

Summer Training Report

Presented By: Gurpreet Singh

MBA (Hospital and Health Management)
2019-20121

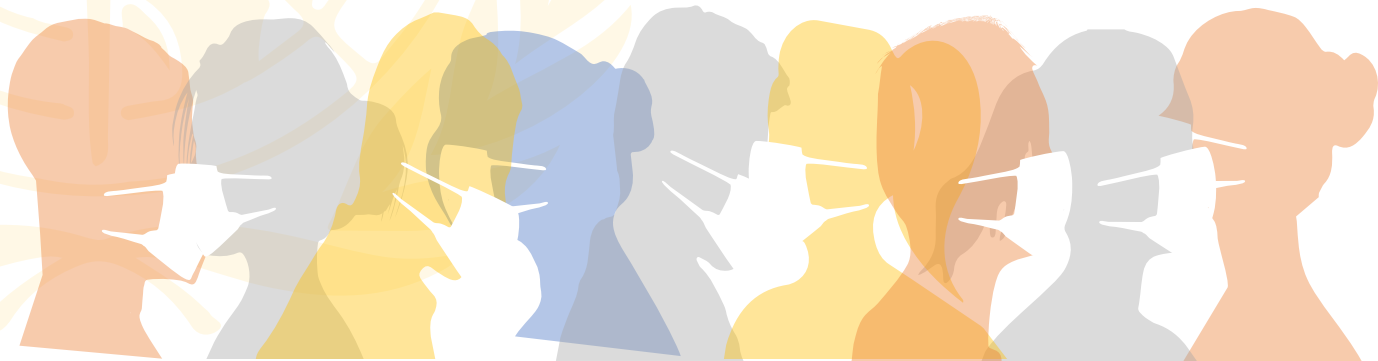
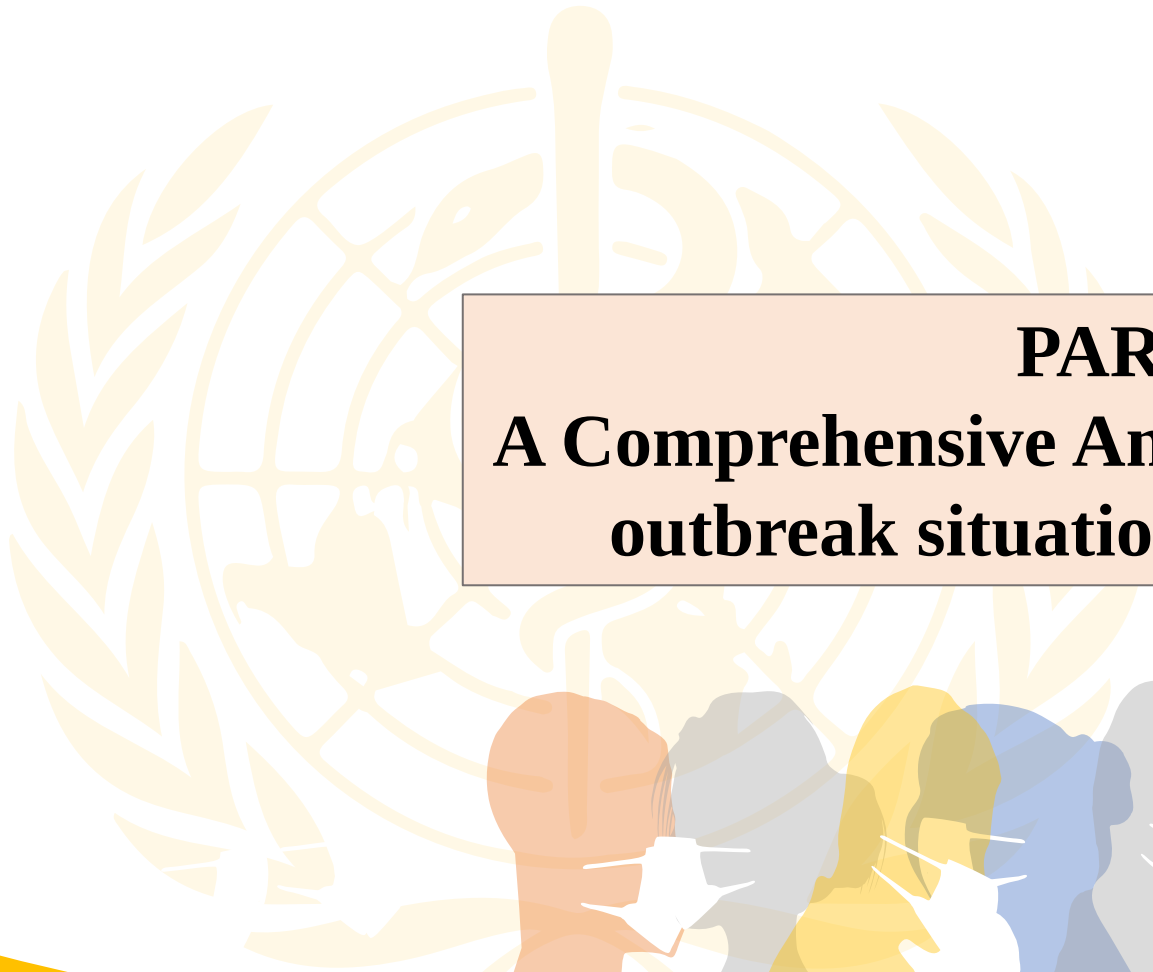
Enrollment no : 0914

Guided By: Dr. Sujata Verma, Assistant
Professor





PART-1
**A Comprehensive Analysis of COVID-19
outbreak situation in Delhi, India**



INTRODUCTION

- Corona viruses(CoVs) have gained an unprecedented degree of global attention recently due to the discovery in December 2019 of highly pathogenic corona virus in Wuhan city of China.
- It is a droplet infection and the most prominent symptoms of CoVs are fever, dry cough, difficulty in breathing and fatigue. Other symptoms which were later added to the list by CDC are chills, sore throat, headache, muscle pain, repeated shaking with chills and loss of taste and smell.
- The first documented case of Novel Coronavirus was registered in India from Kerala on 30 January 2020 where a student studying at the University of Wuhan, China, was tested positively with the deadly virus, whereas in Delhi the first case was detected on 2nd March 2020.
- As of 30th June.2020 there are 1,04,50,628 cases of COVID 19 confirmed globally and at least 5,10,632 people have died so far, whereas in India there are 5,85,703 confirmed cases and 17,410 people have died. When it comes to Delhi 87,360 are the confirmed cases and 2,742 people have lost their life so far.

COVID-19

LITERATURE REVIEW



Epidemiological
and clinical
characteristics, as
well as the
management of
COVID-19
patients in India

By: Nitesh
Gupta

Fever and cough (42.9 per cent) were the most common symptoms, accompanied by sore throat, headache and breathlessness

Indian
perspective of
Coronavirus

By:
Samander
Kaushik

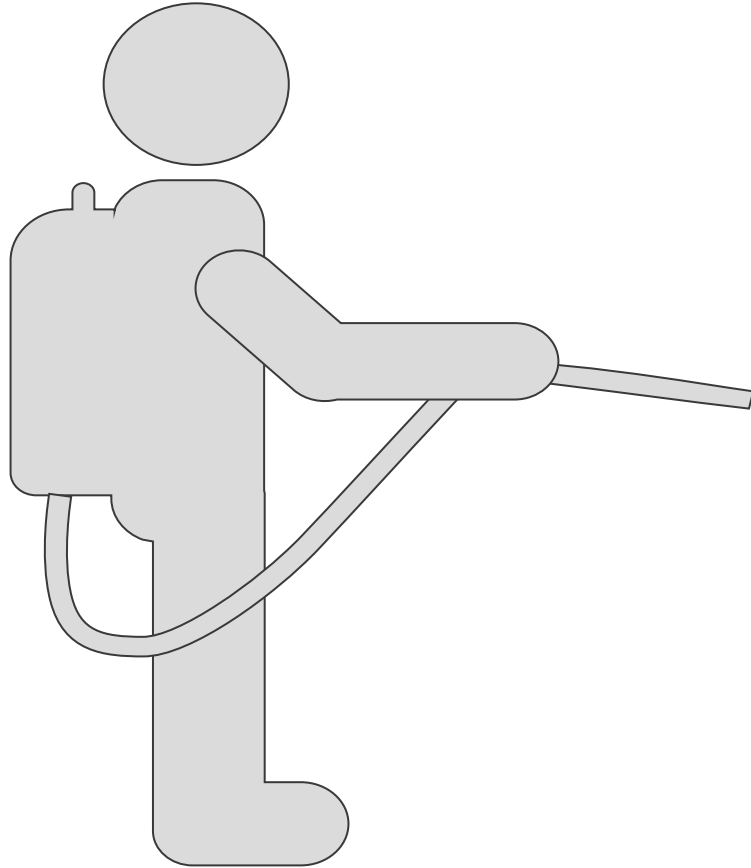
Among the first 21 patients diagnosed with COVID-19 infection in India, the typical clinical presentation consisted of a mild infection of the upper respiratory tract which mainly affected the young male population

Young Indians are
more affected

By: Dipu
Rai

- In India more than half of the cases comprises of youth.
- Of the 1,801 confirmed cases of novel coronavirus, 43% comprises of the people from age group 20-39, followed by 17% in the 40-49 age group as per the data observed.
- That means around 60% of patients are under 50 years of age according to which young age people have higher chances of getting the disease.

OBJECTIVES

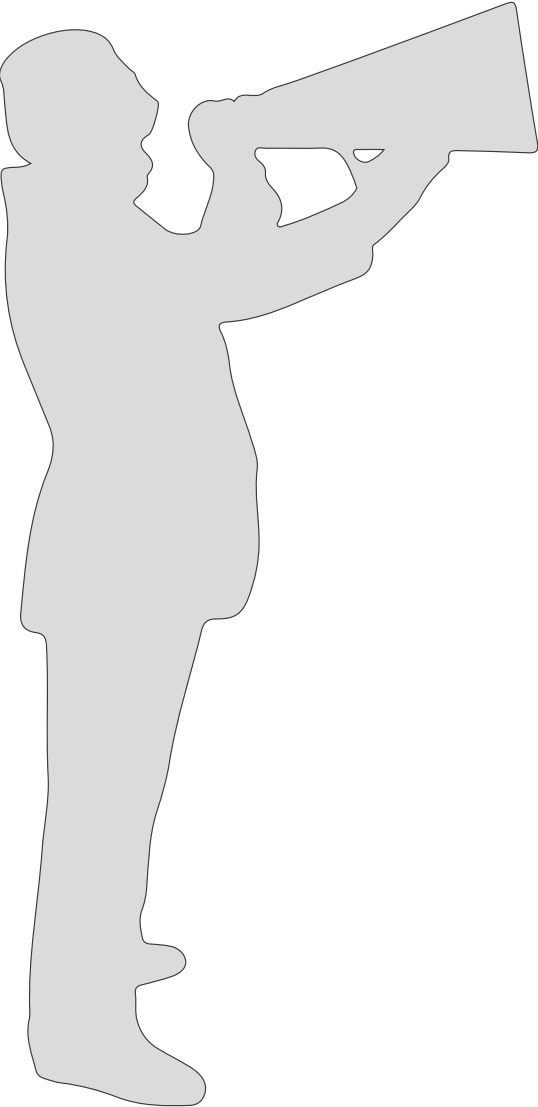


Broad Objective

- ✓ A comprehensive Analysis of COVID-19 outbreak situation in Delhi, India.

Specific Objectives

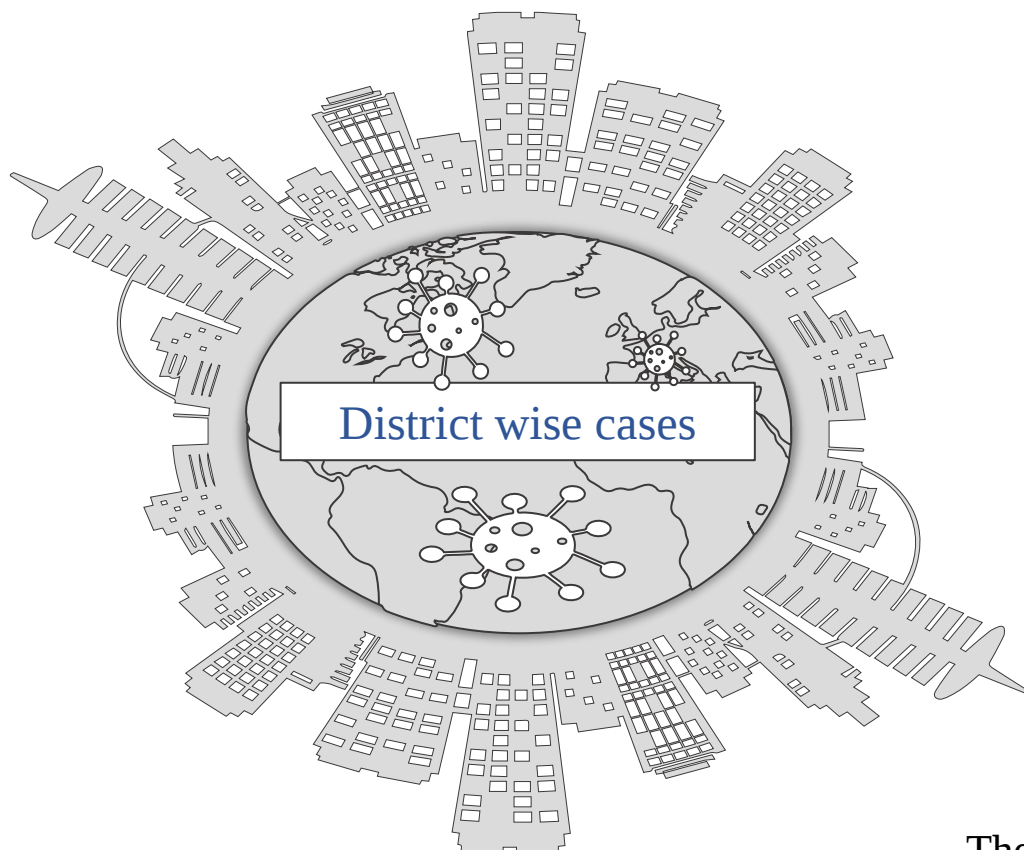
- ✓ To enlist total number of districts affected by COVID-19.
- ✓ To know the mortality, morbidity and recovery indicators among total tested positive COVID-19 individuals in Delhi and the age sex composition of cases.
- ✓ To enlist the positive steps taken by the Delhi government to control the spread of COVID-19.



METHODOLOGY

- ✓ **Study design** : Cross sectional descriptive study
- ✓ **Study setting** : New Delhi state
- ✓ **Study population** : People susceptible to COVID-19.
- ✓ **Study duration**: March-June 2020
- ✓ **Data collection**: Secondary sources (MoHFW, WHO)
- ✓ **Data analysis** : Microsoft excel.

RESULTS AND DISCUSSION



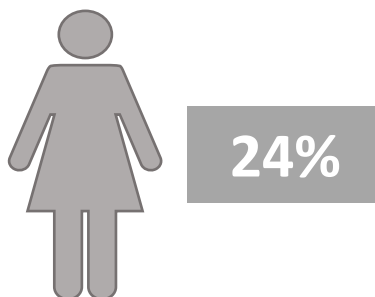
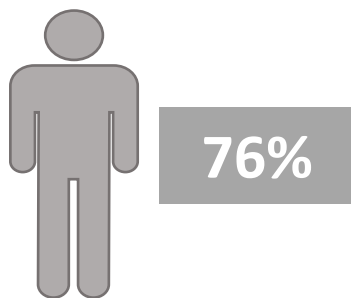
Name of the district	Number of cases	Percentage
NORTH EAST DELHI	25	0.029%
NORTH WEST DELHI	32	0.036%
NEW DELHI	37	0.043%
EAST DELHI	38	0.044%
SOUTH WEST DELHI	42	0.046%
SHAHADARA	48	0.053%
NORTH DELHI	60	0.069%
SOUTH DELHI	70	0.08%
WEST DELHI	122	0.14%
SOUTH EAST DELHI	130	0.15%
CENTRAL DELHI	184	0.21%
UNKNOWN	86,572	99.1%

The worst affected districts in Delhi were observed to be South, West and Central Delhi. Approximately 99.1% of the cases in Delhi were unknown from the beginning itself

Age and sex wise positive case

Age group	Percentage of cases	Cases
0-9	2.5%	2184
10-19	5.0%	4367
20-29	20.8%	18171
30-39	21.9%	19132
40-49	17.6%	15375
50-59	13.5%	11793
60-69	13.2%	11532
70-79	4.3%	3757
80-89	1.1%	961
90-99	0.1%	88

In Delhi most of the cases i.e. 60% of them has been found in the people of age group 10-50. The highest risk group for viral infection i.e. senior citizens (60 +), make up 17 percent of the Covid-19 patient population.

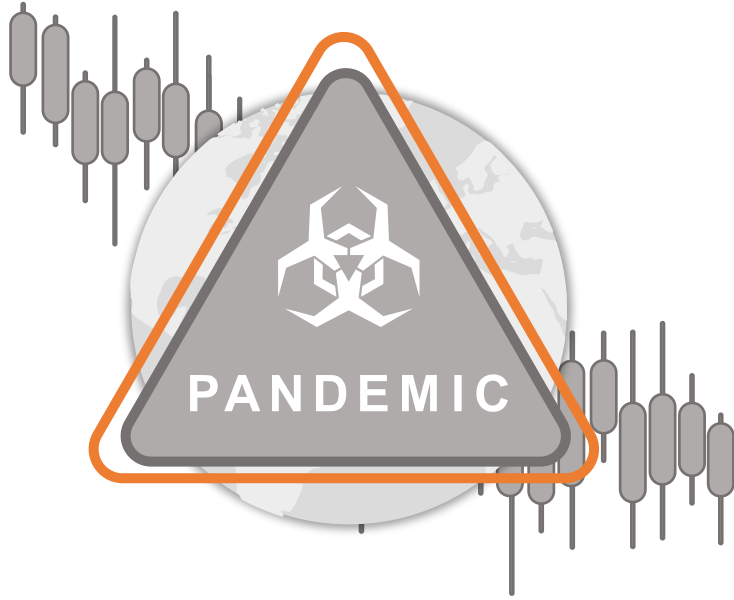


Total cases during different phases of lockdown

Lockdown date	Total cases	Percentage
25th March-14th April 2020	1,531	1.75%
15th April-3rd May 2020	2,988	3.42%
4th May-17th May 2020	5,505	6.30%
18th May-31st May 2020	9,790	11.21%
1st June-30th June	67,516	77.31%
TOTAL	87,330	

In the last phase of lockdown which was also referred to as unlock 1 the cases took a rise to increase to more than double. Around 77.3%(n=67,516) cases were seen during the reopening phase of lockdown.

Calculation of various parameters



Parameter	Figures
Mortality rate	3.14%
Rate of recovery	66.79%
Rate of increase	2.58%
Rate of decrease	-2.58%
Infection rate	0.44%
Confirmed cases per million	4,409
Tests performed per million	26,837

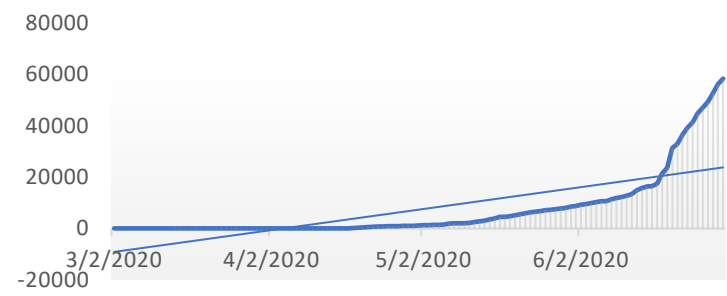
The mortality rate was determined based on deaths and reported cases, by dividing total deaths with a total number of confirmed cases. The mortality rate was 3.14 percent when calculated. Rate of recovery was figured out by dividing total cured cases with that of confirmed cases. Till 30th June the rate was 66.79%.

For rate of increase and decrease with respect to previous day first increase and decrease was calculated. For rate of increase the increase was estimated by subtracting new number with original number and vice versa for estimating decrease. The total rate of increase was determined by dividing increase with original number and the same for rate of decrease, i.e. decrease divided by original number. For increase rate the measure came out to be 2.58% and for decrease rate the measures were -2.58%(negative means that there has been increase).

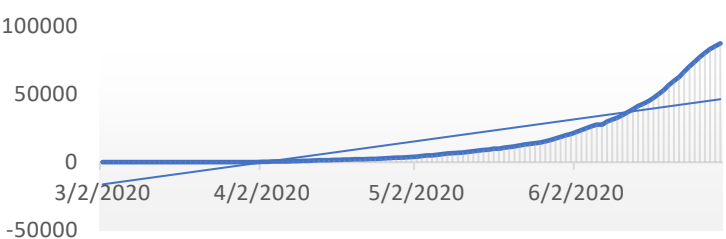
Infection rate was evaluated by dividing total confirmed cases with total state population which is 1,98,14,000. Till 30th June the infection rate was 0.44%. Confirmed per million cases were estimated by dividing confirmed cases by total of state population and multiplying it by 1 million. The total confirmed per million for 87,360 cases were 4,409 case whereas test per million was measured by dividing total test done in state which were 5,31,752 with that of total population and multiplying that with 1 million. The total per million people which came out be 26,837 tests.

Graphical representation of trend analysis for confirmed cases, cured cases, total deceased cases and tests performed from March to June:

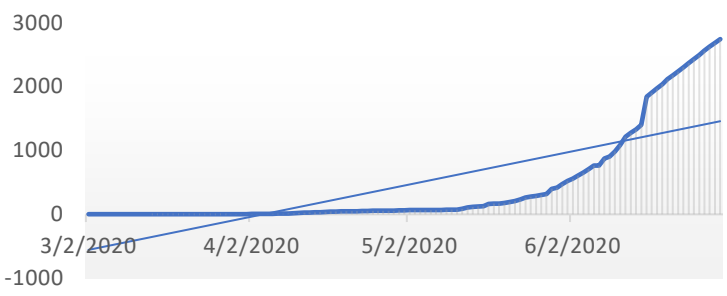
TREND ANALYSIS FOR CURED CASES



TREND ANALYSIS FOR CONFIRMED CASES

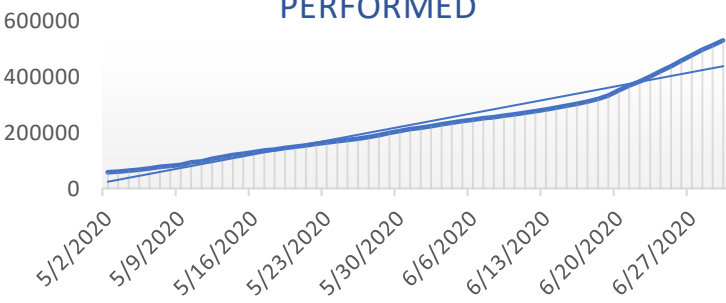


TREND ANALYSIS FOR TOTAL DEATHS



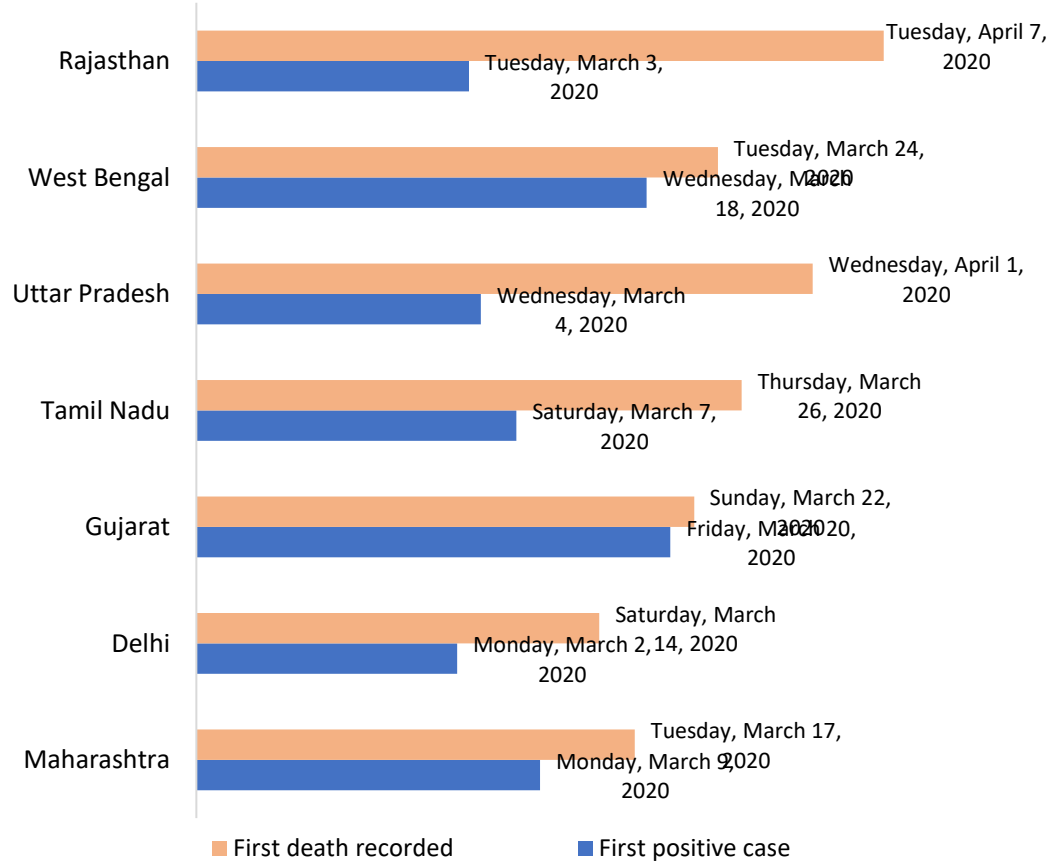
An upward trend has been observed. As the number of cases has increased gradually, the number of cured cases have also increased. The cured cases are almost doubled ($n=58,348$) as that of active cases ($n=26,270$) which is a sign of relief and represents the effectiveness of Delhi's health system.

TREND ANALYSIS FOR TOTAL TESTS PERFORMED



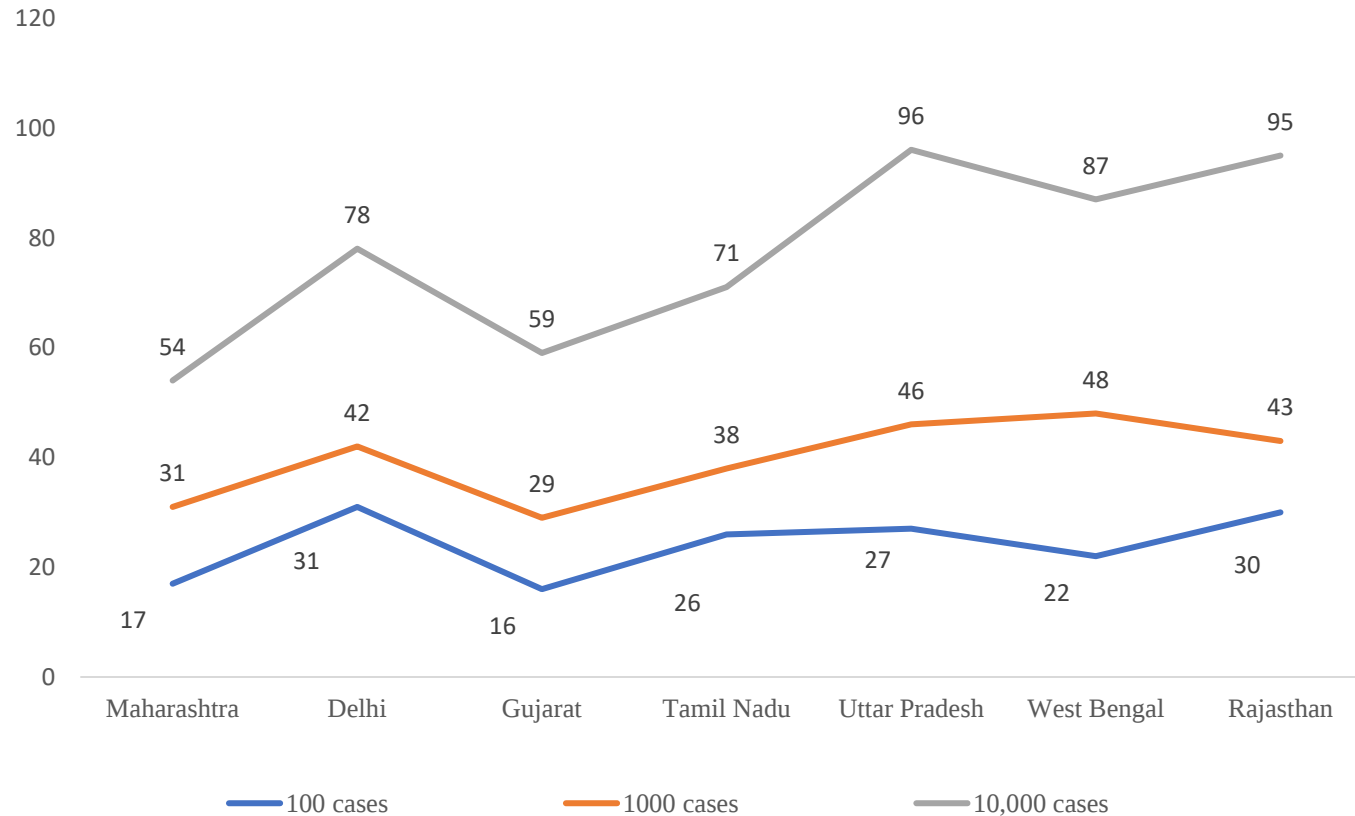
Comparing Delhi with the worst hit states of India reporting first case and first death

First Positive case and First Death recorded



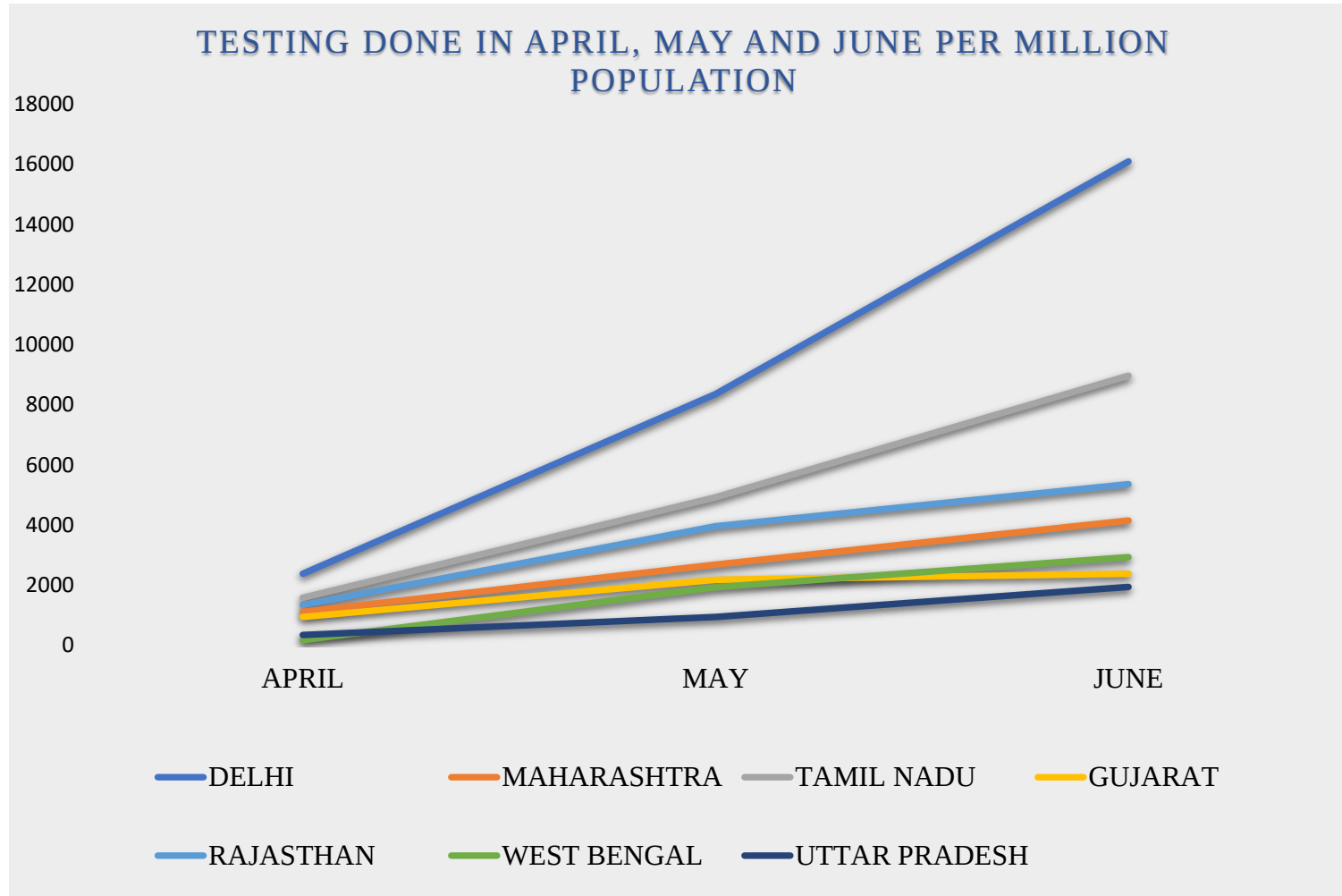
- In India, Kerala was the first state to report a COVID-19 case but slowly and gradually got control over spread of corona virus.
- Delhi is the one which reported the first case on 2nd March 2020 which is the earliest regarding other states and the first death occurred on 13th day from the day of reporting of first case.
- After Delhi is Rajasthan who reported its first case on March 3rd, but the time period between the first case and fatality is long as compared to Delhi i.e. 36 days.
- In present scenario Maharashtra is the state with highest number of COVID cases. Maharashtra recorded his first case on 9th march and first fatality occurred on 17th March.
- Gujarat was the state who recorded it first case in the last when compared to these seven states i.e. on 20th march and the gap between first case and the first case fatality was just 2 days which is the least.

Comparison between different states regarding days taken to reach first 100,1,000 and 10,000 cases



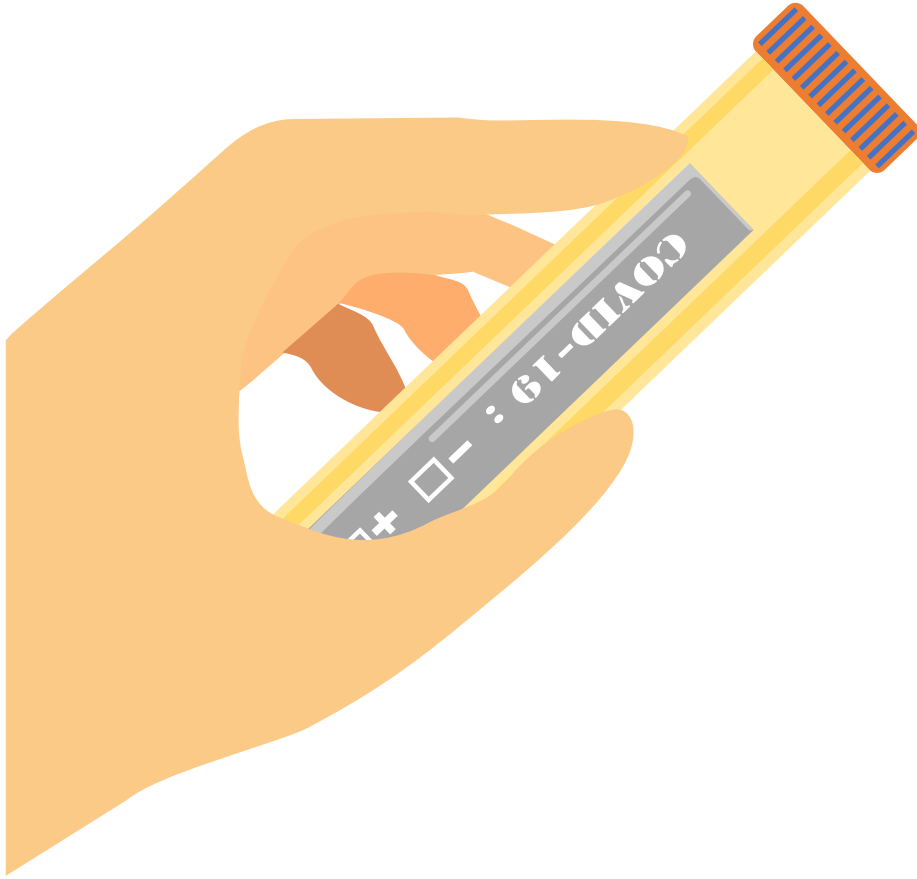
- It was depicted that Delhi was the only state among the top four highest case reporting states in which 10,000 cases took around 2.5 months to occur.
- Maharashtra which is currently on top with more than 1.5 lakh cases reached to 10,000 cases in just 54 days i.e. less than 2 months and the same figures goes for Tamil Nadu which presently has almost same number of confirmed cases as that of Delhi. Gujarat also 10,000 cases appeared in 2 months (n=59 days).

Comparing Delhi with the worst hit states of India with respect to test done per million population



Highest number of tests per million has been performed by Delhi and after that by Tamil Nadu which has almost equal number of confirmed cases as that of Delhi till 30th June. The lowest test per million is done By Uttar Pradesh which has the highest population among all the seven states.

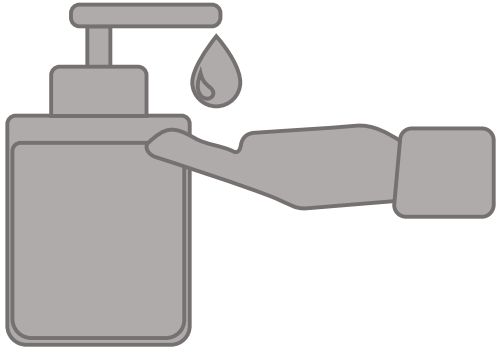
BEST PRACTICES ADOPTED



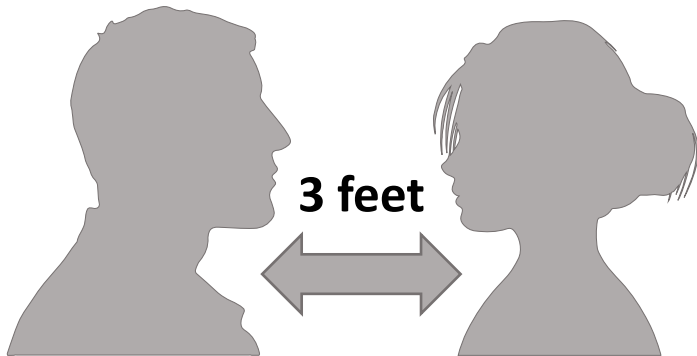
- Converting various stadiums and banquet halls in COVID facilities.
- Opened plasma bank in ILBS hospital, for plasma therapy treatment of COVID patients.
- Installed CCTV cameras in all COVID dedicated hospitals .
- Started serological surveys.
- Installed tablets in the wards of LNJP hospital which helps patient to interact with their relatives through video conferencing.
- Provided pulse oximeters to those under home isolation.

CONCLUSION

It can be concluded from the observational study that as the days are passing, havoc to human life due to this deadly virus is increasing. Delhi government is taking necessary steps to control the spread of COVID-19 in community. Delhi is under lockdown since 25th March 2020 and now reopening phase has been started.

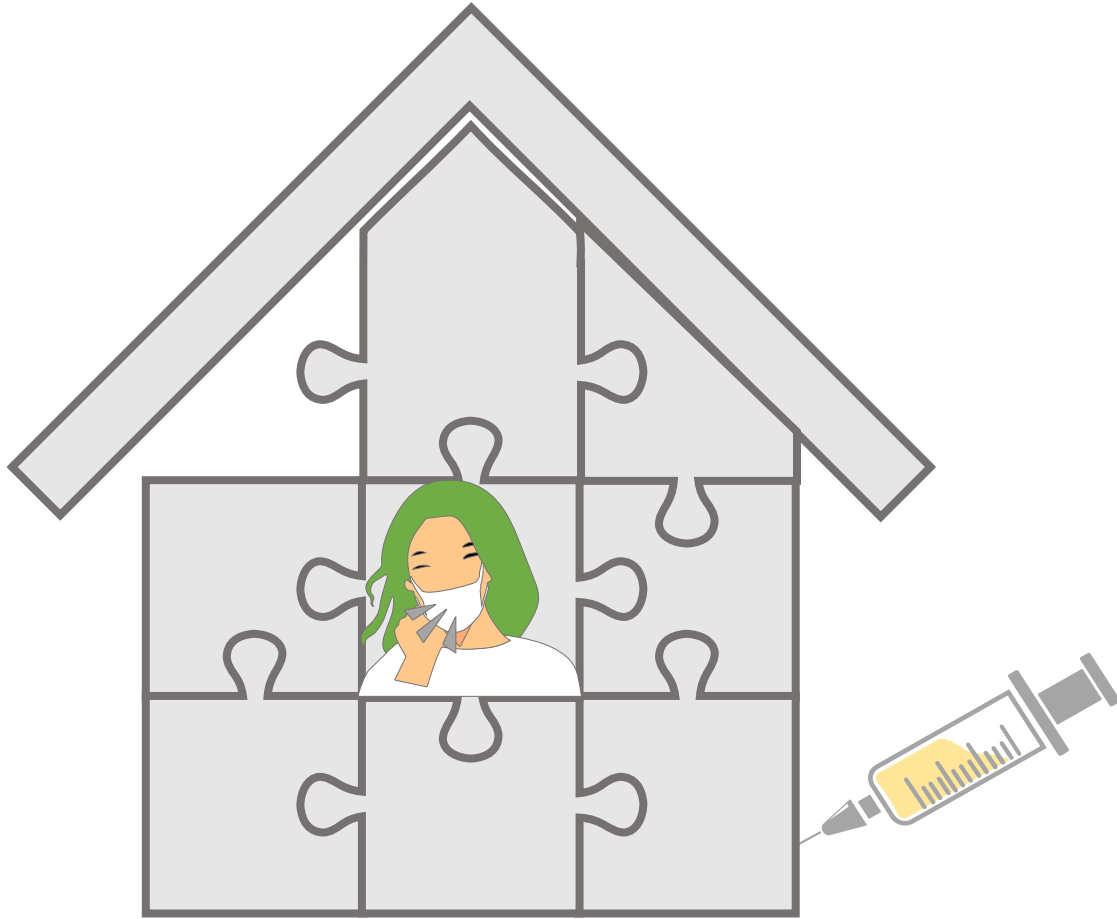


1. The current recovery rate is more than 65% in Delhi which means 65 people out of 100 are getting cured and recoveries have exceeded the figures of active cases.
2. The major sign of worry is the increasing trend of confirmed cases though the necessary steps are being followed but the increasing rate is not declining.
3. The tests done are the highest when compared to per million population.
4. Non-Pharmacological remedies like personal hygiene methods like hand washing, coughing into tissue or elbow, social distancing and avoiding unnecessary touching of eyes, nose, mouth and other body parts from which corona virus can enter the body are being followed.
5. Quarantine method is being followed by people who are in close contact with infected cases.



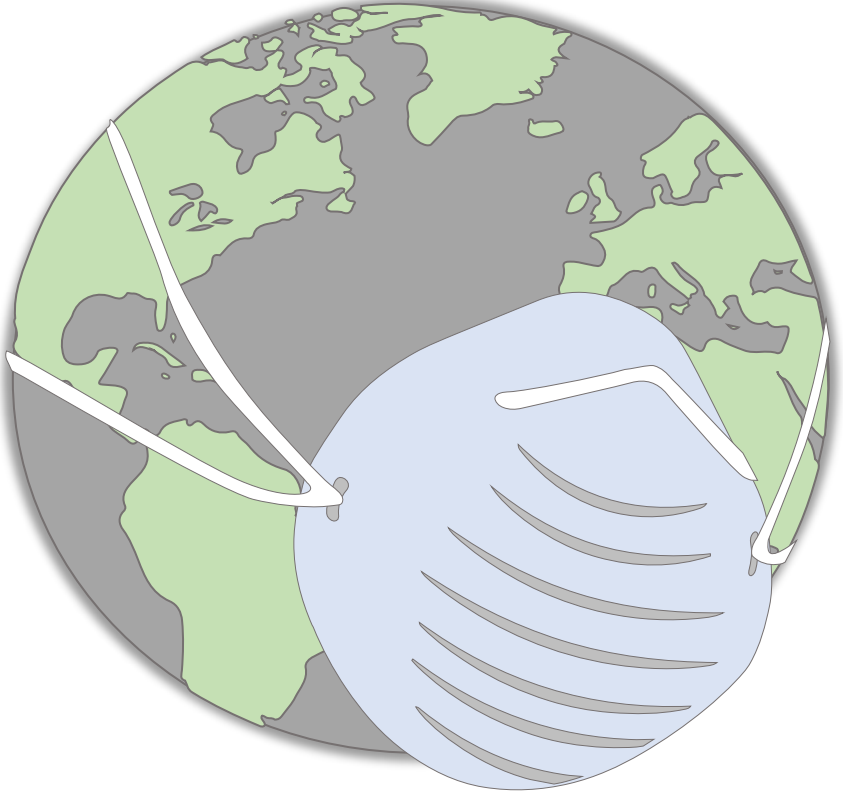
The need of a situation is that everyone should follow guidelines provided by government and health department and should take necessary precautions in order to eliminate this virus not only from state but also from country. As per the recent scenario we can say that time will address us regarding further outbreak and how it will be tackled.

CURRENT RULES AND REGULATIONS BY DELHI GOVERNMENT



- Imposing of penalty on violation of quarantine rules, wearing of mask etc.
- Order to carryout compulsory Rapid antigen detection testing for high risk group of individuals.
- Order fixation of COVID RTPCR test rate at Rs 2400.
- Order creation of hospital beds for COVID-19 in Banquet halls in all districts

RECOMMENDATIONS



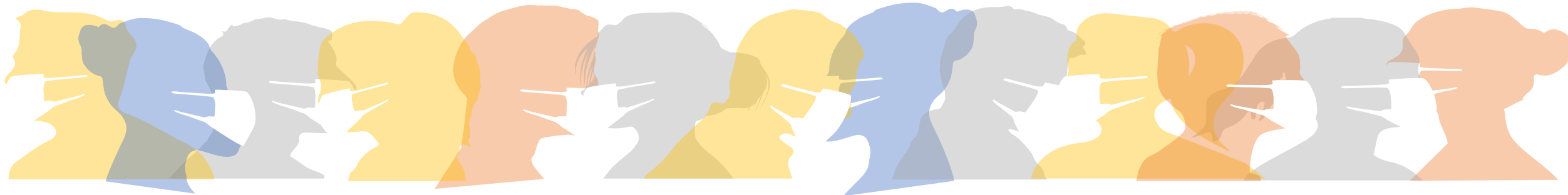
1. Delhi government should start random testing in containment zones and the nearby areas of those zones.
2. Immediate contact tracing should increase.
3. No more relaxations should be provided in reopening phase until at least mid-august (as cases have increased in unlock 1).
4. Strict rules regarding social distancing, at least 3 feet distance between individuals at shop.
5. Number of plasma banks can be increased.
6. Just like LNJP hospital tablets can be installed in other hospitals so that family members can meet their loved one virtually which will also decrease the risk of infection to them.

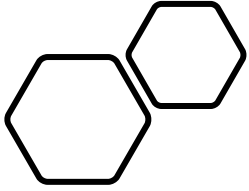
LIMITATIONS

1. There have been claims of underreporting of cases and death.
2. It is all based on numbers and the actual figures may vary and conditions may improve or deteriorate depending on the initiatives and steps taken by the government.

REFERENCES

1. Gupta, N., Praharaj, I., Bhatnagar, T., Thangaraj, J., Giri, S., Chauhan, H., Kulkarni, S., Murhekar, M., Singh, S., Gangakhedkar, R., Bhargava, B. and Team, I., 2020. Severe Acute Respiratory Illness Surveillance For Coronavirus Disease 2019, India, 2020. [online] Ijmr.org.in. Available at: <<http://www.ijmr.org.in/article.asp?issn=0971-5916;year=2020;volume=151;issue=2;spage=236;epage=240;aulast=Gupta>> [Accessed 22 July 2020].
2. Gupta, N., 2020. [online] Available at: <<https://www.monaldi-archives.org/index.php/macd/article/view/1294>> [Accessed 22 July 2020].
3. Kaushik, S., Kaushik, S., Sharma, Y., Kumar, R. and Yadav, J., 2020. The Indian perspective of COVID-19 outbreak. *VirusDisease*, 31(2), pp.146-153
4. India Today. 2020. *Young Indians Comprise More Than Half Of Confirmed Covid-19 Cases*. [online] Available at: <<https://www.indiatoday.in/diu/story/coronavirus-india-young-patients-age-groups-covid19-1662698-2020-04-03>> [Accessed 22 July 2020].
5. The Indian Express. 2020. *Covid-19: Three Delhi Districts Emerge As Worry In Centre Assessment*. [online] Available at: <<https://indianexpress.com/article/cities/delhi/three-delhi-districts-centre-assessment-coronavirus-6397575/>> [Accessed 22 July 2020].
6. India Today. 2020. *83% Of India's Coronavirus Patients Are Below The Age Of 50: Health Ministry Data*. [online] Available at: <<https://www.indiatoday.in/india/story/83-of-india-s-coronavirus-patients-are-below-the-age-of-50-health-ministry-data-1663314-2020-04-04>> [Accessed 22 July 2020].





PART-2

Name of the course:

**Understanding Clinical Research:
Behind The Statistics**

By: University of Cape Town

Course Description

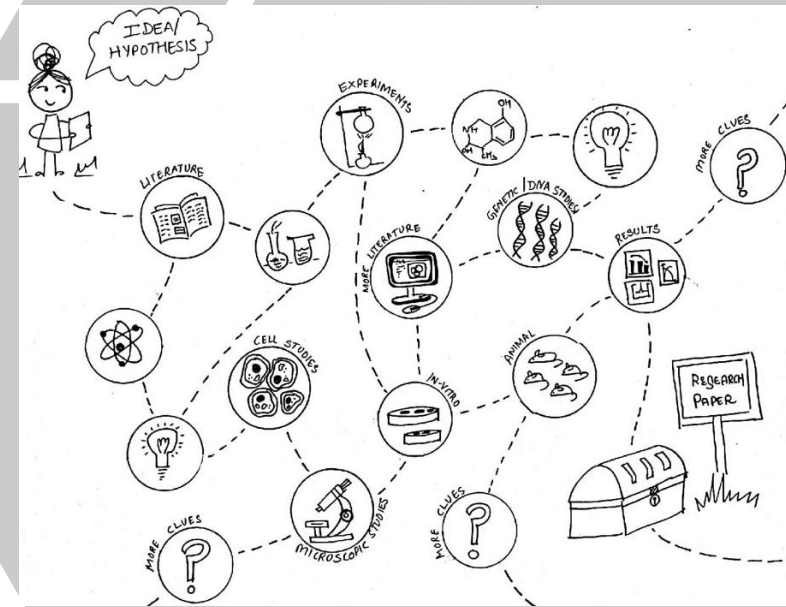
The duration of this program was 6 weeks (2–3 hrs per week) which ensured an easy understanding and interpretation of common statistical approaches. The program will provide information on types of clinical studies and the different forms of data that can be obtained using them and Confidence level and interval, parametric and nonparametric test, hypothesis testing etc

Course objectives

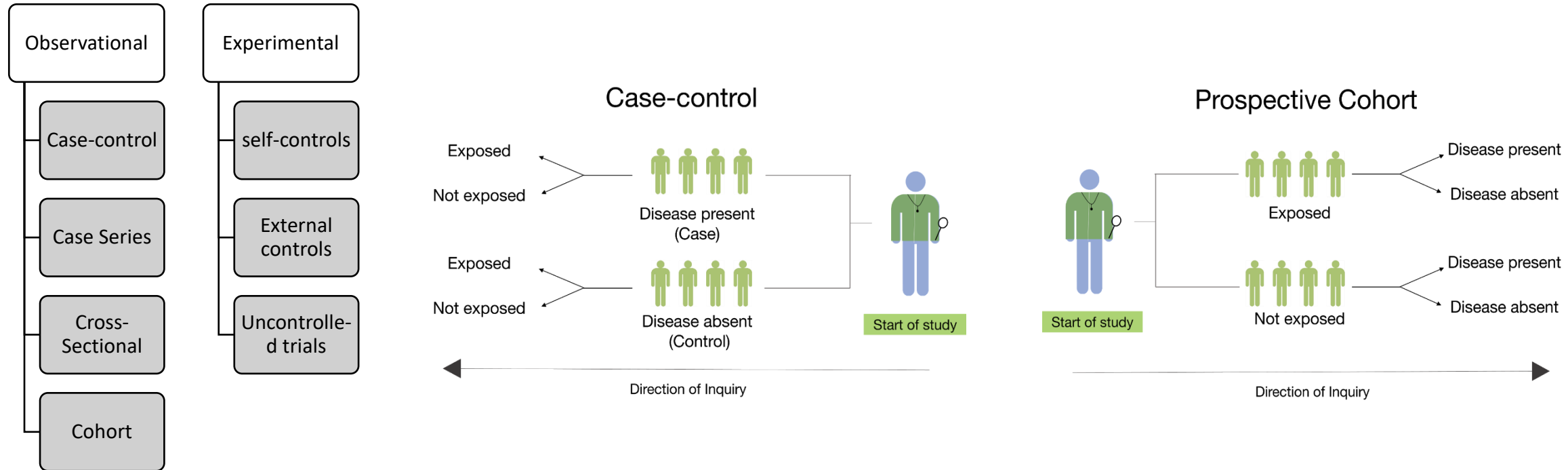
- Defining study types
- Describing your data
- Building an intuitive understanding of statistical analysis
- Hypothesis testing and confidence levels
- Which test should you use?
- Categorical data and analysing accuracy of results

Learning methodology used in the course

- Videos
- Readings materials
- Power point presentations



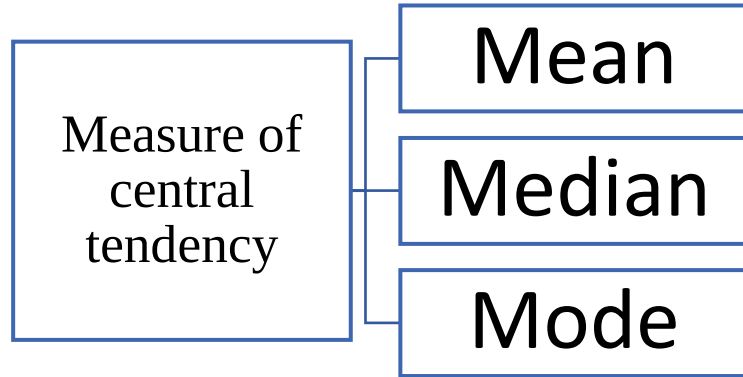
Week-1 Types of study designs



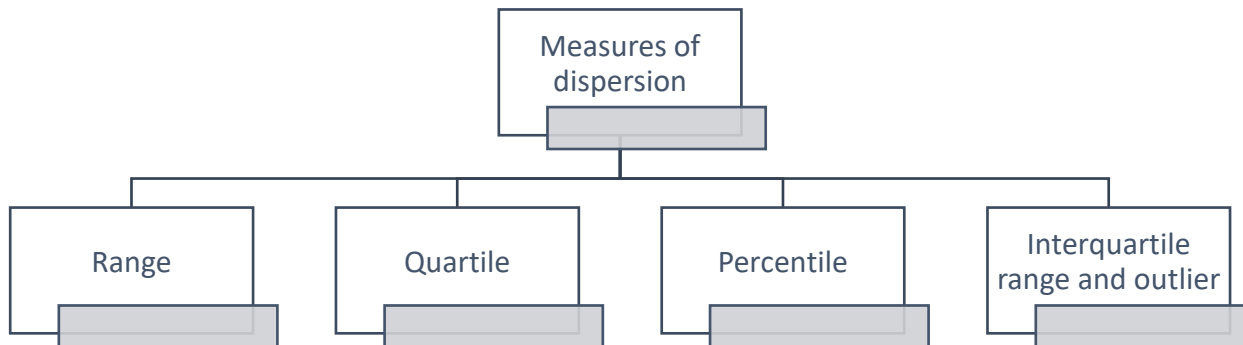
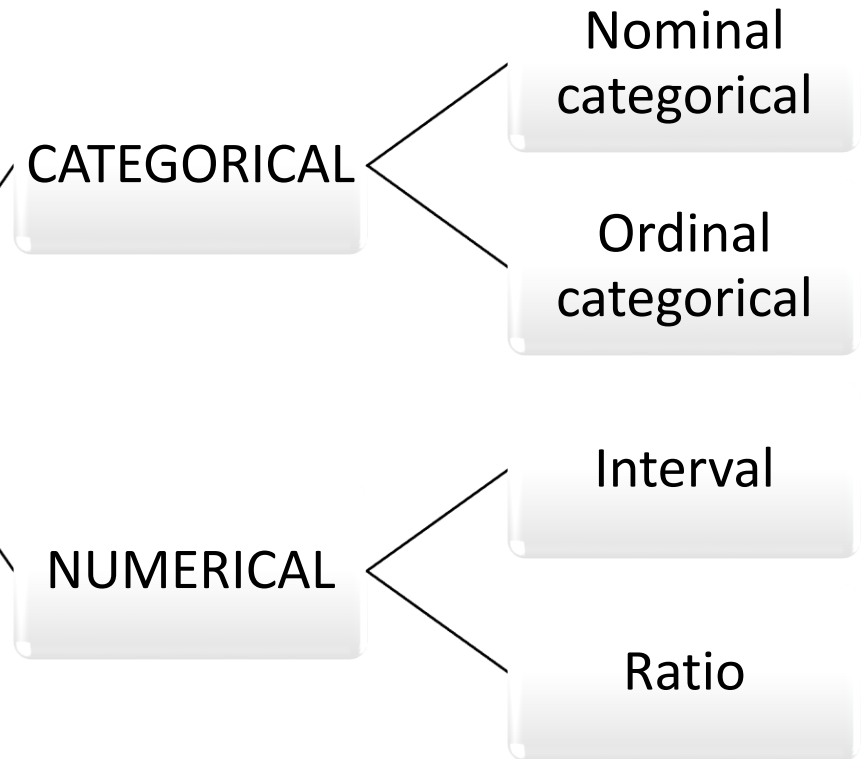
Meta-analysis: It is an outcome of systematic reviews and it is a statistical process to develop an overall conclusion using studies which exist previously (with similar investigation) and by combining the statistical inferences of those studies.

Systematic review: It is a process which include determining a question, setting an inclusion and exclusion criteria, finding, selecting, appraising and synthesizing the literature.

Week-2 Describing your data



Two types of data:

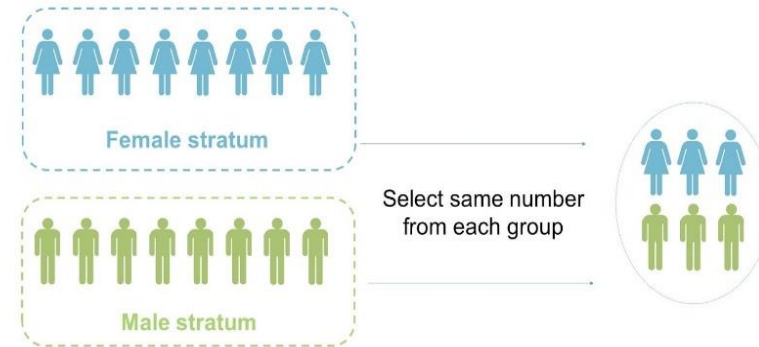


Sampling: Sampling is a technique of selecting sample from a population.

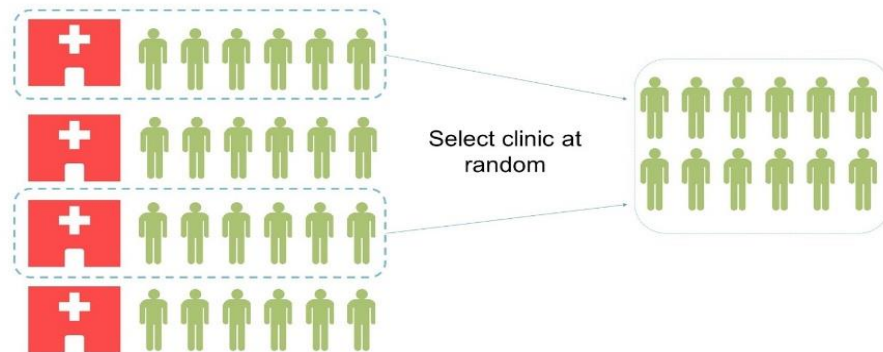
Simple random sampling



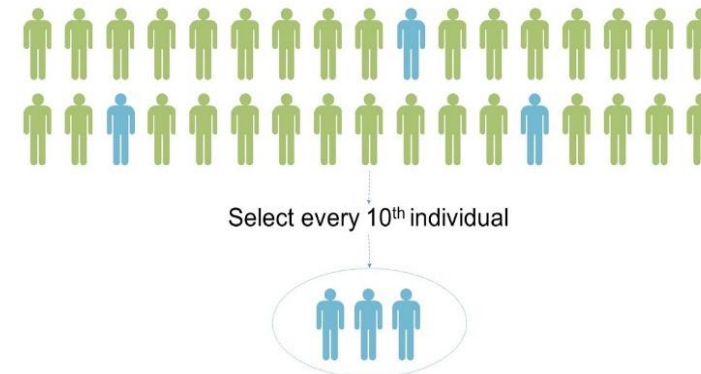
Stratified random sampling



Cluster random sampling



Systematic random sampling



Week-3 Understanding different tests and theorems for statistical analysis

P value: P value is the likelihood of occurring of an event. A simple geometrical curve is drawn and area under that curve is calculated.

Outcome	Combinations						Total
2	1+1						1
3	1+2	2+1					2
4	1+3	3+1	2+2				3
5	1+4	4+1	2+3	3+2			4
6	1+5	5+1	2+4	4+2	3+3		5
7	1+6	6+1	2+5	5+2	4+3	3+4	6
8	2+6	6+2	3+5	5+3	4+4		5
9	3+6	6+3	4+5	5+4			4
10	4+6	6+4	5+5				3
11	5+6	6+5					2
12	6+6						1

Central limit theorem: CLT is the foundation for parametric hypothesis testing. Understanding this theorem provides knowledge of how to apply inferential statistics to data.

According to CLT if we select random samples from any distribution and we calculate mean i.e. the average, then the distribution of that mean will give normal or bell-shaped curve.

The CLT allows the use of confidence intervals, hypothesis testing, design of experiments, regression analysis, and other analytical techniques on data.

Types of distributions

Normal
distribution

Z
distribution

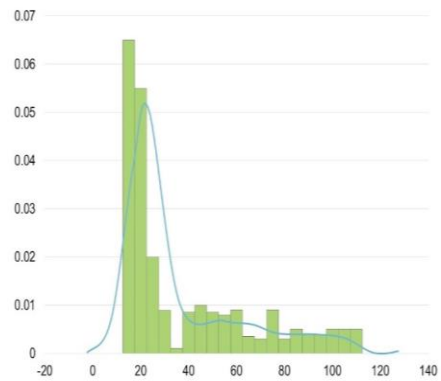
Sampling
distribution

T
distribution

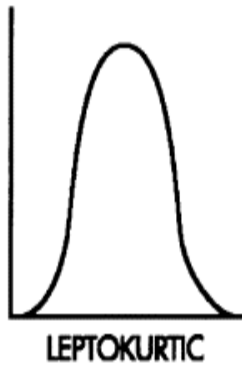
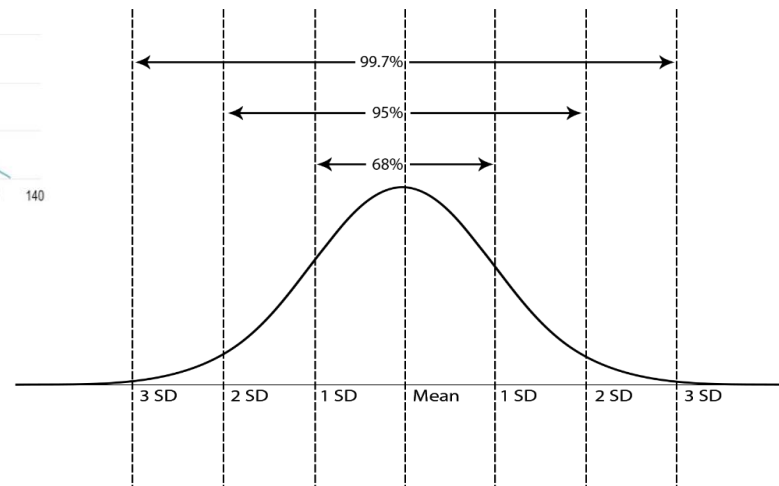
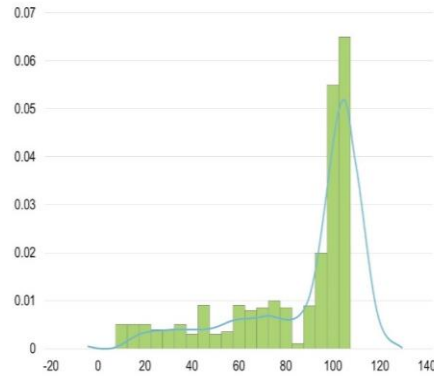
Skewness: Skewness may be referred to as the changes in the symmetry of normal distribution or bell-shaped curve

Kurtosis: Kurtosis essentially describes the type of tail generated by a curve as a result of the data spread.

Positive skewness



Negative skewness



Week-4 Testing hypothesis and describing confidence level

Hypothesis testing: Hypothesis is basically an assumption which statistician make about the population parameters. That assumption can be true or can be false. Hypothesis testing is performing the specific tests to check whether the assumptions made are true or false. There are two type of hypothesis testing.

- Null hypothesis (H_0)
- Alternative hypothesis (H_a)

The two-tailed test: When we test null hypothesis (meaning no difference) or non-directional hypothesis (that is there is difference, but it is not telling what kind of difference it is whether positive or negative) we use two tailed test. There is any difference or not without any concerns of signs.

One tailed test: If it is said that in two groups one mean is more and other is less.

	The null hypothesis is valid	The null hypothesis is invalid
Reject the null hypothesis	Type I error	✓
Fail to reject the null hypothesis	✓	Type II error

Type 1 and 2 error

Confidence level: The probability with which a true null hypothesis is accepted is termed as confidence level

Confidence interval: Confidence interval is referred to as the accuracy of our estimates.

Week-5 Type of test to be used

Parametric tests: Parametric tests are those that make assumptions about the parameters of the population distribution. They assume underlying statistical distribution (following normal probability curve distribution) in the data. Many validity criteria must be met for the parametric test result to be accurate.

T test

Anova

Linear
Regression

Non-parametric test: Also referred to as distribution free test as they do not depend upon any kind of distribution. In this no assumption is made about the distribution of data i.e. whether the data is normally distributed or not. They are applied when the conditions of validity related to parametric test are not met. These are only used when no assumption exists regarding the distribution. Their accuracy depends on how appropriately the researcher has used the test.

Mann-
Whitney-U
test

Wilcoxon
sign-rank
test

Week-6 Describing categorical data and various tests for analysing accuracy of the results

Comparing categorical data:

- a) The chi-squared goodness-of-fit test
- b) The chi-squared test for independence
- c) Fisher's exact test

Predictive values:

When a test yield a true result for true stats, we call it as positive predicted value and when a test produces a false result for false stats, we call it as false predicted value.

Sensitivity and specificity

		<u>Actual Results</u>	
		Positive	Negative
<u>Model Predictions</u>	Positive	<u>True Positive</u> The number of observations the model predicted were positive that were actually positive	<u>False Positive</u> The number of observations the model predicted were positive that were actually negative
	Negative	<u>False Negative</u> The number of observations the model predicted were negative that were actually positive	<u>True Negative</u> The number of observations the model predicted were negative that were actually negative

EXTRA-CURRICULAR ACTIVITIES

1. Effect of COVID-19 on Academics of College Students
With: Hansika Parwani, under the Guidance of Dr. Sujata Verma, Associate Professor.
2. Insomnia and Psychological Issues among Health Care Workers during Pandemic COVID-19
With: Vinny Dureja, under the Guidance of Dr. Neetu Purohit, Associate Professor.
3. Public health intern at Foundation of healthcare technologies and society(fhts).
4. Research intern at Udayan care, NGO.

THANK YOU