Descriptive statistics versus inferential statistics

Descriptive statistics involve the analysis of data to describe, summarize and visualize the key characteristics of a dataset. Inferential statistics make conclusions, inferences, predictions and generalizations about a population using a smaller sample from the same population.

Measures of descriptive statistics

- Frequency distributions, which summarize how often different values occur
- Measures of central tendency:
  - Mean
  - Median
  - Mode
  - Percentiles
  - Quantiles
  - Kurtosis and skewness
- Measures of dispersion:
  - Standard deviation
  - Variance
  - Range
  - Interquartile range (IQR)
  - Coefficient of variation

Visualization techniques for descriptive statistics

- Tables in a structured format that summarize data
- Charts:
  - Bar charts
  - Pie charts
- Graphs:
  - Boxplots
  - Scatterplots
  - Histograms

Descriptive statistics provide an overview of the data.

Inferential statistics

Include and involve:

- Hypothesis testing, for example
  - *t*-test
  - Analysis of variance (ANOVA)
  - Chi-square test
- Correlation analysis
  - Pearson correlation (*r*)
  - Spearman rank correlation (rho)
- Regression analysis (used for predictions)
  - Linear regression
  - Logistic regression
  - Poisson regression
- Confidence intervals, which provide an estimation range for population parameters.

Inferential statistics make conclusions using a sample of data taken from the same population.

Further information

Statistics How To https://www.statisticshowto.com/

***BMJ*. Statistics notes** https://www.bmj.com/specialties/statistics-notes