential statistics allows us to make predictions or inferences from that data. With inferential statistics, we take data from samples and make generalizations about a population.

For example, one may ask a sample of 100 people if they like shopping at a particular mall (for example Cosmos Shopping Mall). After the sample is collected, we could make a bar chart of yes or no answers (that would be descriptive statistics) or one could use our research (and inferential statistics) to conclude whether majority of the people like shopping at the Cosmos.

## Descriptive Statistics :

Descriptive statistics is a term given to the analysis of data that helps to describe, show and summarize data in a meaningful way. It is a simple way to describe our data. Descriptive statistics is very important to present our raw data ineffective/ meaningful way using numerical calculations or graphs or tables. Without descriptive statistics it would be hard for us to visualize the data, especially in cases which involves a large quantity of data. Descriptive statistics therefore enables us to present the data in a more meaningful way, which allows simpler interpretation of the data. However, it is important to note that this type of statistics is applied on already known data.

Descriptive statistics describes the important characteristics/ properties of the data using the measures the central tendency like mean/ median/mode and the measures of dispersion like range, standard deviation, variance etc. subsequently, data can be summarized and represented in an accurate way using charts, tables and graphs. For example: We have marks of 1000 students and we may be interested in the overall performance of those students and the distribution as well as the spread of marks. Descriptive statistics provides us the tools to define our data in a most understandable and appropriate way.

**Inferential Statistics**

In inferential statistics data is used from the sample and conclusions or inferences are made about the larger population from which the sample is drawn. The goal of the inferential statistics is to draw conclusions from a sample and generalize them to the population. It determines the probability of the characteristics of the sample using probability theory. The most common methodologies used are hypothesis tests, Analysis of variance etc.

 For example: Suppose we are interested in the exam marks of all the students in India. But it is not feasible to measure the exam marks of all the students in India. So now we will measure the marks of a smaller sample of students, for example 1000 students. This sample will now represent the large population of Indian students. We would consider this sample for our statistical study for studying the population from which it's deduced. The process of achieving this is called sampling. However, it is important that the sample collected is representative of the population. In other words, It is, therefore, important that the sample accurately represents the population or else it would lead to sampling error and would subsequently lead to incorrect findings. The methods of inferential statistics are (1) the estimation of parameter(s) and (2) testing of statistical hypotheses.

**Conclusion**

Statistics has a very important role to play in the research field. It helps to collect, analyze, and present the data in a form that is measurable. It is difficult to understand if the research lies in descriptive or inferential statistics. This is because people may not really be aware of these two Statistics branches. Descriptive statistics as the name suggests describes the population. On the contrary inferential Statistics is used in order to make a generalization of the population based on the sample. This shows that there is a lot of difference between descriptive and inferential Statistics which basically lies in what you do with the data.

Descriptive statistics is about how we illustrate the current data set whereas inferential stats focus on making an assumption about the extra population which is more than the state of data that is under study. Descriptive Statistics provides a summary of the data that the researcher has studied. Inferential Statistics, however, makes a generalization which is on the data that you have not studied actually.

**These are the differences between descriptive and inferential statistics.**

**Difference between descriptive and inferential statistics**

The descriptive analysis gives information about the raw data that describes the data in a

• particular manner. The inferential analysis makes the inference about a population which is done using the data that is drawn from a population. Descriptive Statistics helps to organize, analyze, and present the data in a meaningful way.

• Inferential statistics allows comparing data and making predictions and hypotheses with it.  Descriptive Statistics is used in order to describe a situation whereas inferential Statistics is

• used to explain the chances of the occurrence of an event  Descriptive Statistics explains the data that is already known and is limited to a population or

• a sample of a small size. Inferential Statistics tries to reach out to a conclusion about the population.  Descriptive Statistics can be done using graphs, charts, and tables. Inferential Statistics is

• achieved through probability.  Descriptive Statistics has a tabular or diagrammatic representation of the final result whereas

• inferential Statistics represents the result in the probability form.  Descriptive Statistics describes the situation where inferential Statistics explains the

• likelihood if the event will occur.  Descriptive Statistics measures only the group that is assigned for the experiment which

• means that when you do the descriptive analysis you decide to not consider in the variables. In the case of inferential Statistics, you account for the sampling errors which may make you conduct additional tests that need to be on a large population depending on the amount of data that is required. In other words, you are likely to get a definite calculation when you use descriptive statistics.  Since you are testing the variables using inferential Statistics it is easy to arrive at

• conclusions when you use descriptive statistics. Difference between Descriptive and Inferential statistics: . Descriptive Statistics Inferential Statistics 1. It gives information about raw data which describes the data in some manner. It makes inference about population using data drawn from the population. 2. It helps in organizing, analyzing and to present data in a meaningful manner. It allows us to compare data, make hypothesis and predictions. 3. It is used to describe a situation. It is used to explain the chance of occurrence of an event. 4. It explain already known data and limited to a sample or population having small size. It attempts to reach the conclusion about the population. 5. It can be achieved with the help of charts, graphs, tables etc. It can be achieved by probability.