



# Statistics & Biostatistics

Biostatistics & Research Methodology  
B Pharm 8<sup>th</sup> Sem | M. Pharm. | PhD



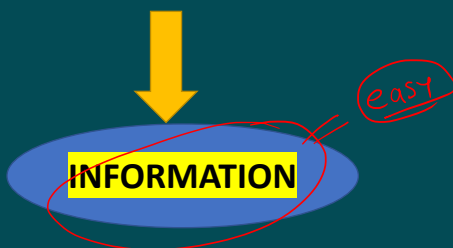
# STATISTICS

# STATISTICS



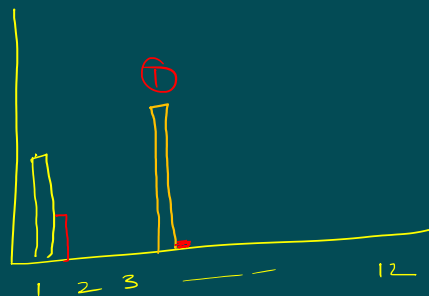
🧠 **Statistics**, is a mathematical body of science that relates or define to the

- 🧠 Collection,
- 🧠 Analysis,
- 🧠 Interpretation or explanation,
- 🧠 and **PRESENTATION** of **DATA** -(Numerical Values)

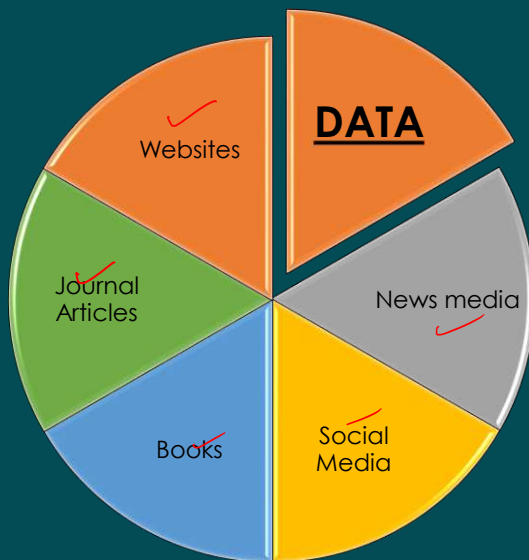


pm = 10000

	expense	Balance
1	8k	2k
2	6	4
3	3	7
4	10	0
5	8	2
6	7	3
7	6	4
8	9	1
9	10	0
10	8	2
11	9	1
12		



## STATISTICS



## STATISTICS



S N	Students	IMA	IP	NDDS	Ph Practic e	Total	%
1	Bhavesh	78	85	87	85		
2	Kusum	87	82	73	78		

## STATISTICS



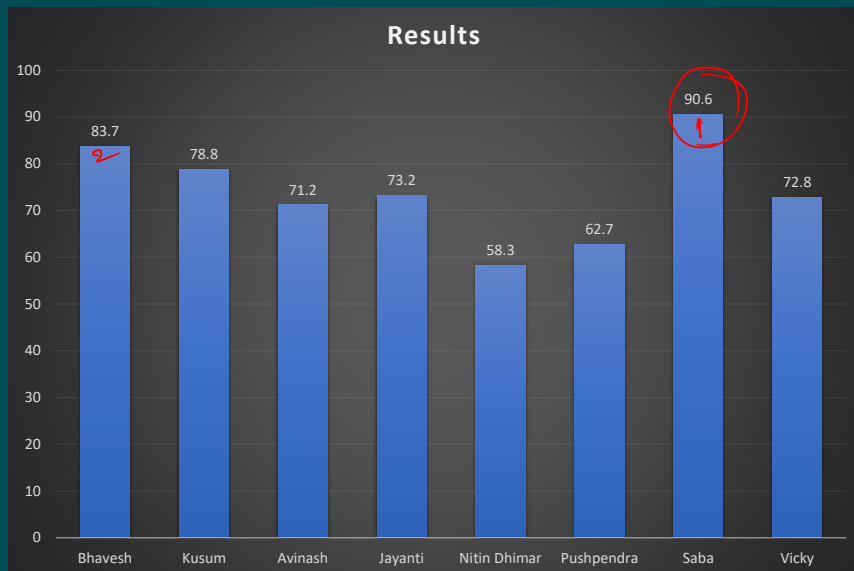
S N	Students	IMA	IP	NDDS	Ph Practic e	Total	%
1	Bhavesh	78	85	87	85	335	83.7 ✓
2	Kusum	87	82	73	70	312	78.8 ✓

## STATISTICS

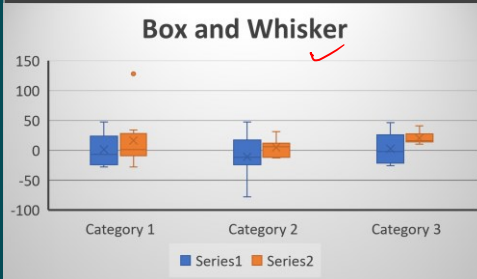
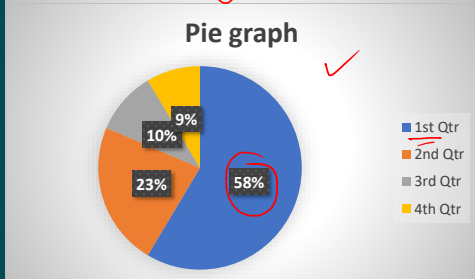
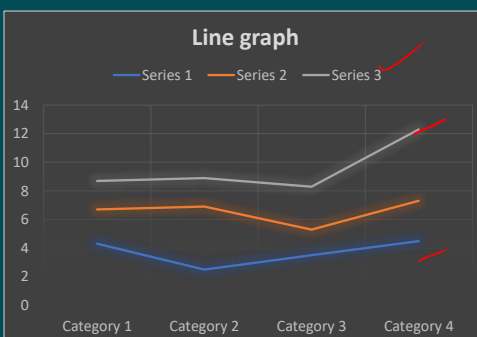
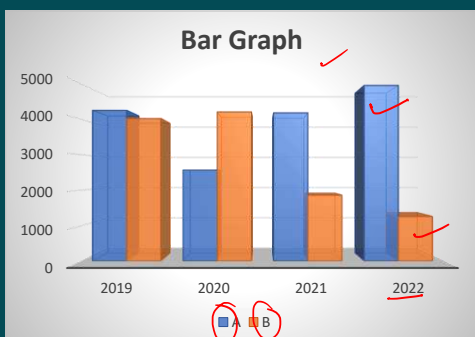


SN	Students	%
1	Bhavesh	83.7
2	Kusum	78.8
3	Avinash	71.2
4	Jayanti	73.2
5	Nitin Dhimar	58.3
6	Pushpendra	62.7
7	Saba	90.6
8	Vicky	72.8

# STATISTICS



# STATISTICS



# STATISTICS



📌 The German statistik, first introduced by Prof. Gottfried Achenwall (1749), originally designated the data analysis of the state.

📌 Statistics- Science of Numbers/Data,

**Numbers/Data**



**INFORMATION** ✓

📌 Statistics helps to learn about

- 📌 How collect the data ✓
- 📌 How to analyze data- Statistical methods
- 📌 How to explain or interpretate the data
- 📌 How to present the data

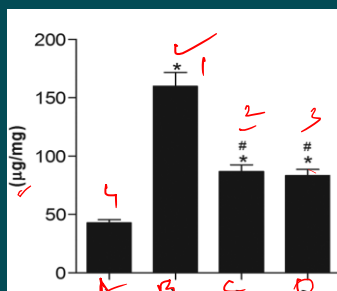
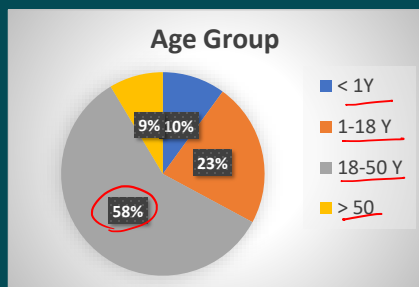


BIO-  
STATISTICS

# BIostatISTICS



- 📌 **Biostatistics**: application of **statistical methods** in the **Biology**
- 📌 When the Statistical tools & Techniques are used to applied to analyze the **Biological**, **Medical**, and **Pharmaceutical data**, that is called **BIostatISTICS**
- 📌 Biostatistics are also referred as **Biometry** and **Biometrics**



gsm

# BIostatISTICS



## Biostatistics

### Biological

- Biological process ✓
- Birth/mortality rate ✓
- Crop Study ✓
- Environment Study ✓

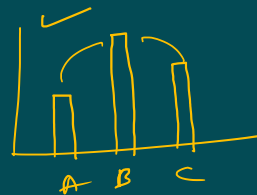
### Medical

- Clinical Trial data ✓
- Epidemiology ✓
- Disease Occurrence ✓
- Clinical Survey ✓

### P'Ceutical

- Drug Evaluation ✓
- Pharmacokinetic Data ✓
- Comparative Study of Drugs ✓
- Toxicological Data ✓

- A - Normal - Saline  
 B -> Hypertension  
 C -> HTN + Tel drug  
 D -> HTN + Dummy



	A	B	C	D
1	120	180	140	170
2	110	190	160	180
3	130	200	150	190

A vs B

---

Mean: (120) (190) 150 (180)

SD  
SEM

Similar

# Frequency Distribution

Biostatistics & Research Methodology  
 B Pharm 8<sup>th</sup> Sem | M. Pharm. | PhD



## Frequency Distribution

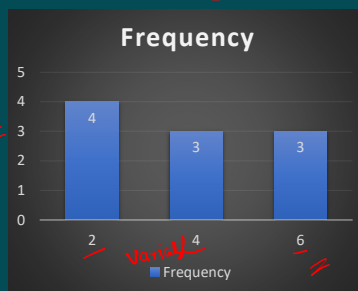


🔑 **Frequency (F)**- 'Repetition' ✓

🔑 The **frequency** of a value is the number of times it occurs in a dataset

🔑 **Example**- SKY- 6, 4, 2, 2, 4, 6, 6, 4, 2, 2

SN	Shots	Frequency
1	2	4
2	4	3
3	6	3



Frequency Table and Graph

No. of =

Atendal = 2  
5 times = 3

## Frequency Distribution



🔑 **Frequency Distribution**- A frequency distribution is a representation, either in a graphical or tabular format, that displays the number of observations (Frequency) within a given interval or dataset.

### Ungrouped data ✓

- Variable data given as individual points (i.e. values or numbers)
- Ex.- 2, 4, 6

### Grouped Data ✓

- data (or information) given in the form of class intervals
- Ex, 0-10, 10-20, etc



# Frequency Distribution

## Frequency Distribution (FD)

### Discrete FD

- Generally having ungrouped data (variable)
- Variable- Single Value
- Frequency- Value

### Continuous FD

- Generally having grouped data (variable)
- Variable- Class interval
- Frequency- Value

Survey 1: no. of HTN Patients per Family (150) (N=790)

SN	No. of HTN Patients	No. of Family
1	0 ✓	50
2	1 ✓	20
3	2 ✓	70
4	3 ✓	10

Survey 2: no. of HTN Patients with age group (n=190)

	Age (Y)	No. of Patient
1	0-20	0
2	20-40	10
3	40-60	100
4	60-80	80

(A)

FN	No. of Pat
1	0 =
2	2
3	4
4	2
5	1
6	1
150	0

(B)

Small group

SN	No. of Pat
1	0
2	1
3	2
4	
5	
6	

(Tally) (F)

No. of Family

||||| = 50

|||| = 20

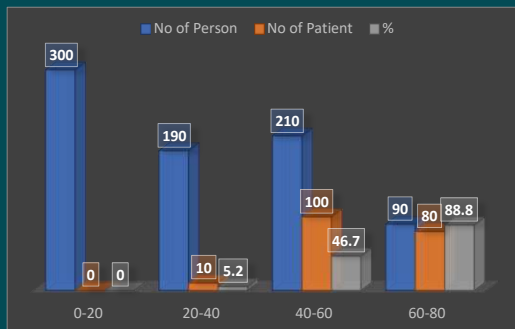
1

# Frequency Distribution



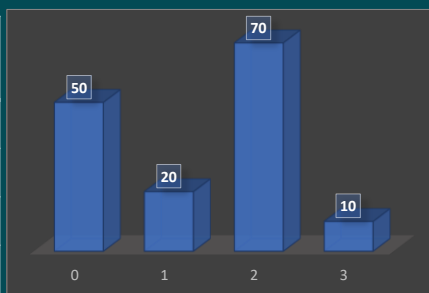
## Continuous FD

	Age (Y)	No of Person	No of Patients	%
1	0-20	300	0	0
2	20-40	190	10	5.2
3	40-60	210	100	46.7
4	60-80	90	80	88.8



## Discrete FD

SN	No. of HTN Patients	No. of Family
1	0	50
2	1	20
3	2	70
4	3	10



# Frequency Distribution



## General Consideration:

No of Class or category should be 5 to 15 (but not rigidly)

Avoid class interval as 3, 7, 11, 26, etc

Preferable group- 5 or multiple of 5 (lower limit)

① 3, 7, 11, 5, 21, 22, 9, 28, 21, ③0

②4, 29, 42, 41, 26, 54, ⑤9, 25, 29,

*Handwritten notes:*  
 Su variable  
 0-5-10  
 5-10 10-20  
 |||||  
 0-5, 5-10, 10-15, 15-20, 20-25, 25-30  
 20-30 30-40 40-50 50-60

To ensure continuity and get correct intervals, we should adopt Exclusive method of classification (Upper limit if exclusive) ?

Sometimes Inclusive method is adopted and need correction ?

## Frequency Distribution



Exclusive Upper Limit

Example: Raw data: 1, 5, 3, 10, 8, 11, 16, 18, 19, 4

Arranged data: 1, 3, 4, 5, 8, 10, 11, 16, 18, 19

	Weight (Kg)	No of Person
1	0-5	3
2	5-10	2
3	10-15	2
4	15-20	3

Inclusive Upper Limit

	Weight (Kg)	No of Person
1	0-4	3
2	5-9	2
3	10-14	2
4	15-19	3

## Frequency Distribution



Inclusive Upper Limit

	Weight (Kg)	No of Person
1	0-4	
2	5-9	
3	10-14	
4	15-19	

Correction Factor =  $(2^{\text{nd}} \text{ LL} - 1^{\text{st}} \text{ UL})/2$   
 $5-4/2 = 1/2 = 0.5$

	Weight (Kg)	No of Person
1	0-4.5	
2	5-9.5	
3	10-14.5	
4	15-19.5	



# Thanks for Watching



## Subscribe my YouTube Channel

