On the Basis of Distribution of Data

Parametric and nonparametric statistics are the two classifications on the basis of distribution of data. Both are also concerned to population or sample. By population we mean the total number of items in a sphere. In general it has infinite number therein but in statistics there is a finite number of a population, like the number of students in a college. According to Kerlinger (1968) "the term population and universe mean all the members of any well-defined class of people, events or objects." In a broad sense, statistical population may have three kinds of properties – (a) containing finite number of items and knowable, (b) having finite number of articles but unknowable, and (c) keeping infinite number of articles.

Sample is known as a part from population which represents that particular population's properties. As much as the sample selection will be unbiased and random, it will be more representing its population. "Sample is a part of a population selected (usually according to some procedure and with some purpose in mind) such that it is considered to be representative of the population as a whole".

Parametric statistics is defined to have an assumption of normal distribution for its population under study. "Parametric statistics refers to those statistical techniques that have been developed on the assumption that the data are of a certain type. In particular the measure should be an interval scale and the scores should be drawn from a normal distribution".

There are certain basic assumptions of parametric statistics. The very first characteristic of parametric statistics is that it moves after confirming its population's property of **normal distribution**. The normal distribution of a population shows its symmetrical spread over the continuum of –3 SD to +3 SD and keeping unimodal shape as its mean, median, and mode coincide. If the samples are from various populations then it is assumed to have same variance ratio among them. The samples are independent in their selection. The chances of occurrence of any event or item out of the total population are equal and any item can be selected in the sample. This reflects the randomized nature of sample which also happens to be a good tool to avoid any experimenter bias.

In view of the above assumptions, parametric statistics seem to be more reliable and authentic as compared to the nonparametric statistics. These statistics are more powerful to establish the statistical significance of effects and differences among variables. It is more appropriate and reliable to use parametric statistics in case of large samples as it consist of more accuracy of results. The data to be analysed under parametric statistics are usually from interval scale.

However, along with many advantages, some disadvantages have also been noted for the parametric statistics. It is bound to follow the rigid assumption of normal distribution and further it narrows the scope of its usage. In case of small sample, normal distribution cannot be attained and thus parametric statistics cannot be used. Further, computation in parametric statistics is lengthy and complex because of large samples and numerical calculations. T-test, F-test, r-test, are some of the major parametric statistics used for data analysis.

Nonparametric statistics are those statistics which are not based on the assumption of normal distribution of population. Therefore, these are also known as distribution free statistics. They are not bound to be used with interval scale data or normally distributed data. The data with non-continuity are to be tackled with these statistics. In the samples where it is difficult to maintain the assumption of normal distribution, nonparametric statistics are used

for analysis. The samples with small number of items are treated with nonparametric statistics because of the absence of normal distribution. It can be used even for nominal data along with the ordinal data. Some of the usual nonparametric statistics include chi- square, Spearman's rank difference method of correlation, Kendall's rank difference method, Mann-Whitney U test, etc.