

SUMMER TRAINING REPORTS

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PART-1 WORK FROM HOME

(Assigned by Faculty)

**TOPIC- BURDEN AND RISK FACTORS OF NON COMMUNICABLE
DISEASE(NCDs) IN KERALA- A SYSTEMATIC REVIEW**

INTRODUCTION



Cardiovascular
Diseases



Chronic Respiratory
Diseases



Diabetes



Cancer

- WHO defined “Noncommunicable diseases (NCDs), also known as chronic diseases, are the result of a combination of genetic, physiological, environmental and behaviour risk factors and tend to be of long duration.”
- NCDs contributed 56.9 million global deaths in 2016 and almost 31.5 million deaths occurred in low- and middle-income countries in 2016.
- The major behavioral risk factors are tobacco and alcohol use, physical inactivity, increased fat and sodium intake, low fruit and vegetable consumption, the biological risk factors are overweight and obesity, high blood pressure (BP), higher blood glucose and cholesterol.
- NCDs contribute to around 5.87(60%) million deaths in the year 2016 in India.
- The four major NCDs are Cardiovascular diseases(CVD), Chronic Respiratory Diseases, Diabetes and Cancer.

- Kerala has achieved good health indicators such as lowest infant mortality rates, maternal mortality rates, fertility rates and highest life expectancy rates. But the state is facing higher prevalence of the 4 main NCDs. Kerala has advanced epidemiological transition where the NCDs are more than communicable, maternal, neonatal and nutritional diseases(CMNND).
- The sustainable development goals(SDG) includes one target to reduce the premature morbidity by 2025 and premature deaths due to NCDs by 2030.

OBJECTIVES

- General- To find and compare the major risk factors and the burden of NCDs, in Kerala with the national value.
- Specific- 1. The four major non communicable diseases were Diabetes, Cardiovascular diseases, Cancer and Chronic Respiratory diseases, 2.To identify the major causes of death in Kerala,3. To identify the sex group which is affected more with the NCD burden.



METHODS

- PubMed, Google scholar were used to access previous studies for the systemic review.
- 22 published papers were assessed for eligibility.
- Data from World Health Organization's (WHO) website and relevant central and state government department websites, national and state level surveys (such as NFHS-4 2015-16, Census 2011, NSSO) and programs were used to retrieve relevant policy and program documents.
- Keywords- NCDs burden in Kerala, Risk factors,
Non communicable diseases Kerala, NCDs Kerala



FINDINGS

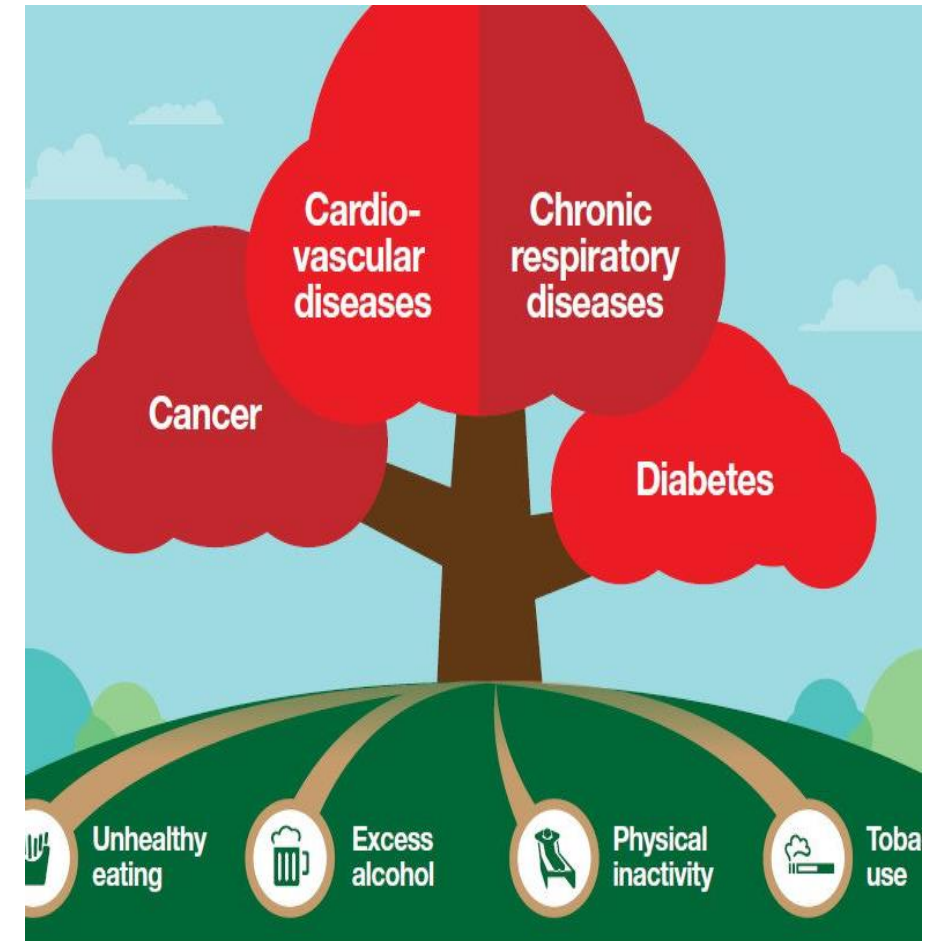
- Chronic Respiratory Diseases - COPD ,Asthma, Bronchitis and other lung diseases. COPD and Asthma are the common respiratory diseases in India.
- Kerala has the highest prevalence of Asthma. In Kerala the asthma patients are more among women and is more than the national level

- Diabetes- Kerala has the highest diabetic prevalence in both sexes in India and is called as the diabetic capital of India.
- Cancer- The major cancers were stomach cancer, breast cancer, lung cancer, lip cancer, oral cavity cancer, pharynx cancer, colon and rectum cancer, leukemia, cervical cancer, esophageal cancer and brain cancer.
- The crude DALY rates for breast cancer & lung cancer incidence and the crude incidence rate for prostate and ovarian cancer were highest in Kerala in 2016. The crude DALY rates for colon and rectum cancer in males were second highest in Kerala in 2016.
- The crude incidence rate for larynx cancer and liver cancer in males and the crude incidence rate of thyroid cancer were highest in females in Kerala in 2016. The delayed childbearing and lower parity were very high in Kerala as it can be considered as the risk factors of breast cancers among females in Kerala.
- The percentage of cancer disease among both sexes in Kerala is same as that of the national level while in Kerala women have more cancer diseases than men.

➤ Cardiovascular diseases- The major CVDs are Ischemic heart disease and stroke. The prevalence of CVDs such as stroke and ischemic heart diseases were highest in Kerala in 2016.

Risk Factors

- Tobacco use- Tobacco products are of smoking and non-smoking. Men uses more Tobacco products than women in age 15-49 in Kerala.
- The prevalence of tobacco use is comparatively lower in Kerala than national value.
- Alcohol use- Men consume more alcohol than women, and the Kerala state level percentage of alcohol consumption is higher in both sexes. Men consumes more alcohol daily in Kerala.



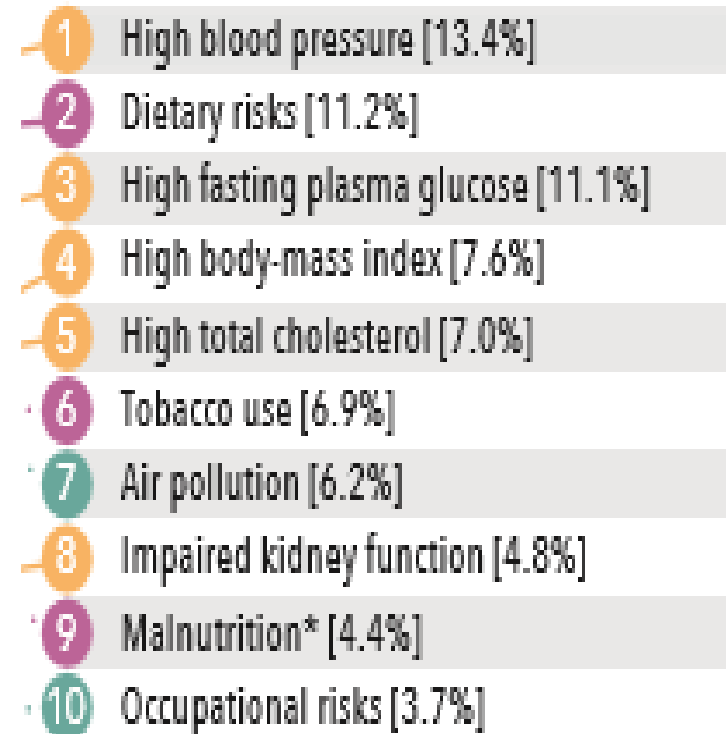
➤ Dietary intake- The Kerala women and men consume fish or chicken or meat daily and that's almost ten times more than the national level . Kerala men and women age 15-49, consume more fried foods daily than nationally .

■ Kerala men and women consume less dark green, leafy vegetables daily than the nationally. The salt intake in Kerala was found to be 6.75 gm/day . All this shows an unhealthy lifestyles.

➤ Blood Pressure-The Kerala state level high B.P level is lesser than the national level.

➤ Random blood glucose level- The high (141-160 mg/dl) and very high (>160 mg/dl) random blood glucose value of box sexes in Kerala are more than the national value.

Risk factors 2016



India State level disease burden
initiative- ICMR, PHFI, IHME

➤ Body Mass Index- Kerala men and women are more obese, as the rate is higher than the national value . The age group 40-49 has highest percentage of body mass index (BMI) ≥ 25 (overweight or obese) in both sexes in Kerala.

- Kerala experience demographic burden, as the state has more percentage of elderly people (60 years and above) than the national level.
- In Kerala, private institutions remained the main provider of inpatient healthcare in both rural and urban areas.
- The 4 main NCDs are the major causes of deaths and disabilities in the State. The prevalence of diabetes in both sexes is the highest in India among all other states.
- The risk factors such as dietary intake, high body-mass index is more associated with women in Kerala. NCDs caused the most death and disability among most of the age groups except under 5.

RECOMENDATIONS

**Act now to reduce deaths from NCDs
by 25% by 2025**



- The NCDs and its prevalence must be controlled in Kerala through government interventional programs. Government should implement programs based on proper nutritional diet, more on sports education, hike taxes on food items which contains trans-fat and limit the availability of alcohol and cigarettes to the population.
- Proper knowledge and awareness must be imparted to the population of the state about the required healthy dietary intake and identifying the risk factors. Each and every person in the state must be aware about the prevailing NCDs and its major risk factors they are following or exposing. This awareness can help people to adopt a healthier life style.

CONCLUSION



- The findings provide support for more studies into the interventions for controlling NCDs in Kerala. The prevalence of NCDs in Kerala is high when compared to the National figures. Timely diagnosis and Management are the most possible way to control NCDs. Even though the Kerala has the highest life expectancy but the state has one of the highest morbidity rates in India and this leads to a paradox.
- The literacy level of the state is high but a large population is unaware about their medical conditions and the changing life patterns. Kerala people are spending more on healthcare treatments in private hospitals which leads to out of pocket expenditure. All these issues lead to severe health and economic burden in Kerala, which in future can also occur in other developing states in India. A comprehensive and collaborative intervention for early detection, screening and treatment must be implemented in order to prevent and reduce the NCDs and its risk factor for attaining SGD goals and to decrease the morbidity due to NCDs .

PART-2- ONLINE COURSE

TOPIC- DATA ANALYTICS FOR LEAN SIX SIGMA



OBJECTIVE

- To learn data analytics and its techniques used within Lean Six Sigma improvement projects.
- To learn how to play with data and operate the software Minitab to find the relationship between variables.

COURSE DESCRIPTION

- Data analytics technique that are typically useful within Lean Six Sigma projects for the belt.
- To analyze and interpret data gathered within such a project.
- Use of statistics for data analysis.
- Learnt to use data analytics tools and interpretation of the outcome to find the relationship between different variables.
- Training on Statistical power tool software Minitab.

LEARNING METHODOLOGY

Video Lectures, Cases, Assignments, Quizzes and Reading Materials

KEY LEARNINGS

- Statistics
- Lean Six Sigma method
- Data Analysis
- Minitab Software
- Hypothesis Testing

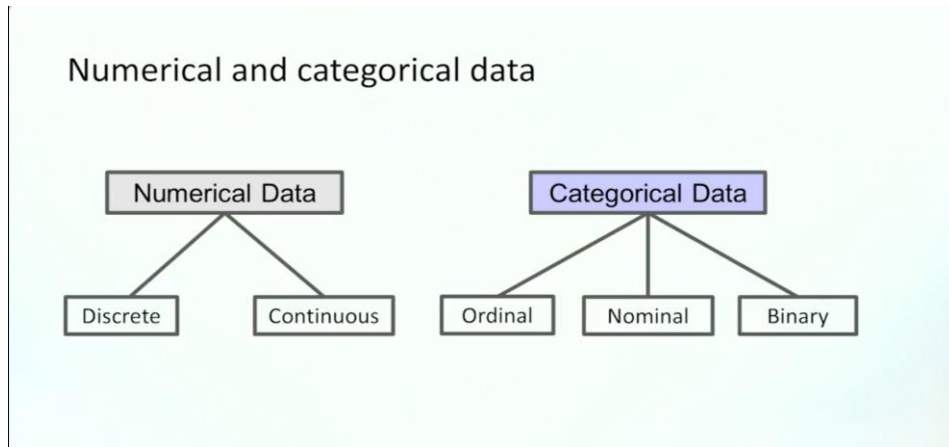
WEEK- 1(9 videos, 1 Practice quiz, 1 Graded Quiz)

- Data and Lean Six Sigma- Introduction about Lean Six Sigma and the software Minitab which is used for data analytics.
- Lean Six Sigma is a methodology for process improvement, and it makes use of data and data analytics. Lean Six Sigma is a data-driven approach to process improvement.
- DMAIC- The acronym stands for 1. Define, 2. Measure, 3. Analyze, 4. Improve, 5. Control. It is a step wise procedure in Lean Six Sigma for process improvement. Someone leading the Lean Six Sigma project is called a Belt.
- Selecting Critical to Quality Test (CTQ)- In Lean Six Sigma, the CTQ is the metric which is used to change. It is often called Y-variable or dependent variable or outcome variable.
- Units and Measurement definition- Units are things which we collect data on. Example - Objects, People. Units are always stored in the rows of the data set.
- Sampling- Collecting a representative sampling and Minitab is used to make a random sample population.
- Organizing data- Data can be organized in a structured way using units and variables. Variables are properties we measure and It is always stored on the column.

WEEK-2 (8 Videos, 1 Practice Quiz, 1 Graded Quiz)

- Understanding and visualizing data – Differentiating numerical and categorical variables. Visualizing data of both single variables and two variables using appropriate graphs.

➤ Numerical & Categorical data-

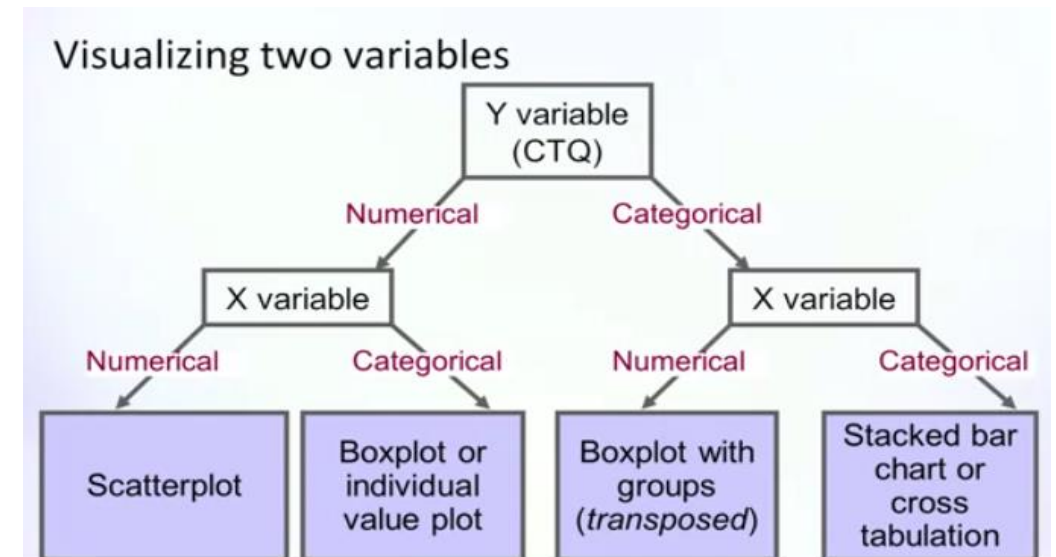


- Descriptive analysis- Descriptive statistics are only available for numerical data. It summarizes features from a collection of information such as mean, median, Range, Standard deviation, Variance, Interquartile range etc.
- Visualizing numerical data- The histogram and boxplot are the graphs for the numerical data.

➤ Visualizing categorical data- Pie chart, Bar chart and Tally table are used for visualizing categorical data.

➤ Pareto Analysis- It is a chart in which Pareto principle can be seen and it counts how often each cause on the x-axis occurs.

➤ Visualizing two variables- The graph to visualize two variables depends on the type of data .

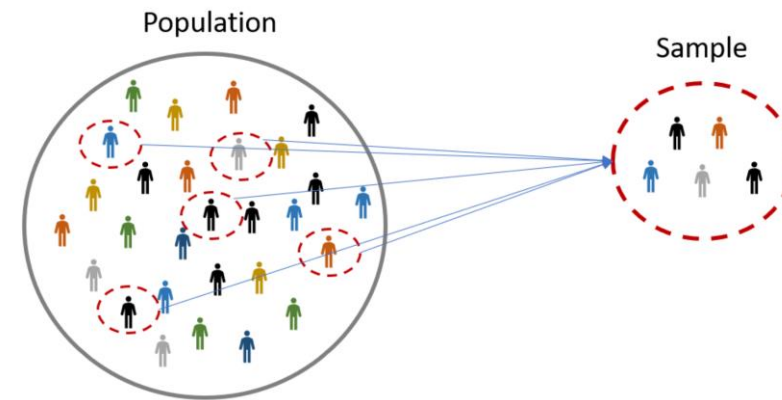


WEEK-3(7 Videos, 1 Explanation Quiz, 1 Practice Quiz, 1Graded Quiz)

- Using Probability Distributions- Usage of probability distributions and Quantifying uncertainty.

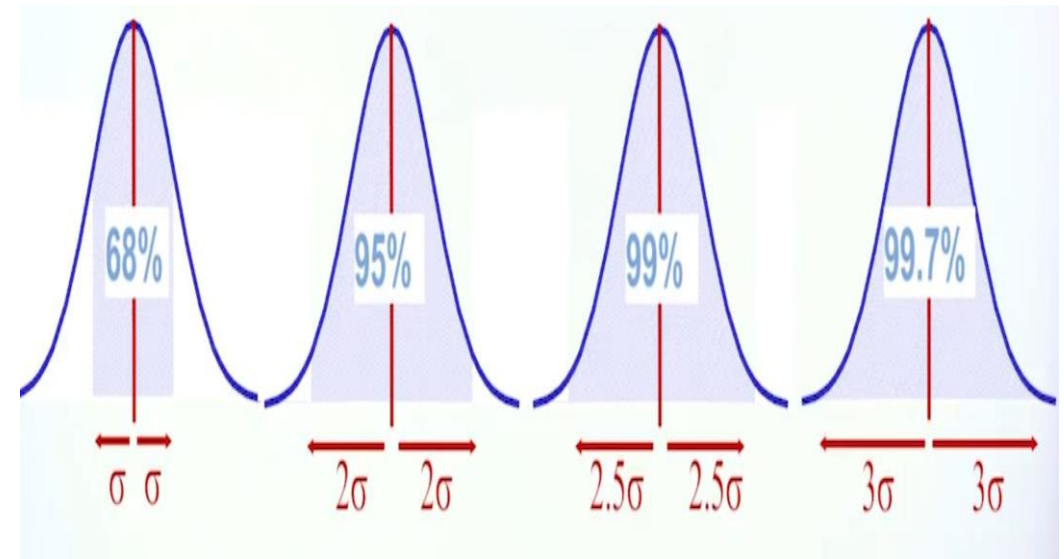
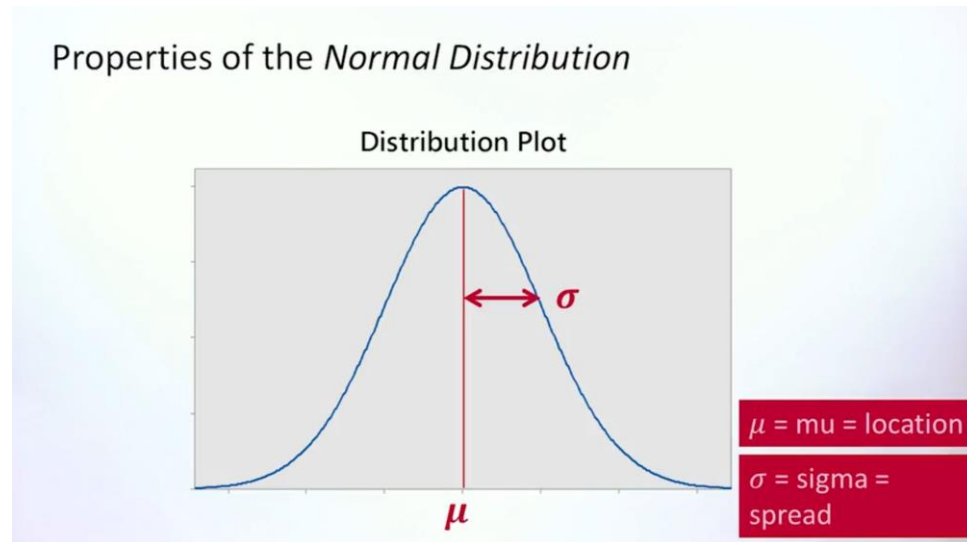
➤ Population versus Sampling-

The population is a collection of all units of interest. The sample is a subset of the population.



- Estimation and Confidence Interval- Estimates the unknown population parameters and uses confidence interval to quantify the uncertainty.

- Probability distribution- The normal distribution is the most often seen probability distribution while in Lean Six Sigma projects, both Weibull distribution and Lognormal distribution are also relevant.
- Probability Plot- It is a tool used to determine which distribution to be used for modelling the population. It can be used to spot data anomalies.
- Empirical CDF- It is used in the analyze phase of the project and it is used to calculate percentages.
- Properties of Normal distribution- It is symmetrical looks like a bell shaped. It is even called Gauss curve.

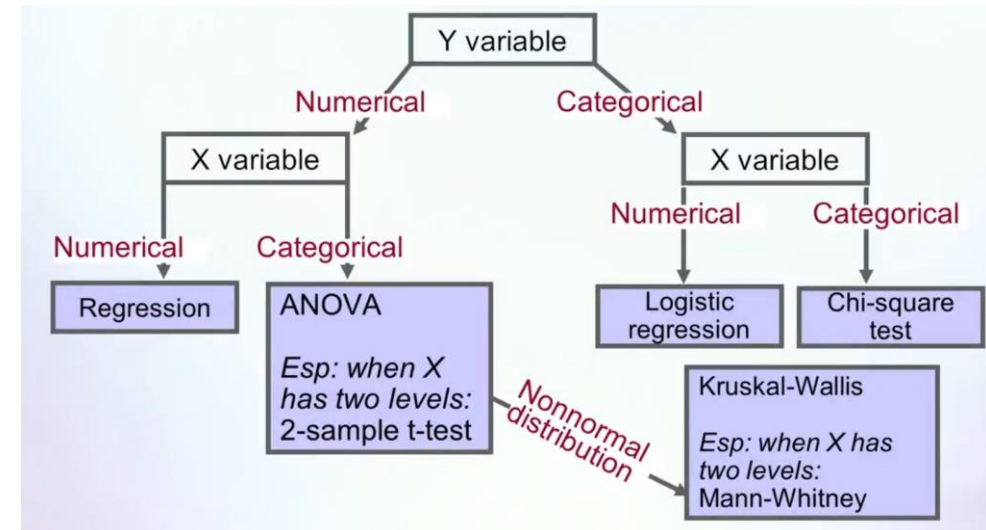


WEEK- 4(9 Videos, 2 Explanation Quiz, 2 Practice Quiz, 1 Graded Quiz)

- [Introduction to Testing](#) -Modeling CTQ and influence factors and selecting appropriate tool for data-based testing of the models.

➤ [Introduction to data analysis](#) –

In the Lean Six Sigma project, the main intension is to know whether CTQ is related to the influence factor or not. The suitable method depends on the type of data that is the CTQ and the influence factor is categorical or numerical variable.

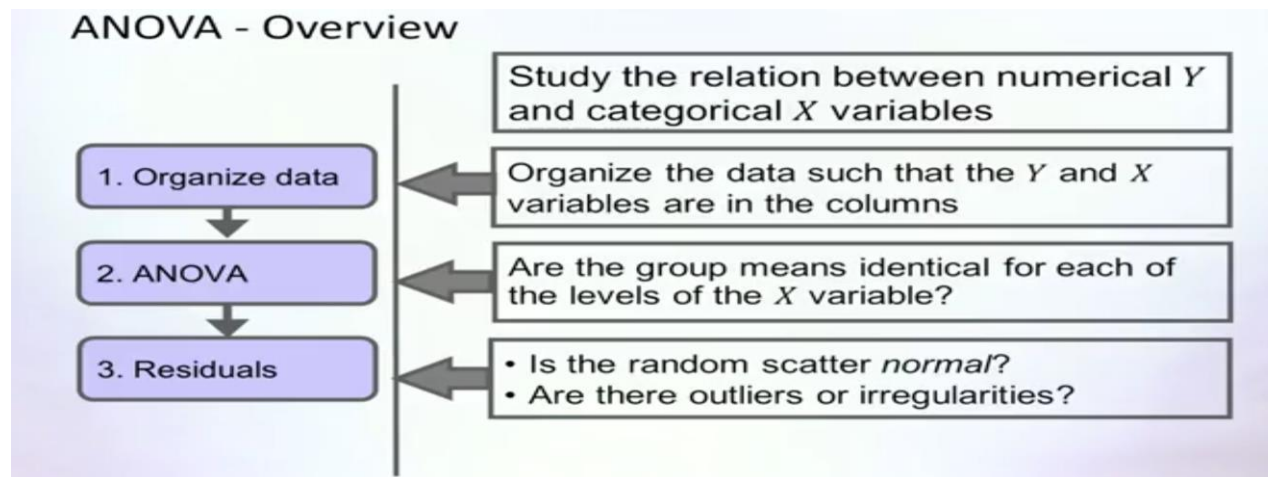


- [Hypothesis Testing](#) – This is done to find the effect between the variables. The null hypothesis and alternate hypothesis stated have to be checked in accordance with the P-value. If the P- value is smaller than 0.05, reject null hypothesis. If P-value is larger than 0.05, do not reject null- hypothesis.

➤ Causality- It is about the cause & effect of relationships, example if x variable changes y variable also changes.

Testing numerical Y and categorical X- Establishing relationship between numerical Y variable (CTQ) and categorical influence factors (X variables).

➤ Introduction to ANOVA- It stands for analysis of variance.



➤ Two sample t-test – This is used to analyze the difference between the means of two groups. The P-value obtained can be used to calculate whether the mean difference is coincidental or truly significant.

- Test for equality of variances- This is used to test the variability across groups as variation shows the consistency of the variables. The hypothesis test shows the consistency of the variance.

WEEK-5(8Videos, 3 Explanation Quiz, 2 Practice Quiz, 1 Graded Quiz)

- Testing: numerical Y and numerical X- Statistical tests to relate a numerical Y variable (CTQ) and numerical X variable (influence factor).
- Correlation- It shows the strength of relationship between two numerical variables. It is always between the value -1 and +1. A negative correlation shows that the variables are correlated in the opposite direction. Correlation of 0 means there is no relation between the variables.
- Regression- This is a statistical method to test whether two numerical variables are related or not by calculating the best fitting line. Regression analysis is about finding the values of a and b from the formula $y = a + bX$. Regression analysis consists of 4 steps which are, 1. Make a fitted line plot to visualize the data, 2. Perform main Regression analysis, 3. Perform residual analysis, 4. Calculating the prediction interval.

- Quadratic Equation- This is used when the linear regression analysis is not meeting the assumption. A curved line fits to the data instead of a straight line.

- Testing categorical Y- Testing relationship between a Y and a X variable, when Y variable (CTQ) is categorical.

- Chi- Square analysis- It is used to find the relation between a categorical Y and categorical X variables. This has two steps, 1. Cross tabulation of data, 2. Chi-square analysis and p-value. The p-value shows the significance of relationship between the variables.

- Logistic Regression- It is used to find the relation between a categorical Y and numerical X variables. This consists of 3 steps, 1. Enter data in event/trial format, 2. Make fitted line plot, 3. P-value. The p-value shows the significance of relationship between the variables.

THANK YOU