

SUMMER TRAINING REPORT

PART A

Under The Guidance Of

Dr Arindam Das

Associate Professor

Institute Of Health Management Research,
Jaipur

Report By

Preetha P

Roll No – 0959

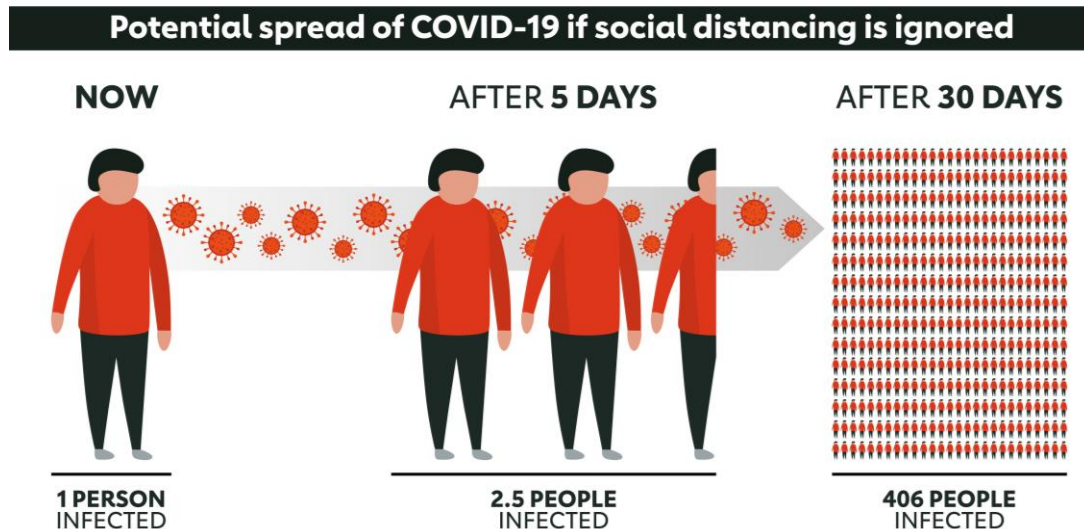
MBA Hospital And Health Management

2019-2021



IMPACT OF COVID 19 LOCKDOWN ON HEALTH RISK BEHAVIOUR OF INDIVIDUALS

INTRODUCTION



Source – World Health Organisation

- Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus.¹
- The COVID-19 viruses spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes.¹
- Viruses have varying abilities to infect people.¹
- For COVID-19, each person with the virus can go on to infect around 2.5 people. If each of those people go about their day as normal, and infect another 2.5 people, within a month, 406 people would be infected just from that first infection.¹
- This is one of the reasons why countries have imposed on **lockdown** emphasizing on quarantining at home.¹
- The rationale is to ensure people have minimal contact with each other



Ban on Cigarette and liquor deal

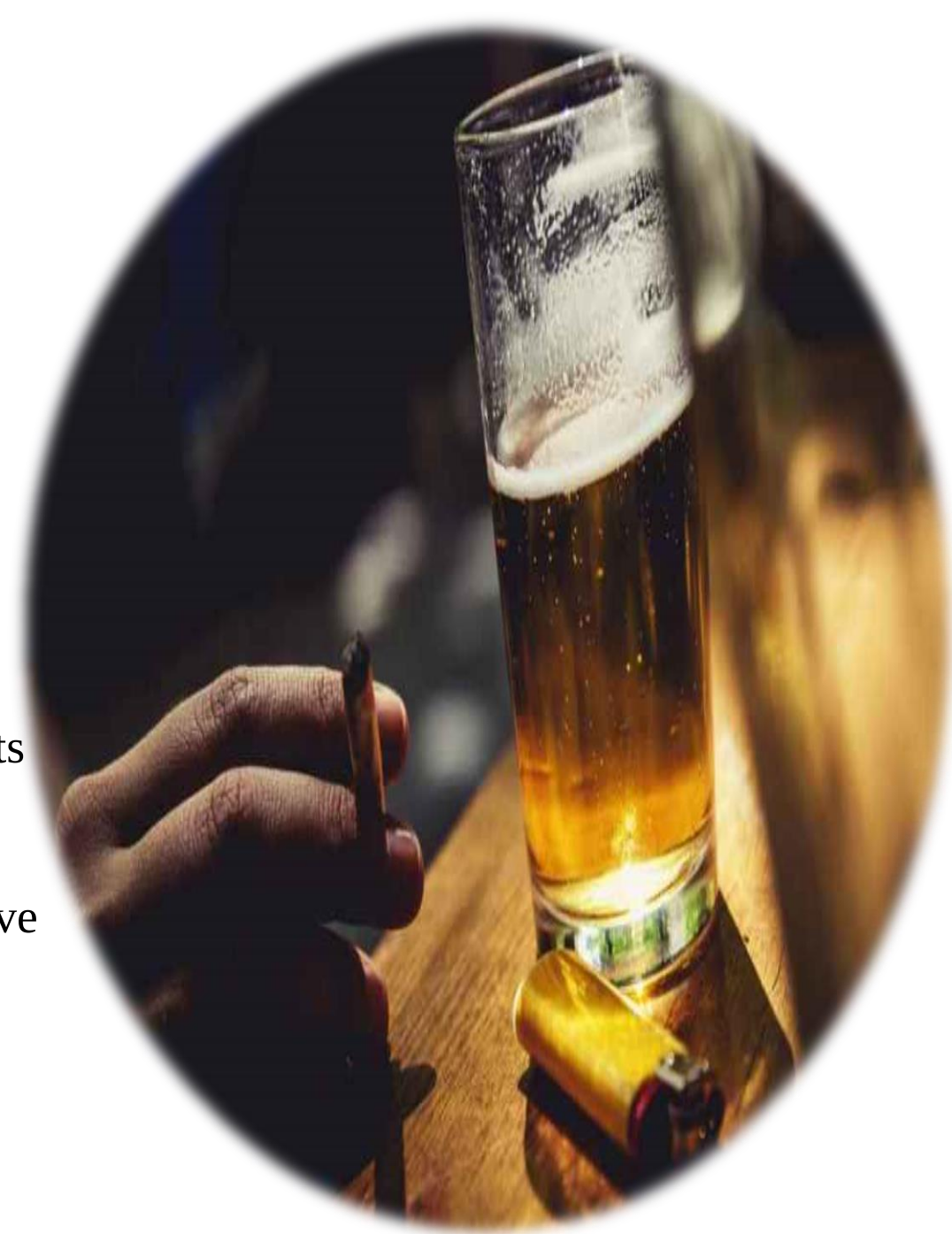


Lockdown claimed substantial cost of the economy

- ❑ Difficult to take their daily portion of nicotine
- ❑ Some are wrestling with withdrawals
- ❑ Others despite everything are utilising the opportunity to kick the butt.

Why this study ?

Knowing the patterns of consumption design amidst lock down gets enthusiasm for tossing experiences in regards to the psychological conduct and approach of people towards such health risk hazard practices and if a pandemic with lock-down can acquire constructive or destructive results in people .



RESEARCH QUESTION

What is the impact of COVID-19 lockdown on alcohol consumption and smoking of individuals?

BROAD OBJECTIVE

To study impact of COVID -19 lockdown on health risk behaviours (alcohol consumption and smoking) on individuals.

SPECIFIC OBJECTIVE

- To study if alcohol consumption and smoking has been more than usual, same as usual or less than usual since the lockdown and analyse the trend based on gender, age group, place of residence, work and household.
- To study the reasons behind change in trends of drinking alcohol and smoking since the lockdown and analysis based on gender, age group, place of residence, work and household
- To know if the individuals are expected to have a change in their consumption habits post lockdown and analyse the trend based on gender, age group and place of residence, work and household

METHODOLOGY

STUDY DESIGN : Cross Sectional Analytical Study

METHOD OF SAMPLING: Purposive sampling

SAMPLE SIZE ESTIMATION

- ◆ $Z = 1.96$
- ◆ $d = 0.05$
- ◆ $p = 0.14$ (14 of every 100 persons are estimated to have health risk behaviour)
- ◆ $q = 0.86$
- ◆ Sample size = $(Z^2 * pq) / d^2 = 185$

The mode of data collection was through the link :

<https://docs.google.com/forms/d/16L28P71gcoOilTJW3jPUprmFzJpWaysWVRRqYb6tI/edit>

INCLUSION CRITERIA

- Participants should have access to internet connection to obtain the questionnaire.
- Participants should practice at least one of the Health risk behaviours.
- Participants should be between the age group of 18 years - 67 years

EXCLUSION CRITERIA

Participants who did not give complete responses to the parts of questionnaire.

The duration of the study was from 13th May - 13th June.

DATA COLLECTION :

- The questionnaire was purposefully forwarded to individuals who practiced any one of the Health risk behaviours.
- The questionnaire was also broadcasted to friends and relatives staying in India and Abroad who were known to smoke and consume alcohol.
- It was also shared on social media platforms like LinkedIn and Facebook.
- To meet the required sample size and for maximum participation, one of the owners of a Resto bar was requested to provide with mail IDs of customers who visited the bar in the month of February and the link for the questionnaire was forwarded to them.



QUESTIONNAIRE FORM

- Upon clicking the form, the first page described the objective of the research
- The consent page of the questionnaire promised on keeping the confidentiality of the participants and that their participation in the study was voluntary.

IMPACT OF COVID-19 LOCK DOWN ON HEALTH RISK BEHAVIOUR OF INDIVIDUALS

The purpose of this research is to study if health risk behaviours like alcohol consumption and smoking have been more than usual, same as usual or less than usual since the lock down and the reasons behind change in trends with an analysis based on gender, age group, place of residence, work and household. As an individual who has at least one of the health risk behaviour, you are invited to participate in the study. This is a research study being conducted by student of IIHMR Jaipur as a part of curriculum. Your participation in this research study is voluntary. You may choose not to participate. If you decide to participate in this research survey, you may withdraw at any time. If you decide not to participate in this study or if you withdraw from participating at any time, you will not be penalized. The procedure involves filling an online survey that will take approximately 4-5 minutes. Your responses will be confidential and we do not collect identifying information such as your contact number. To help protect your confidentiality, the survey will not contain information that will personally identify you. The results of this study will be used for scholarly purposes only. The results of the study will be shared with you. Clicking on the "agree" button below indicates that:

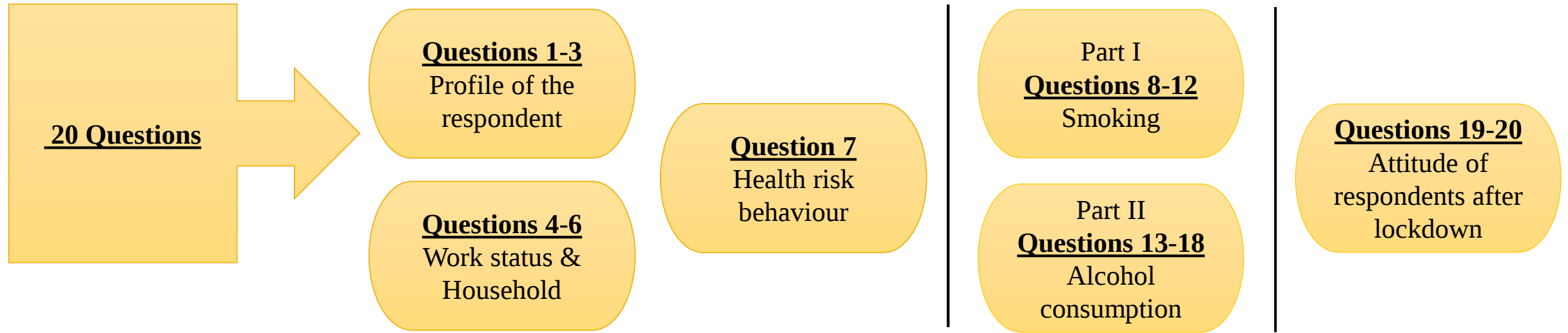
- you have read the above information
- you voluntarily agree to participate
- you have at least one of the health risk behaviour (smoking/ alcohol consumption)
- you are at least 18 years of age

*Required

If you do not wish to participate in the research study, please decline participation by clicking on the "disagree button" *

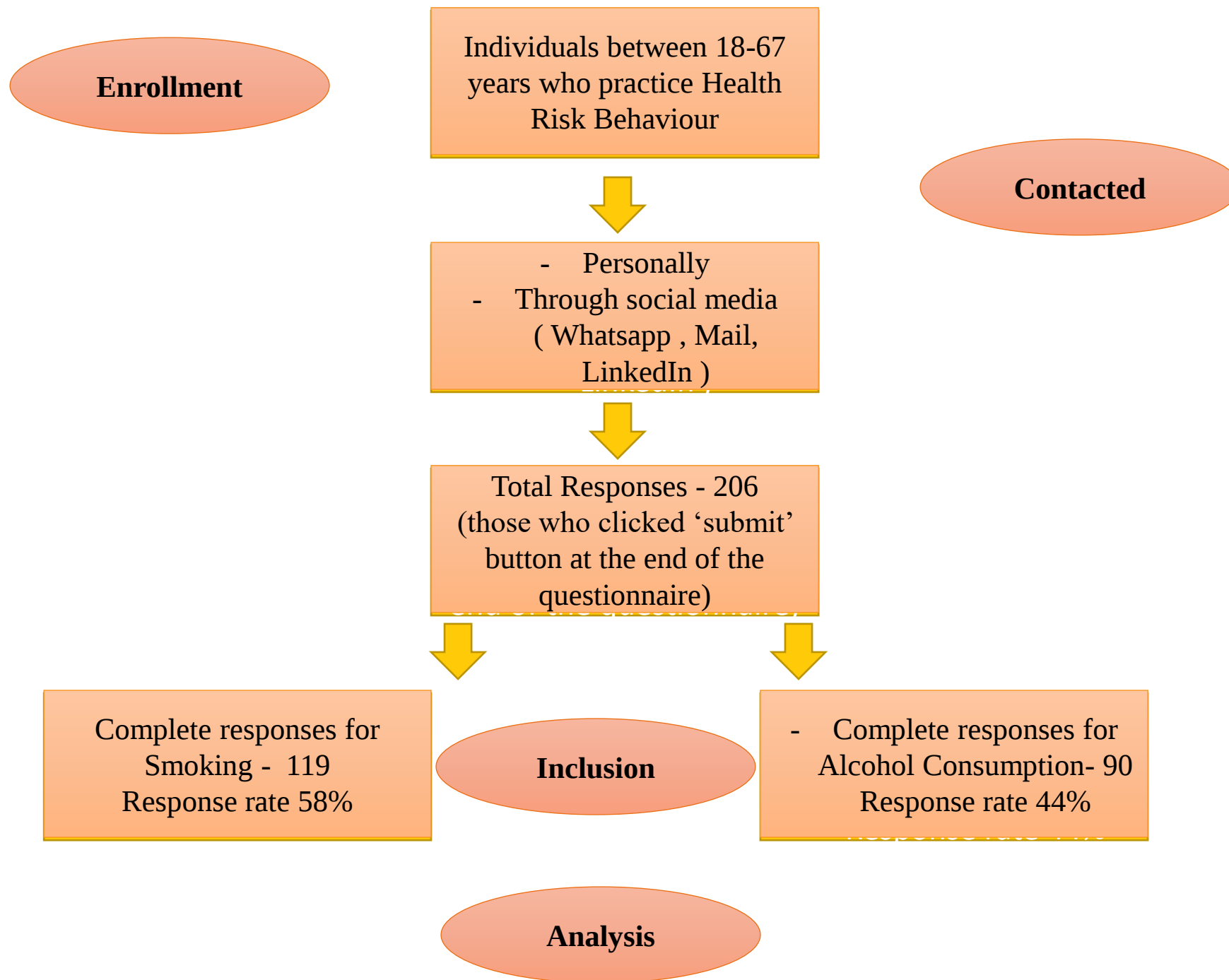
- ☐ Agree
- ☐ Disagree

Next



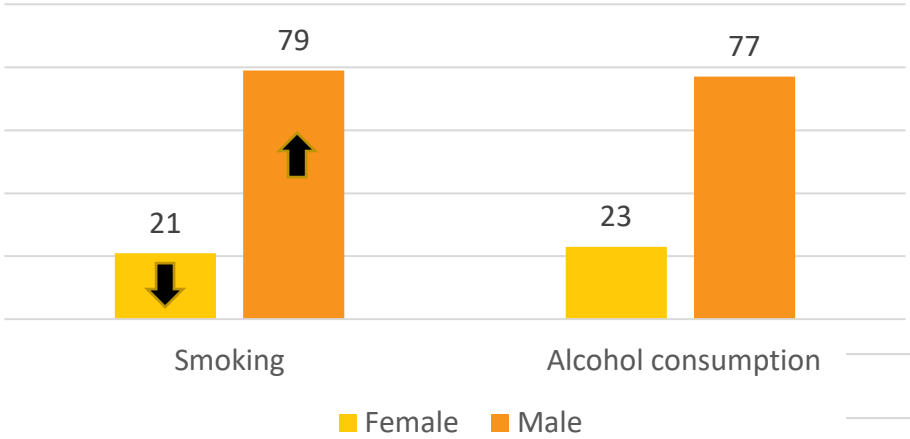
DATA ANALYSIS :

- The data analysis included descriptive statistics of the percentages of individuals under each variable
- Association of consumption pattern of smoking and alcohol with respondent's characteristics
- Analysis on the reasons perceived by respondents for a change in consumption pattern (less than usual or more than usual) in lockdown
- The attitude of respondents towards Health risk behavior post lock down
- The analysis was done using **Ms -Excel, R and Minitab Statistical Software.**

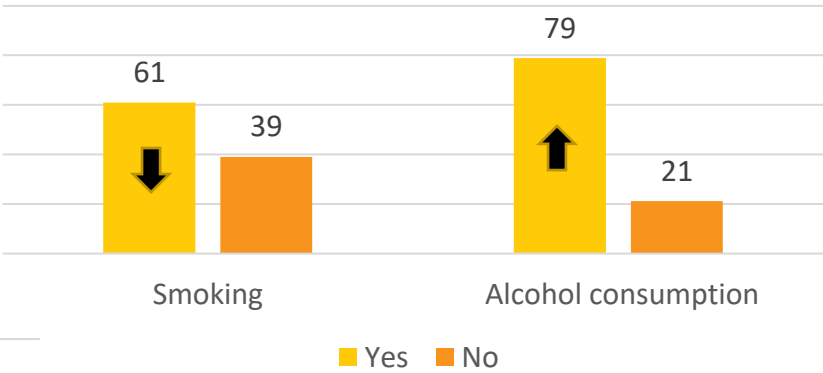


CHARACTERISTICS OF RESPONDENTS

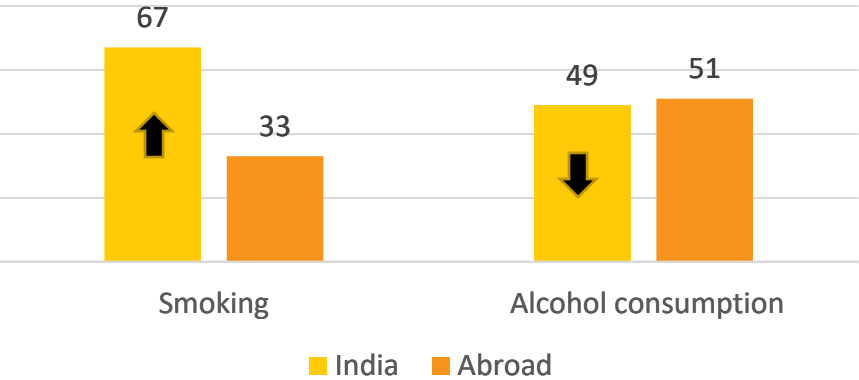
GENDER (%)



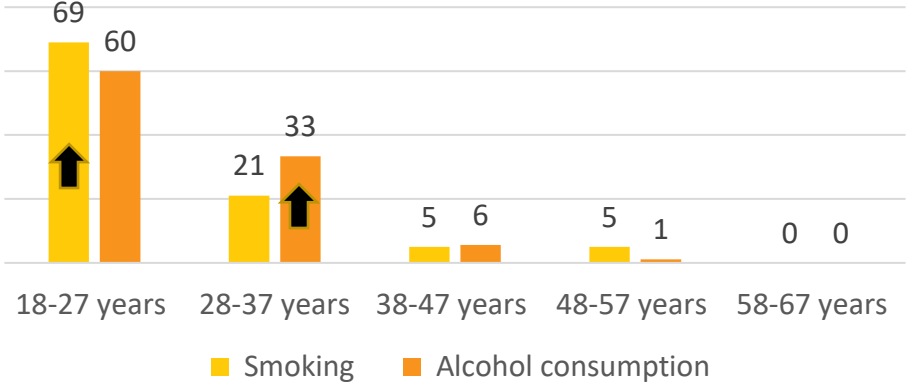
WORK STATUS (%)



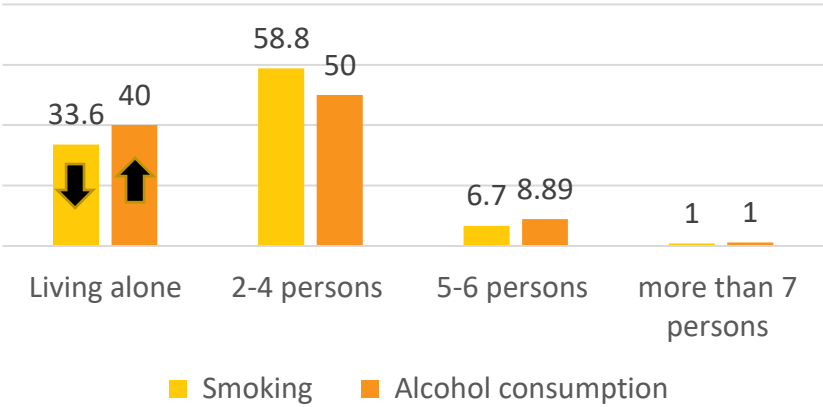
RESIDENCE (%)



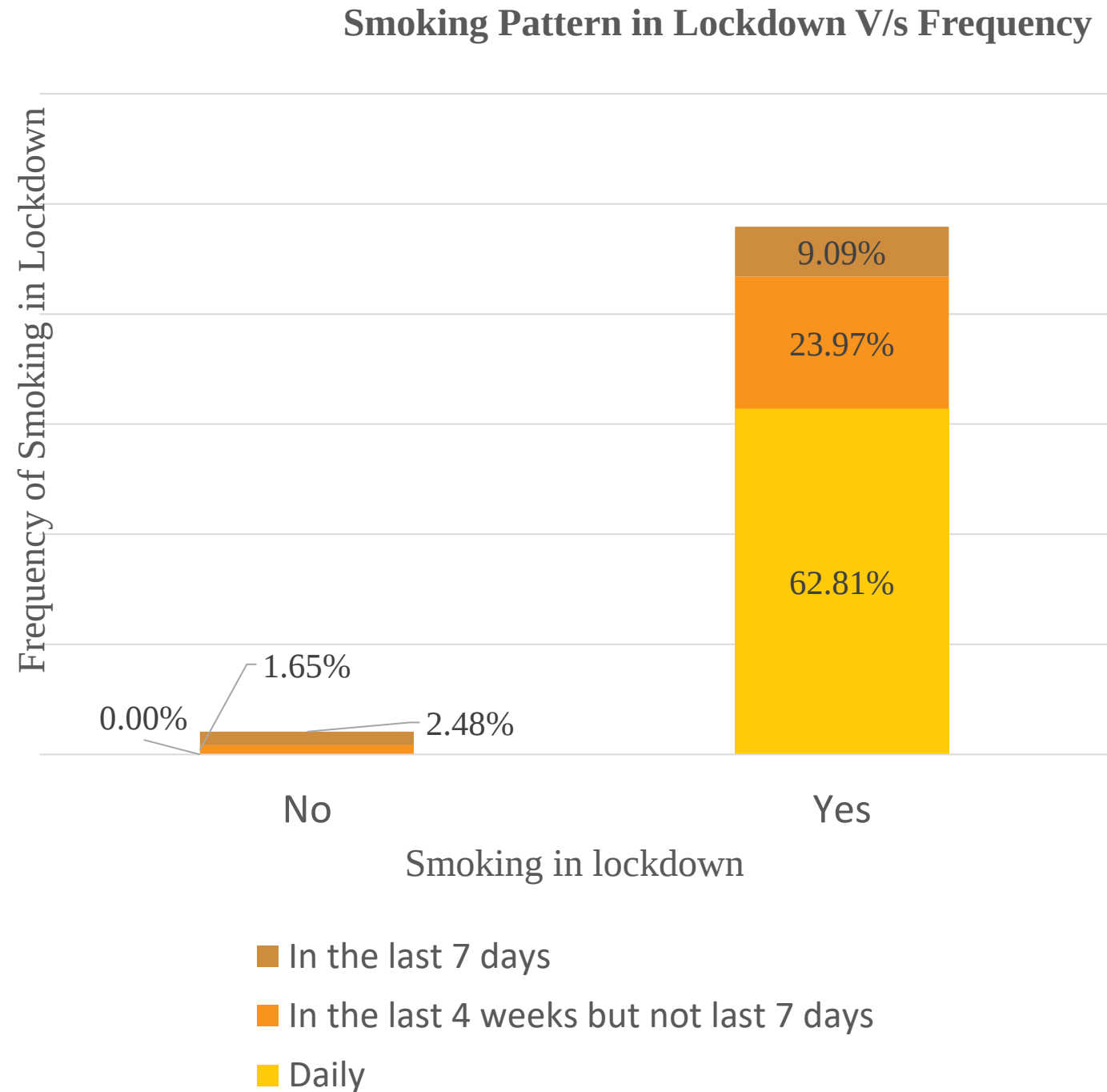
AGE GROUP (%)



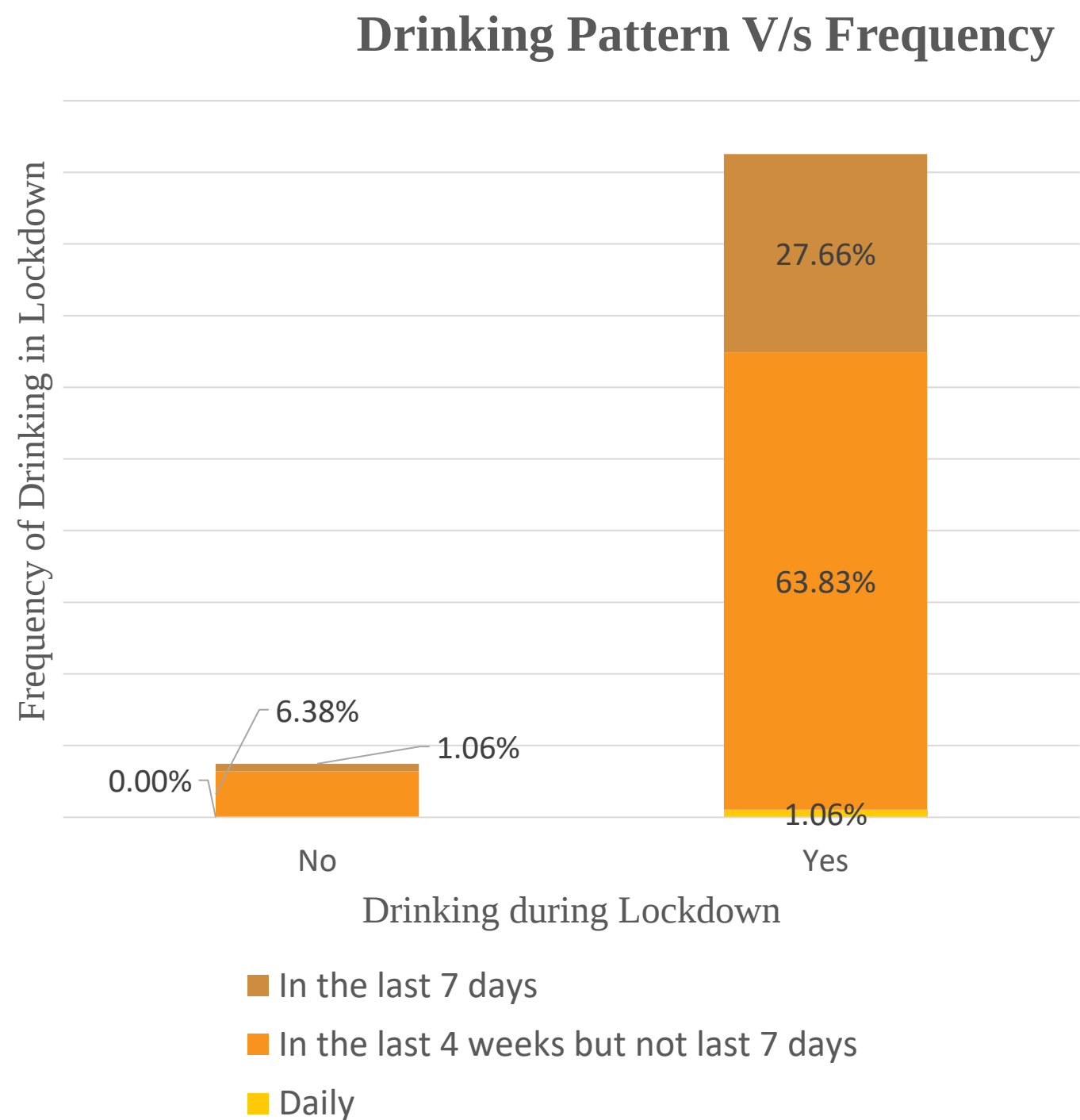
PERSONS IN HOUSEHOLD (%)



Smoking Pattern v/s Frequency In The Lockdown

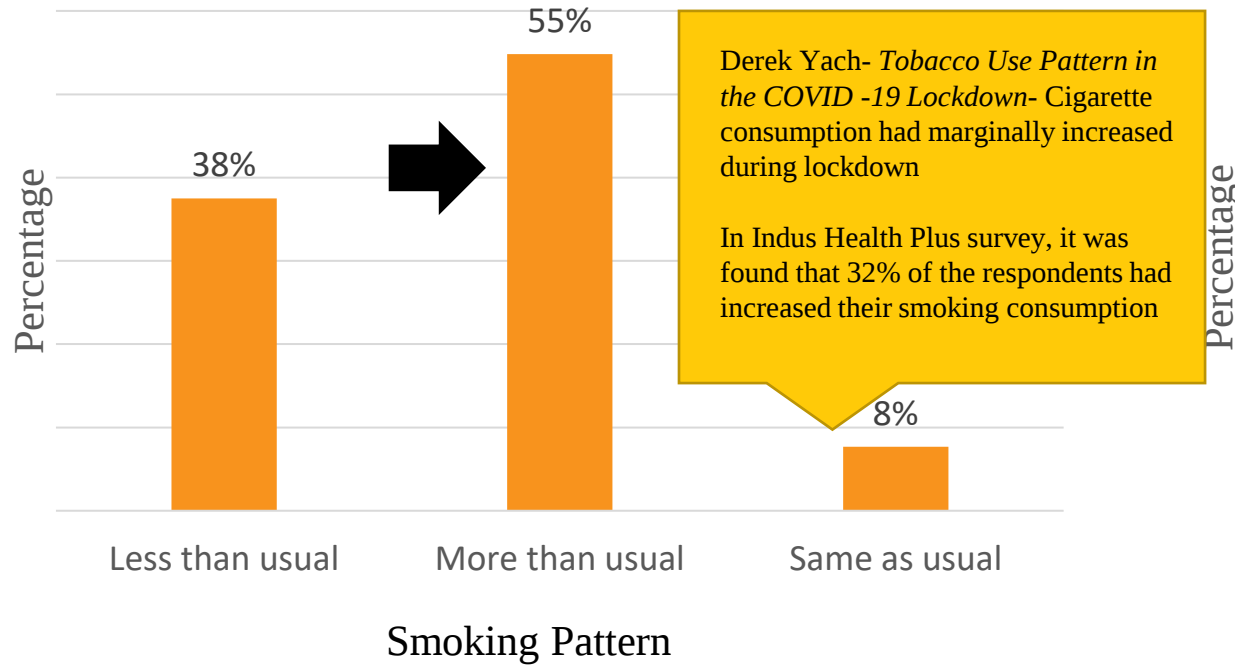


Alcohol Consumption Pattern v/s Frequency In The Lockdown

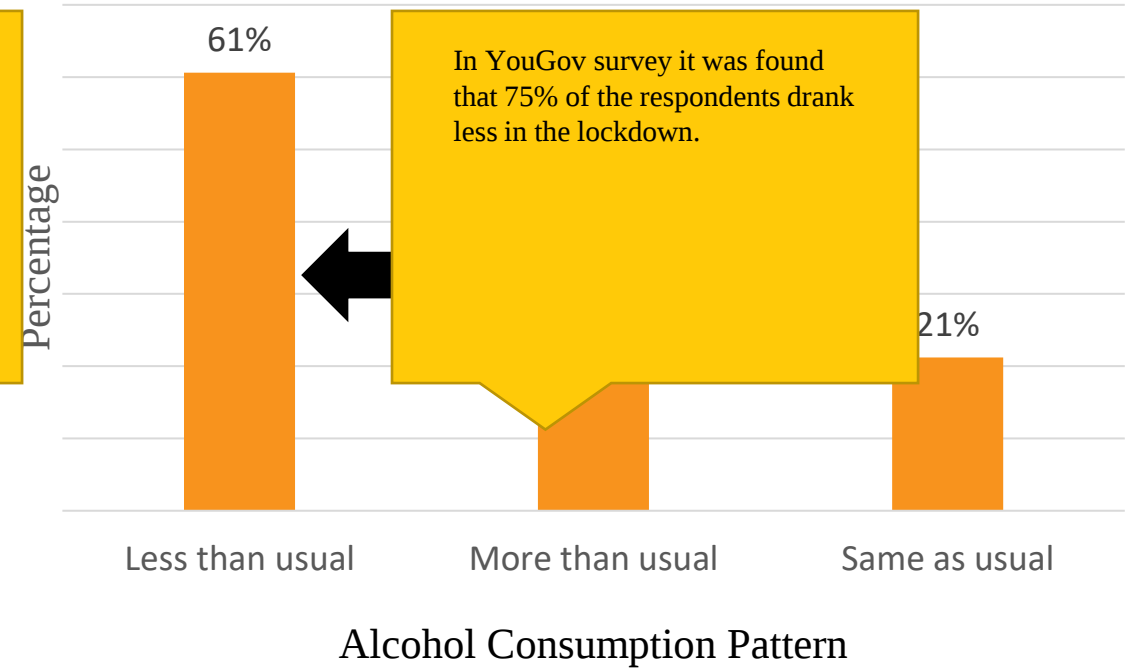


HEALTH RISK BEHAVIOUR IN THE LOCKDOWN

Smoking pattern in the lockdown



Alcohol consumption in the lockdown



- ✓ A chi square test was carried out to find out the significance of smoking pattern and alcohol consumption with respondent's profile.
- ✓ It was emerged from the analysis that all the variables significantly influenced the smoking pattern in the lockdown.
- ✓ On the other hand, only variables like **place of residence** and **number of persons in the household** influenced the alcohol consumption pattern in the lockdown significantly.

Reasons for Smoking Less than usual in the Lockdown

N%

	Financial constraints	12.24%
★	No cigarettes available	85.71%
★	No social life	46.94%
	Chances of getting COVID 19	8.16%
★	Living in Smoke free household	32.65%
	Suggestions by others to reduce	8.16%
	Increased workload	0%
★	Self-reduction	38.78%

Association Between Characteristics Of Respondents And Smoking Less Than Usual In The Lockdown

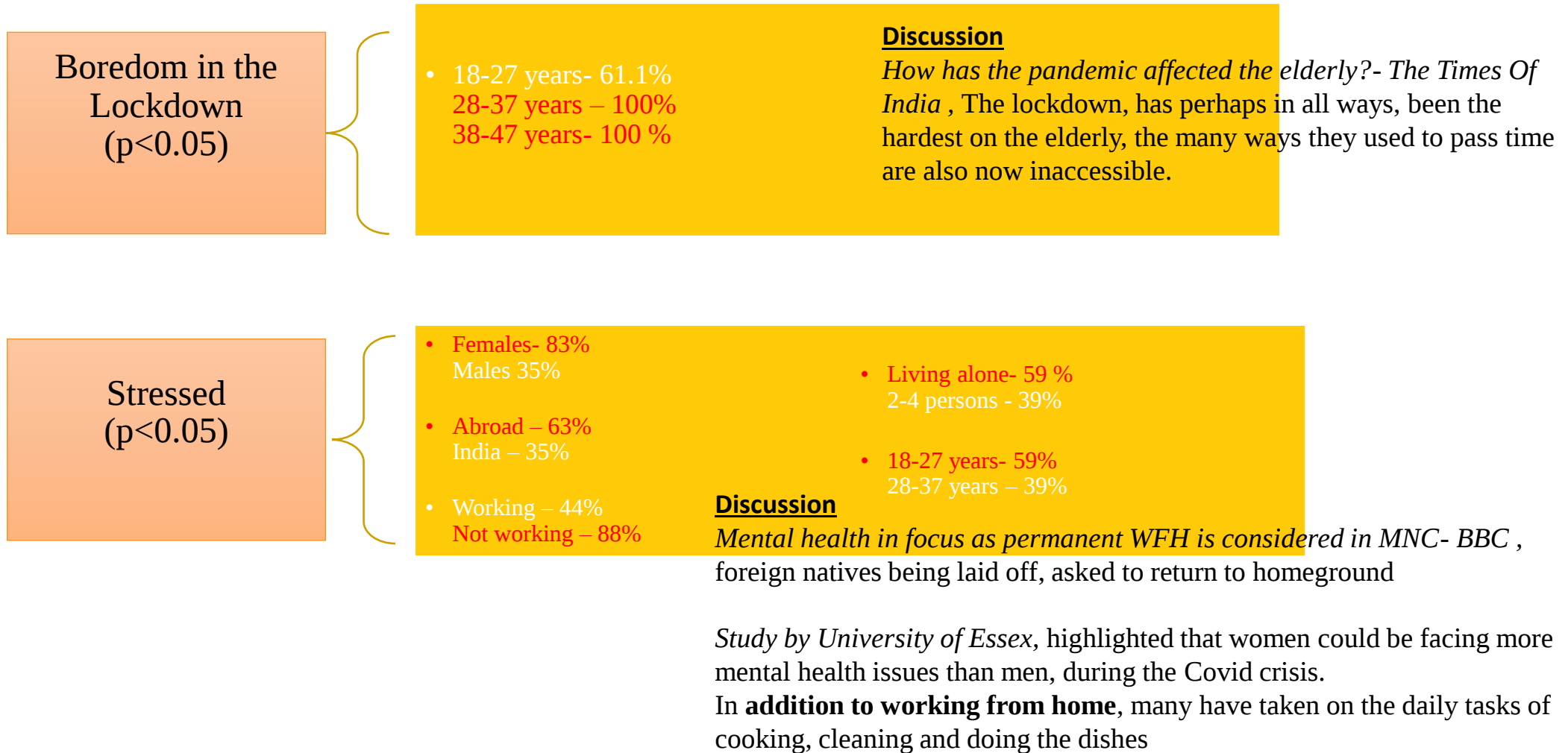
Less or No Social Life ($p < 0.05$)	- Females- 14.29 % Males- 52.38%	<u>Discussion</u> In an article <i>Why Covid-19 is different for men and women – BBC</i>, Women tend to shoulder more responsibilities than their male counterparts
Financial Constraints ($p < 0.05$)	- Living alone- 33.33 % 2-4 persons - 2.63% 5-6 persons- 57.14% - More than 7 persons- 0%	<u>Discussion</u> <i>Unemployment during coronavirus: The psychology of job loss – Work life BBC</i>, people lost job returning to their hometown securing them with family, financial uncertainty to take care of large family without an income.
Chances of getting COVID 19 ($p < 0.05$)	18-27 years- 7.69% 28-37 years – 0% 38-47 years- 100 %	<u>Discussion</u> <i>Study by Liz McKeown : How has lockdown affected people of different ages?</i>, Older people were worried about the impact of the virus on their lives were more likely to say that they are the risk groups

Reasons for Smoking More than usual in the Lockdown

N%

★ Feeling bored in the lockdown	75.86%
★ Feeling stressed out	50%
Smoking more with people at home	24.14%
Online occasion	0%
While meeting friends outside	8.62%

Association Between Characteristics Of Respondents And Smoking More Than Usual In The Lockdown



BUYING CIGARETTES IN THE LOCKDOWN



Discussion

- Study conducted –
Lockdown 4.0 imposed
- Relaxation in tobacco deals

	N%
Bought enough supply	31.78
Buying on demand	80
Offered from elsewhere	31.78

Reasons for drinking less than usual in the lockdown

N%

★ <i>No social life</i>	78.85
<i>Financial constraints</i>	9.62
★ <i>Difficult to get alcohol</i>	65.38
<i>Do not like drinking at home</i>	15.38
<i>Someone suggested on reducing</i>	5.77
<i>Increase workload</i>	3.85
<i>Self-reduction</i>	13.46

Association Between Characteristics Of Respondents And Consuming Alcohol Less Than Usual In The Lockdown

Financial
Constraints
($p < 0.05$)

India – 17%

Difficulty in getting
hold of alcohol
($p < 0.05$)

Female – 42%
Males – 73%

Not drinking at
home
($p < 0.05$)

2-4 persons – 35%
5-6 persons – 6.7%

India – 27%

Discussion

Unemployment during coronavirus: The psychology of job loss – Work life BBC, people lost job, financial uncertainty

Lockdown sends grey-market booze prices soaring- The Times Of India, with bars and liquor stores shut for weeks across most parts of the country.

Discussion

When a Parent Drinks Too Much Alcohol
- Influence on kids-
Health Info Guide
This is sometimes “stigma” or “discrimination.”

Reasons for drinking more than usual in the lockdown

N%

Decrease chances of getting COVID 19

0

Help in relaxing

16.67

Feeling bored

16.67

Feeling stressed out

75

Being more social at home with family

75

Need not get up for work

0

Online occasion

0

No association was found between characteristics of respondents and reasons for consuming more alcohol in the lockdown

Buying Alcohol in the lockdown

	N%
Bought enough supply	46.15
Buying on demand	46.15
Offered from elsewhere	28.85

Attitude of Respondents towards Health Risk Behavior post Lockdown

After lockdown

Yes

N%

44.88

Reasons for no change post lockdown

N%

Availability of supply post lock down

8.26

Facing withdrawal symptoms during lock down

13.76

Habitual urge to drink or smoke

73.39

I do not find a reason not to drink.

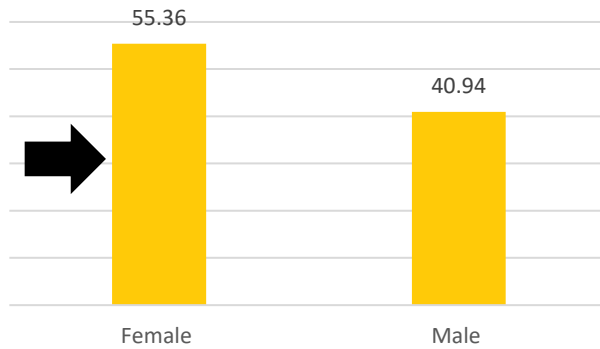
0.92

Peer pressure

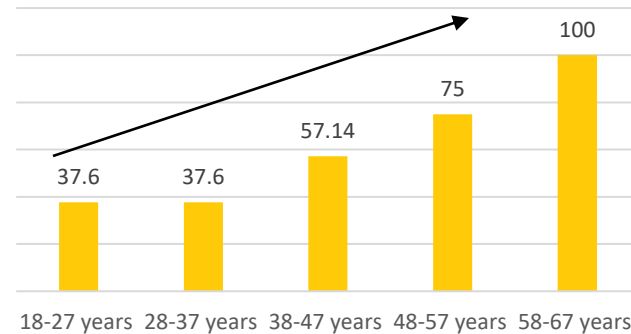
3.67

Association Between Characteristics And Attitude Change After Lockdown

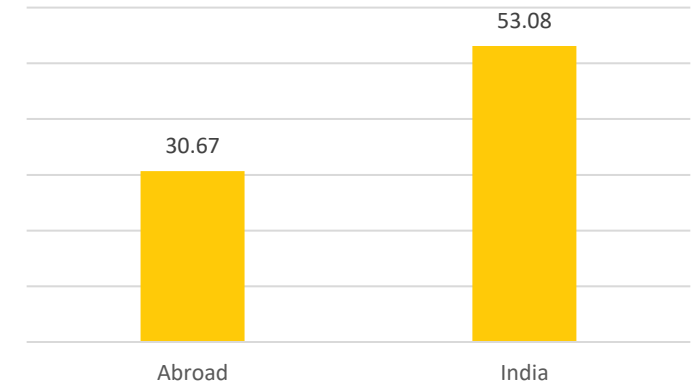
Gender ($p > 0.05$)



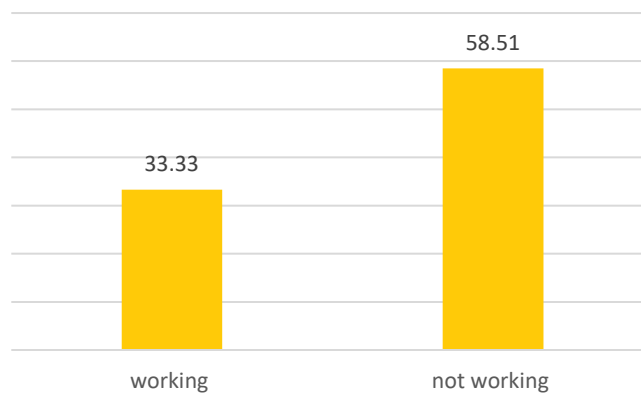
Age- group ($p < 0.05$)



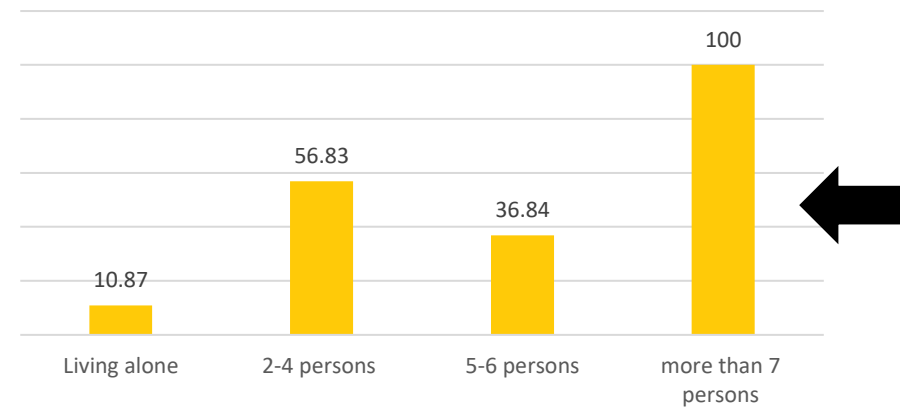
Place of residence ($p < 0.05$)



Working status ($p < 0.05$)



Persons in Household ($p < 0.05$)



CONCLUSION

- ❖ The study helped in throwing insights about the emotional well-being of cigarettes and alcohol users amidst lockdown.
- ❖ The user's attitude towards behavior changed were also described.
- ❖ Lockdown imposed to contain the spread of COVID 19 had its positive and negative impacts on individuals.
- ❖ Where a few individual perceived their change in behaviour habits to have brought in a positive impact on their mental and physical health and are looking forward to quit their habits hereon, there are individuals who cannot deprive themselves of their daily dose of nicotine and lockdown imposing them with withdrawal symptoms
- ❖ The psychological code of conduct plays a major role in driving individuals towards health risk behaviour. The lockdown has turned to be constructive to the mental health and decreased pattern of smoking and consuming alcohol for a few individuals and for other it has turned into being destructive.

SCOPE OF STUDY

- ❖ To assess the physical well being of individuals who smoked or consumed alcohol less than usual in the lockdown
- ❖ Stress assessment amongst individuals practicing health risk behavior effect of pandemic on their mental well being

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SUMMER TRAINING REPORT

PART B

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Data Analytics in Lean Six Sigma

OBJECTIVE



To know about a Lean Six Sigma venture



To know how to quantify a certain phenomenon



To identify the influence factor responsible for a phenomenon

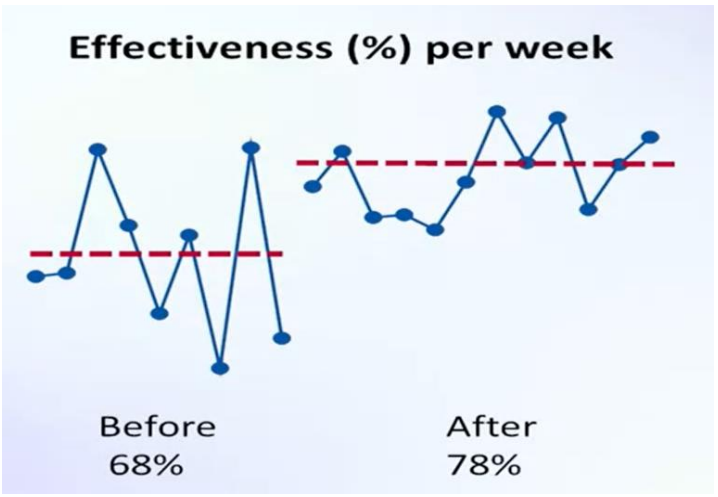


To evaluate the processes and decrease the number of defects



To understand the influence of Data Analytics in quality before and after a project

LEARNING OUTCOME



- Typical example of Lean Six Sigma Project presentation
- Involves process and improvement
- Processes are a series of actions or steps taken to make a product or deliver a service and every process requires improvement.
- A typical process in health care is the treatment of the patient in a hospital and improvement would be reducing medical errors
- Lean Six sigma is a popular method to improve process
- Data is important in process improvement

D-M-A-I-C Framework	
Define	Select and establish objectives
Measure	Make the problem quantifiable and measurable
Analyse	Analyse the current situation and make diagnosis
Improve	Develop and implement improvement action
Control	Control the improved process performance and close the project

CTQ (Critical to Quality)
A property of a product, process or service that is typical to the project objective

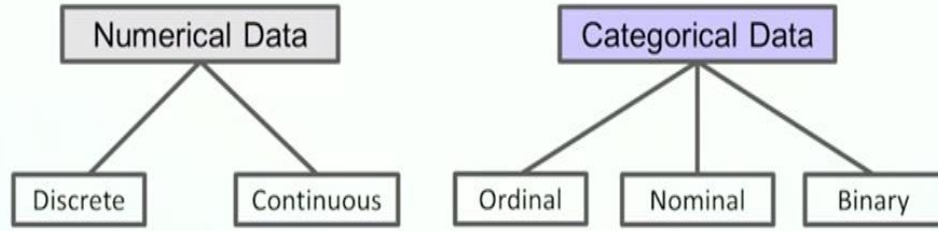
How to find CTQ?
Which metric do I want to change ?
Does it solve the problem ?

Terminologies	
Unit	Units are the things one collects data on
Measuring Unit	the properties of the things one collects data on
Operational definition	The agreement on how to measure a variable and what the unit is
Variables	The variables are the properties of the units that are being measured

Organising Data

- ✓ Units are always stored in the rows of the data set
- ✓ Variables are stored in the columns of the data set

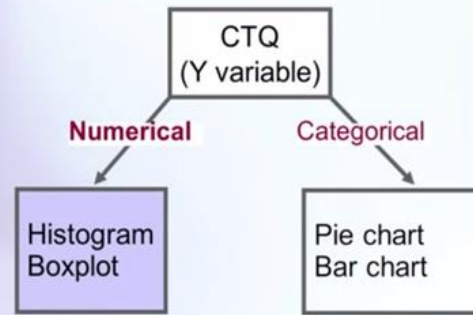
Numerical and categorical data



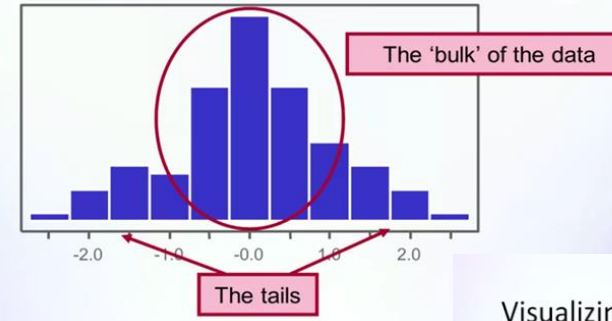
DESCRIPTIVE STATISTICS

- N
- N*
- Mean
- Standard Deviation
- Minimum
- Q1
- Median
- Q3
- Maximum

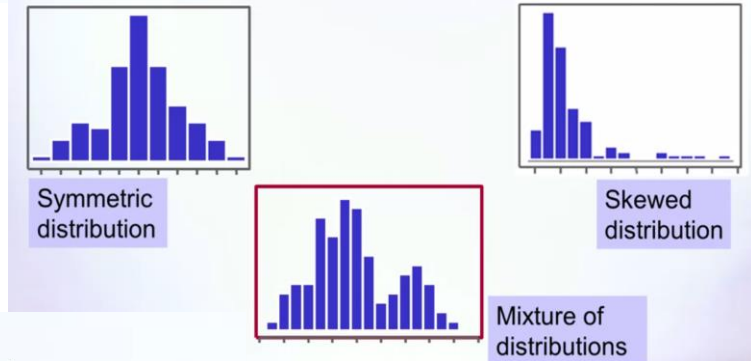
Visualizing data



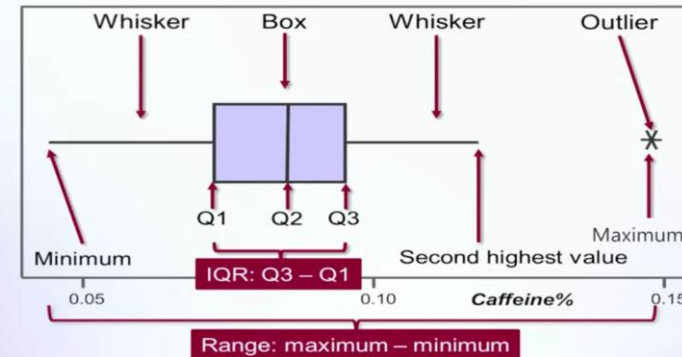
Visualizing numerical data - Histogram



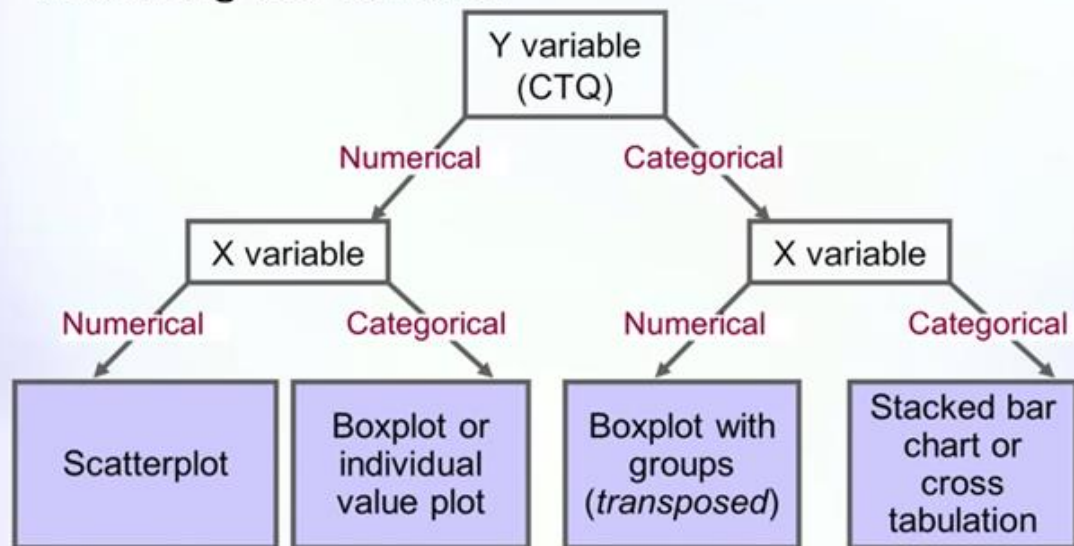
Visualizing numerical data - Histogram



Visualizing numerical data - Boxplot



Visualizing two variables

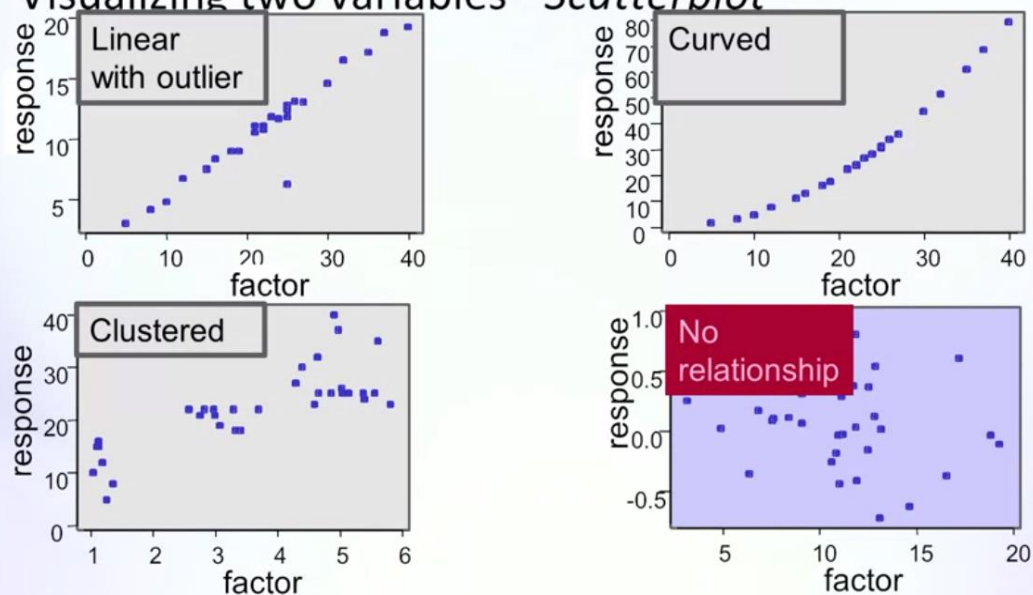


Rows: gender Columns: smoking_pattern

	Less than usual	More than usual	Same as usual	All
Female	7 28.00 14.29	18 72.00 30.00	0 0.00 0.00	25 100.00 21.01
Male	42 44.68 85.71	42 44.68 70.00	10 10.64 100.00	94 100.00 78.99
All	49 41.18 100.00	60 50.42 100.00	10 8.40 100.00	119 100.00

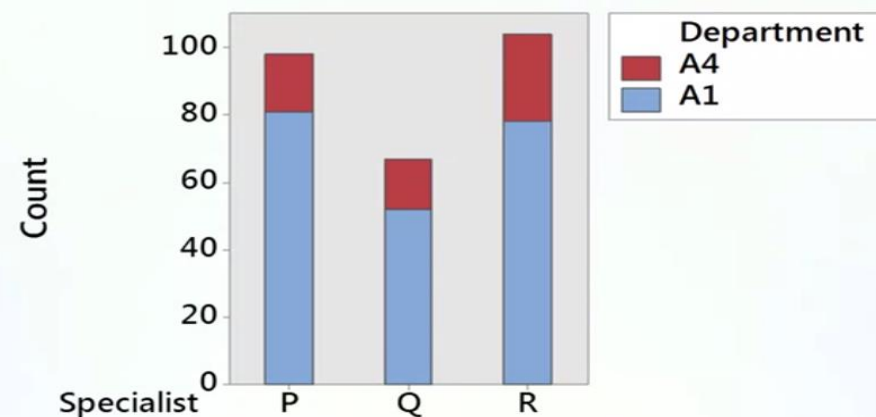
Cell Contents
Count
% of Row
% of Column

Visualizing two variables - Scatterplot

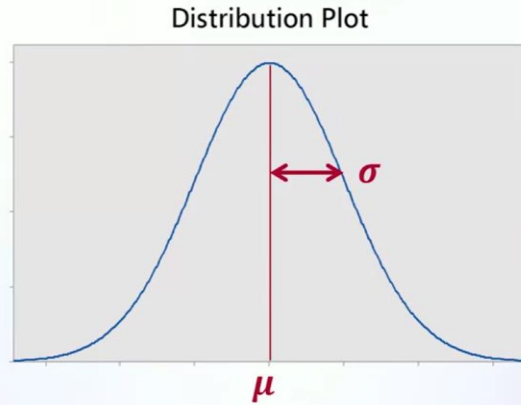


Visualizing two variables – Stacked bar chart

Chart of Specialist, Department



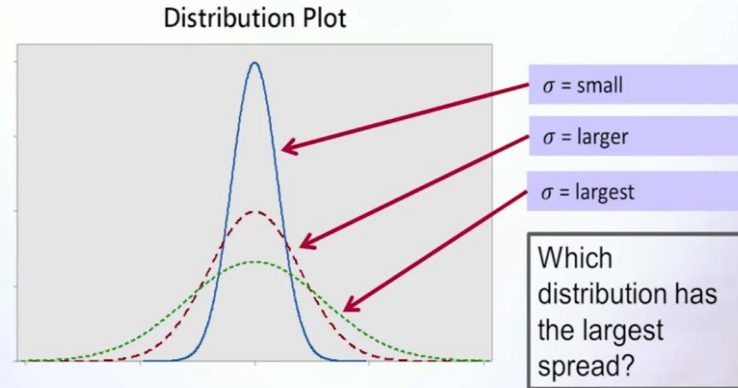
Properties of the Normal Distribution



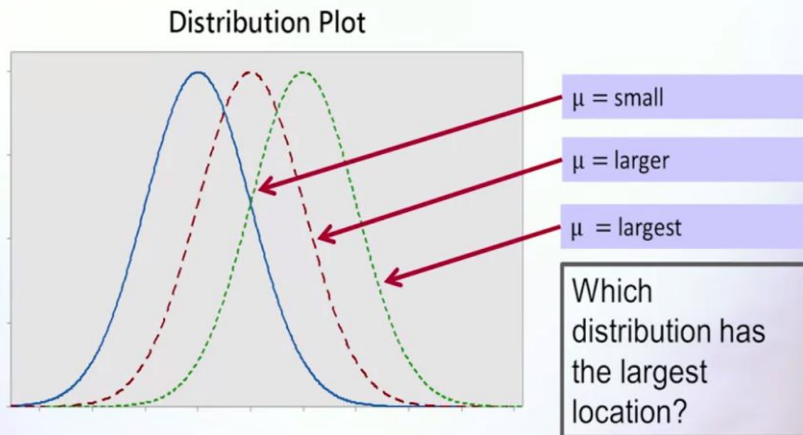
μ = mu = location

σ = sigma = spread

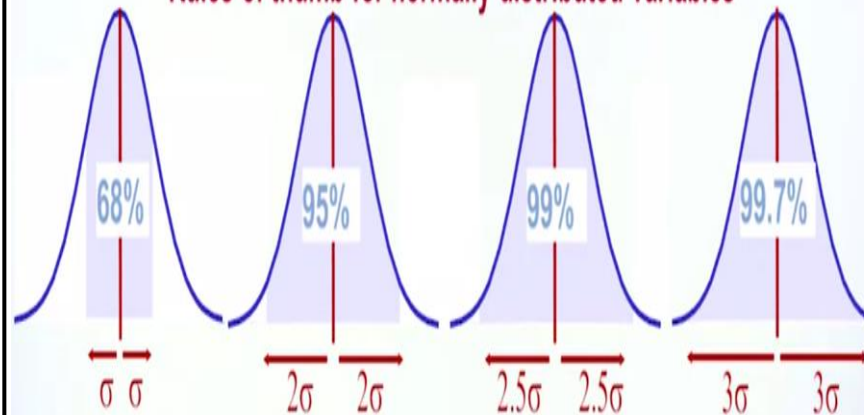
Properties of the Normal Distribution



Properties of the Normal Distribution



Rules of thumb for normally distributed variables



PROPERTIES OF NORMAL DISTRIBUTION

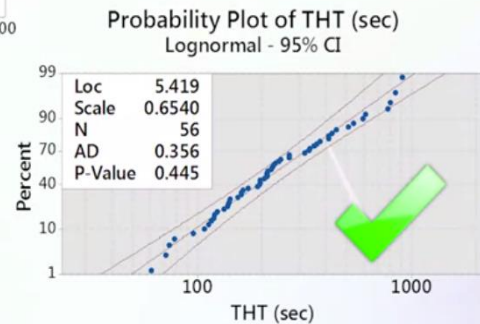
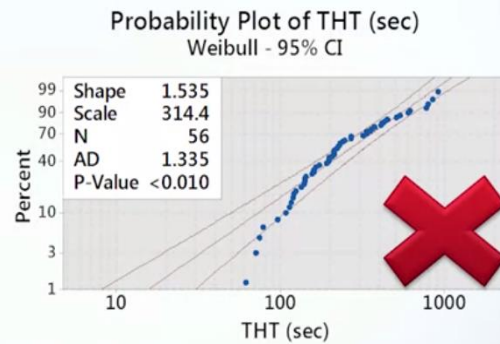
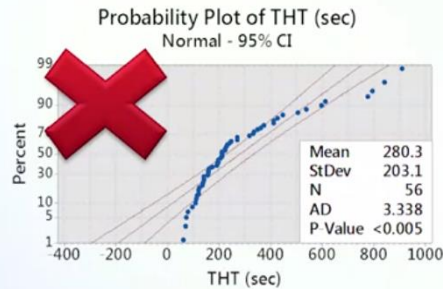
- The principal parameter is the location parameter which decides the midpoint.
- The subsequent parameter portrays the state of the distribution and is known as the dispersion parameter.

RULE OF THUMB

- A variable that is normally distributed will consistently be, for 68% of the time, in the middle of the new μ in addition to 1 sigma and less 1 sigma.
- Proportionally, 95% of the populace will be in the middle of μ in addition to 2 sigma and less 2 sigma.
- 99% of the populace will be in the middle of the mean and in addition to 2.5 sigma and short 2.5 sigma and 99.7 % will be in the middle of in addition to and less 3 times sigma.

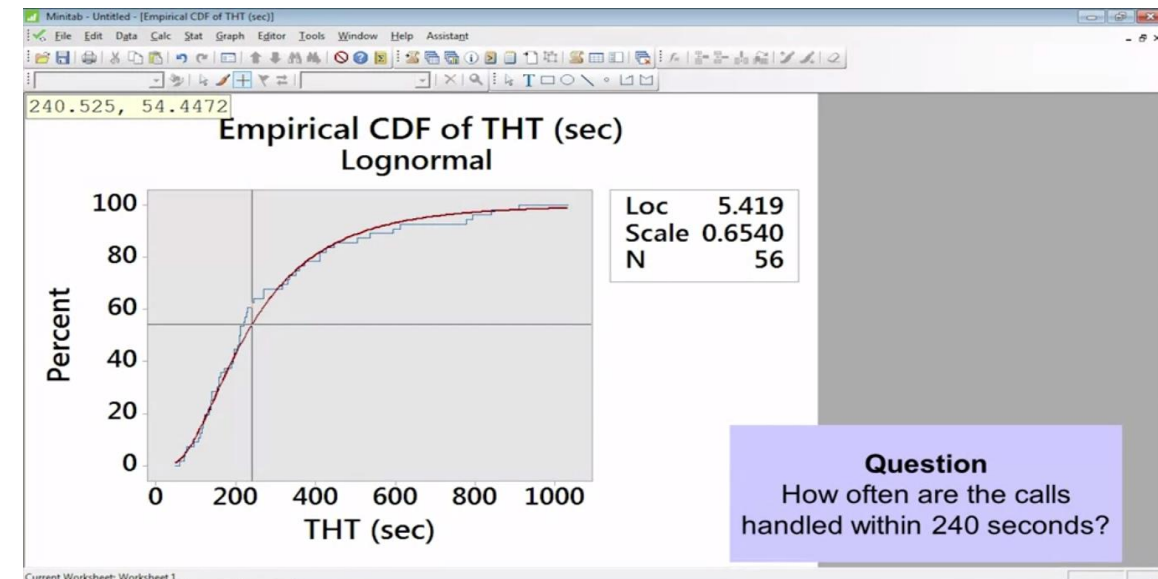
PROBABILITY PLOT AND EMPIRICAL CDF

Probability Plot - Example



- In sigma venture, this device is utilised in the analyse stage for finding the probabilities and rates.
- In the figure on the right, the blue bar speaks to the data of the example, the red curve speaks to the probability distribution.

- Minitab can be used to find the best fitting distribution which is known as the probability plot.
- If the dots of the estimation are on a straight line and however much as could reasonably be expected between the two outside lines, the appropriation fits well.
- Looking at the figure, one can presume that a lognormal appropriation fits best.
- One can also look at the Anderson Darling to know the best fit of the population. The lower the value, the better the fit.



LEARNING OUTCOME

DATA BASED TESTING IN LEAN SIX SIGMA

ANOVA ANALYSIS

1. Organise Data



- Study the relationship between the numerical Y and categorical X variable.
- Organise the data such that Y and X are in columns.

2. ANOVA

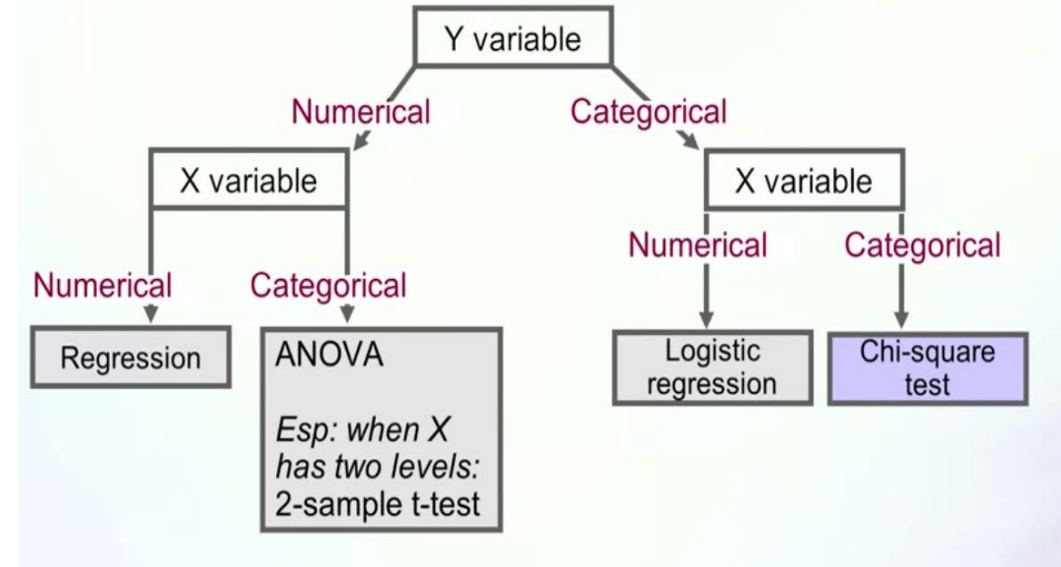


- Are the group means identical for each of the levels of X variable ?

3. Residuals



- Is the random scatter normal?
- Are their any irregularities ?



ANOVA – Hypothesis test

Analysis procedures often result in p-values.

$P < 0.05$

That is because they are *hypothesis tests*.

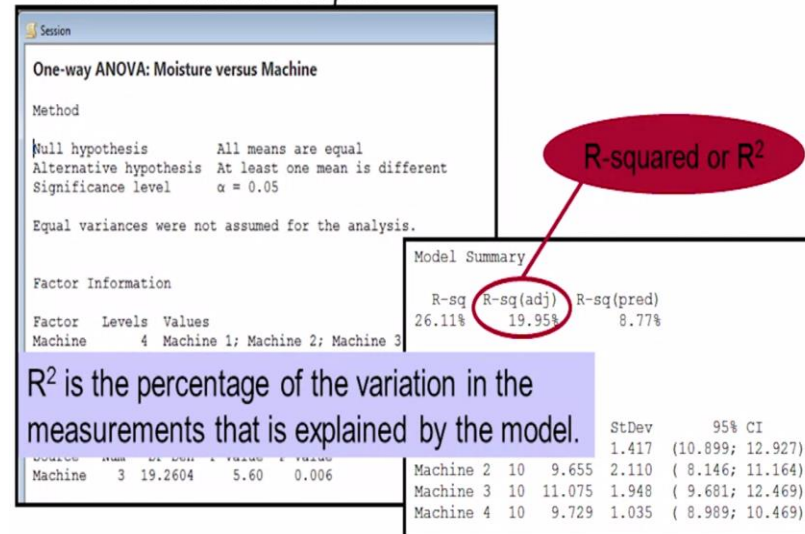
Null hypothesis $H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$



Alternative hypothesis $H_a: \mu_i \neq \mu_j$ for some i and j

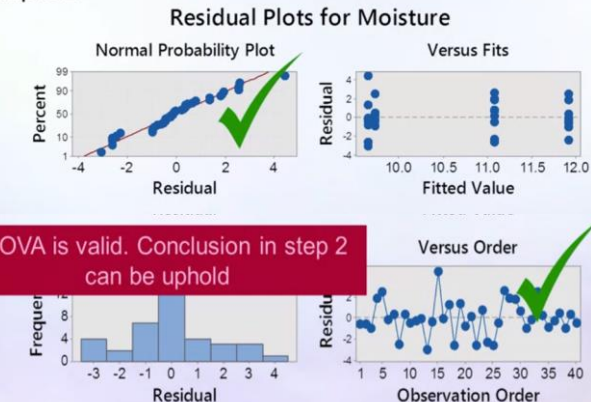


ANOVA – Minitab output



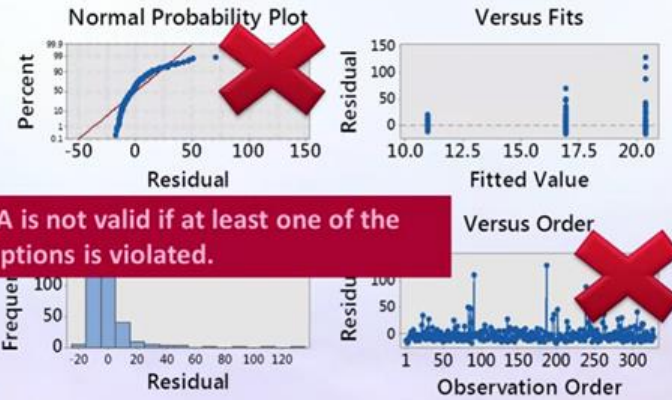
ANOVA: residuals analysis

Example 1



ANOVA: residuals analysis Example 2

Residual Plots for Example 2



ANOVA is not valid if at least one of the assumptions is violated.



Kruskal-Wallis Minitab output

Session

Kruskal-Wallis Test: THT (sec) versus Training

Kruskal-Wallis Test on THT (sec)

Training	N	Median	Ave Rank	Z
No	35	246.0	33.9	3.18
Yes	21	191.0	19.5	-3.18
Overall	56		28.5	

H = 10.12 DF = 1 P = 0.001
H = 10.12 DF = 1 P = 0.001 (adjusted for ties)

Median for the each group

Kruskal-Wallis Minitab output

Session

Kruskal-Wallis Test: THT (sec) versus Training

Kruskal-Wallis Test on THT (sec)

Training	N	Median	Ave Rank	Z
No	35	246.0	33.9	3.18
Yes	21	191.0	19.5	-3.18
Overall	56		28.5	

H = 10.12 DF = 1 P = 0.001
H = 10.12 DF = 1 P = 0.001 (adjusted for ties)

p-value < 0.05 so the difference between the medians is significant

The Kruskal-Wallis test is a non-parametric test. This test ought to be performed when the basic suppositions of the ANOVA examination are not met.

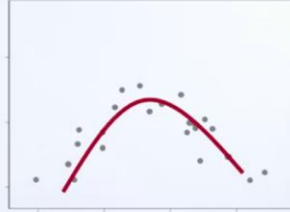
CORRELATION ANALYSIS

Correlation - Examples



Is there correlation in this example?

Correlation: -0.08
(no relationship)



Is there correlation in this example?

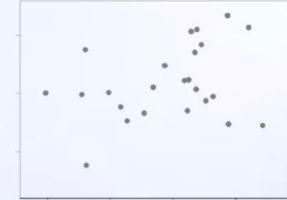
No correlation (but there is a non-linear relationship)

Correlation - Examples



Is there correlation in this example?

Correlation: 0.93
(strong positive relationship)

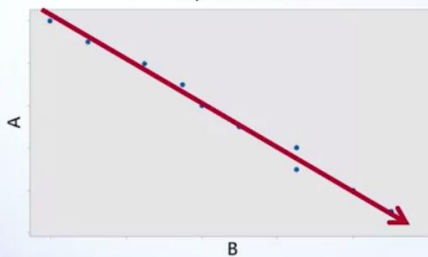


Is there correlation in this example?

Correlation: 0.31
(weak positive relationship)

Correlation

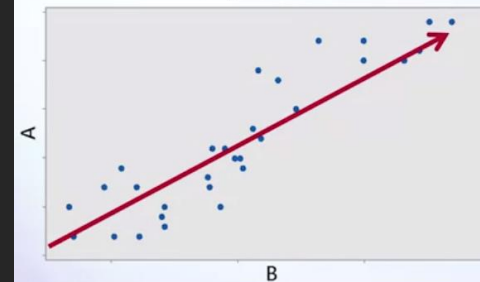
Scatterplot of A vs B



Negative correlation

Correlation

Scatterplot of A vs B



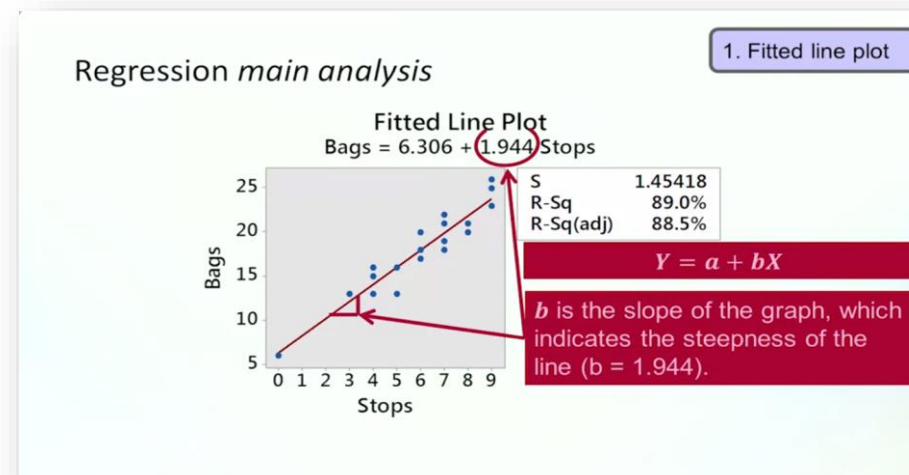
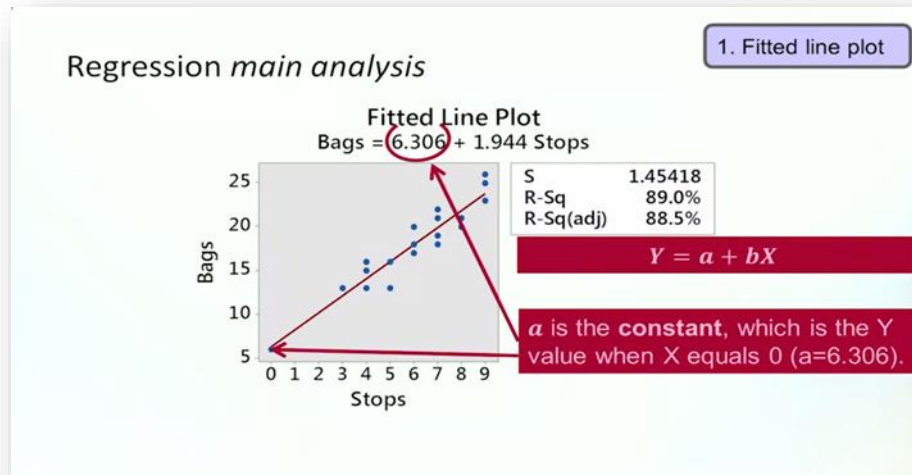
Positive correlation

Correlation is a list that communicates how solid a connection between two numerical variables is. This list is consistently between plus 1 and minus 1.

LEARNING OUTCOME

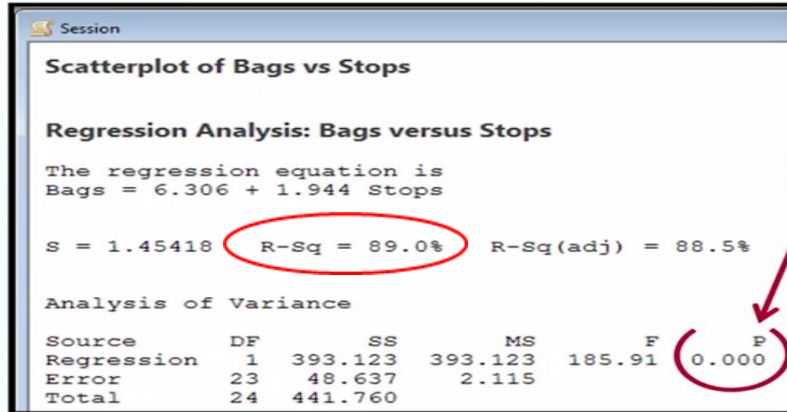
Regression analysis : It is tied in with finding the best fitting straight line for two numerical factors in the data. Regression analysis comprises of four stages.

1. Fitted line plot



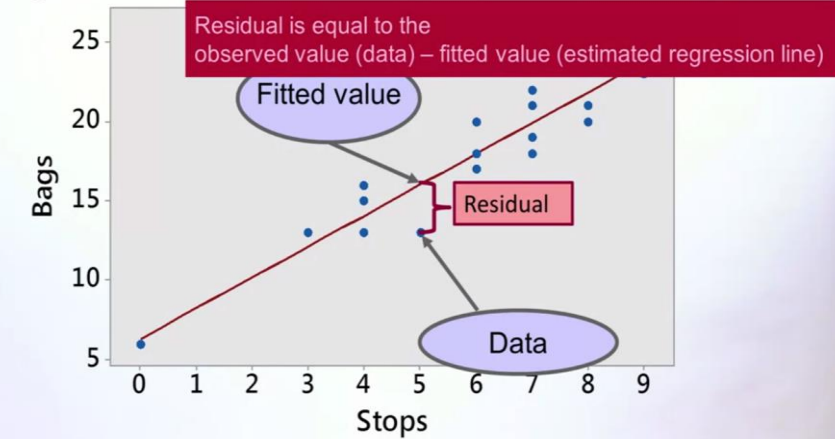
2. Regression analysis

Regression – p -value and R^2



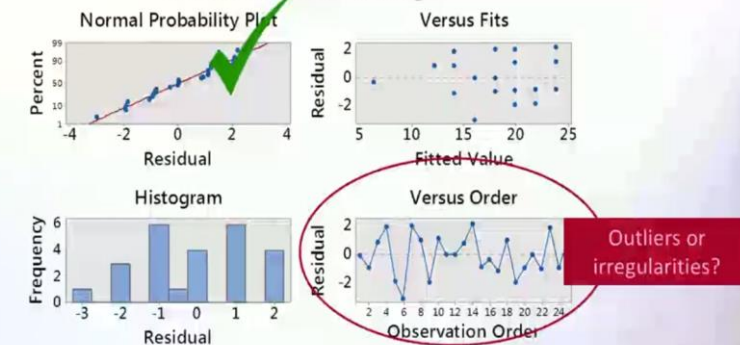
3. Regression – Residual analysis

Regression – Residual



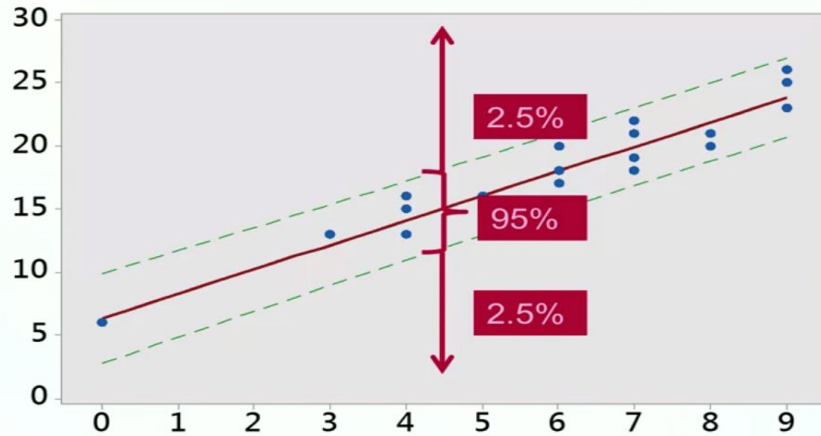
Regression – Residual Analysis

Residual Plots for Bags

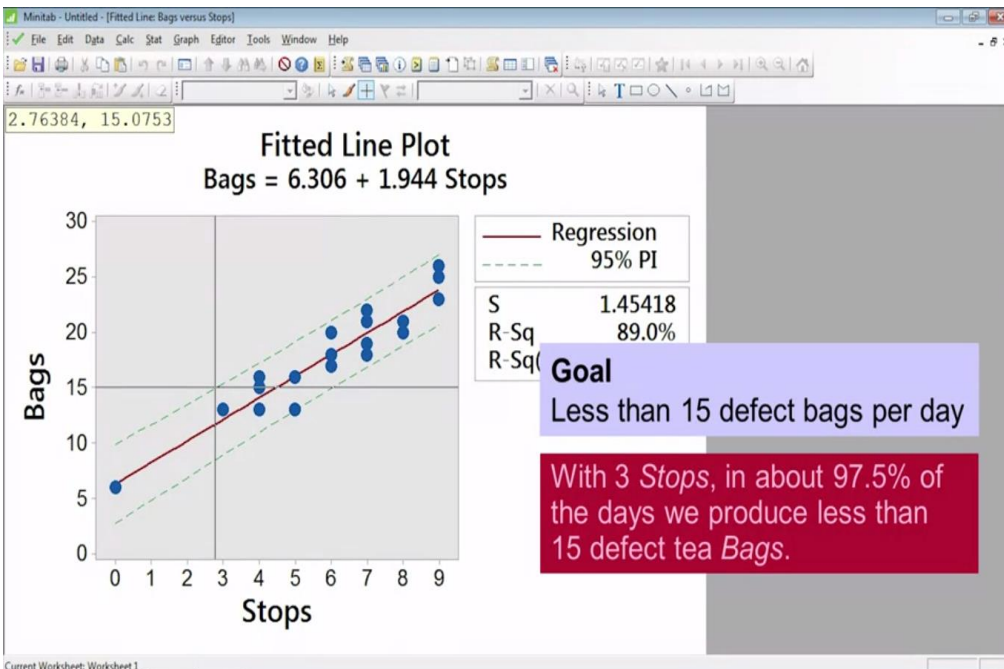


4. Regression Prediction Interval

Regression – Prediction Interval



- The prediction interval can be used to determine the level of influence factor, which ensures a certain CTQ performance.
- The prediction interval is the fitted line plus or minus two times the standard deviation of the residuals.
- So 95% of the measurements should be within this interval.
- Also, two and a half percentage of the measurements will be above the interval and of course, two and a half percentage will be below the interval
- If we want the maximum of broken tea Bags to be 15 in 97.5% of the days, we have to have at most 3 Stops per day.



Chi-square analysis

Session				
Rows: Department Columns: Specialist				
	P	Q	R	All
A1	81	52	78	211
	38.39	24.64	36.97	100.00
	82.65	77.61	75.00	78.44
A4	17	15	26	58
	29.31	25.86	44.83	100.00
	17.35	22.39	25.00	21.56
All	98	67	104	269
	36.43	24.91	38.66	100.00
	100.00	100.00	100.00	100.00
Cell Contents: Count				
% of Row				
% of Column				
Pearson Chi-Square = 1.783, DF = 2, P-Value = 0.410				
Likelihood Ratio Chi-Square = 1.812, DF = 2, P-Value = 0.404				

H_0 : there is no relation between X and Y
 H_A : there is a relation between X and Y

No significant effect
 H_0 cannot be rejected

CHI – SQUARE ANALYSIS

1. Cross Tabulation
2. Chi-Square analysis

Logistic Regression

1. Organise data in event trial format
2. Get the binary fitted plot
3. Check if results are significant and can be generalised to population

Logistic Regression - Example

X variable

All possible outcomes of the X variables

Event/trial format			
HoldTime	HungUp	Calls	
1	1	19	
2	0	15	
3	2	12	
4	1	15	
5	5	14	
6	2	13	
7	8	17	
8	10	21	
9	9	18	
10	3	13	
11	7	13	
12	10	16	
13	7	15	
14	9	19	
15	18	22	
16	19	25	
17	12	17	
18	13	16	
19	21	21	
20	14	15	

Example

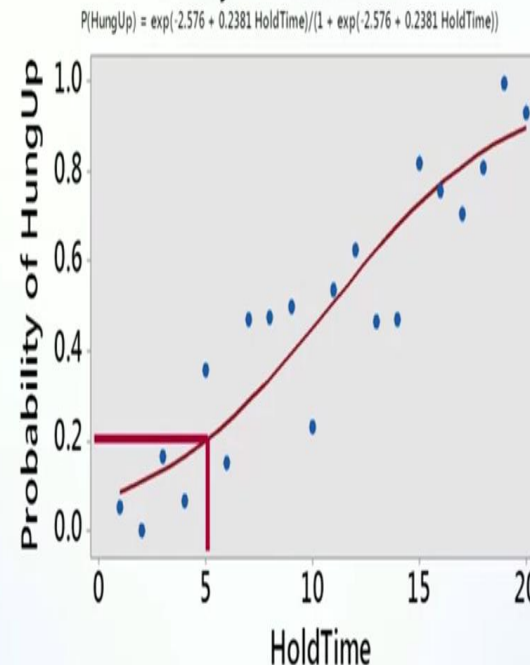
data_files_DA-LSS.xls
Callcenter

Trials
Number of times that this level of the X variable occurred

Events
Number of times that the event occurred for this level of X.

Logistic Regression

Binary Fitted Line Plot



Binary Fitted Line Plot

Response Information

Variable	Value	Count	Event Name
HungUp	Event	171	HungUp
	Non-event	165	
Calls	Total	336	

Relation between HoldTime and probability of HungUp is significant.

Deviance Table

Source	DF	Adj Dev	Adj Mean	Chi-Square	P-Value
Regression	1	111,93	111,927	111,93	0,000
HoldTime	1	111,93	111,927	111,93	0,000
Error	18	28,85	1,603		
Total	19	140,78			

Formula for calculating percentages.

Regression Equation

$$P(\text{HungUp}) = \exp(-2,576 + 0,2381 \text{ HoldTime}) / (1 + \exp(-2,576 + 0,2381 \text{ HoldTime}))$$

CONCLUSION

- ✓ At the end of the course, I briefly know about Lean Six Sigma and how data analytic techniques are useful within Lean Six Sigma improvement process.
- ✓ I can analyze and interpret data gathered for any improvement project and have developed the efficiency to use Minitab to analyze the data, with various data analytical tools and interpret the outcome



THANK YOU
