

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

# Biostatistics

**Lecture two**

**Doctor:**

**Nedal Nawaiseh**

**Done by Doctor:**

**Abdullah daradkh**

**Mahmoud Otoom**

# GRAPGHICAL PRESENTATION

## 1- THE LINE GRAPH

\* This type is specifically used when we are dealing with a certain observation that varies according to ***time***.

\* That is when we are dealing with a time variable. (The time variable is a special type of continuous quantitative variable)

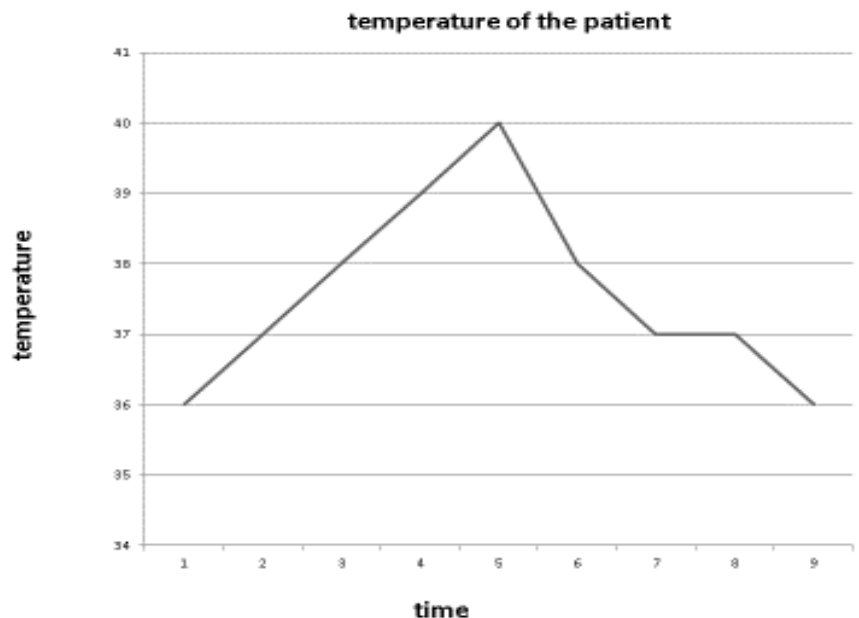
Usually **the time variable** is put on the **horizontal axis (X-axis)** and the other variable is put on **the vertical axis (Y-axis)**,

then each observation is shown on the graph by means of a point opposite to the exact time value on the horizontal axis and opposite the corresponding value on the vertical axis,

then every two consecutive points are joined by a straight line.

Example of this is a temperature chart of the patient. It is also used in study of trends of birth and death rate

Time	temperature
1	36
2	37
3	38
4	39
5	40
6	38
7	37
8	37
9	36



## 2- THE BAR CHART: (columns)

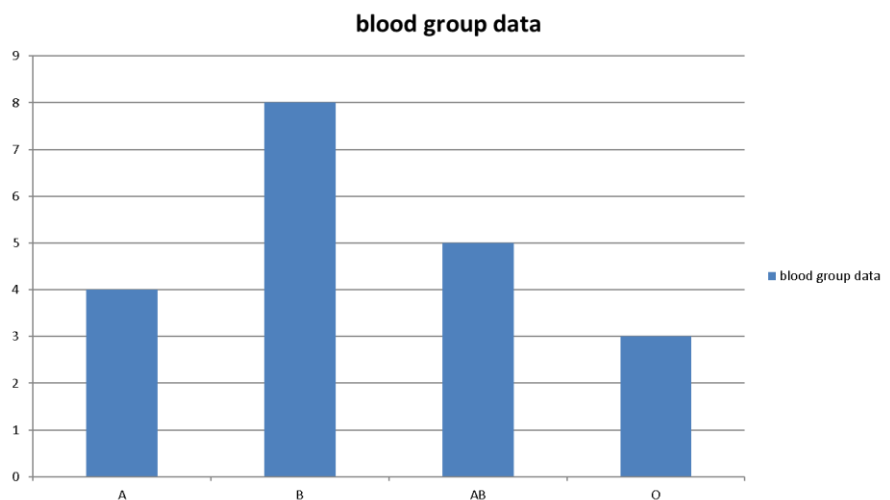
This type of graph is suitable to represent data of the two subtypes of **qualitative** and **quantitative discrete** type.

Each category in the table is represented by a **bar** or **column** or **rectangle**,

So the height of the bar is opposite to the corresponding **frequency on the Y axis.**

All bars must have the **same width** and a **space** must be left between every two consecutive bars, the width of that space is about same or **half the width of the bar.**

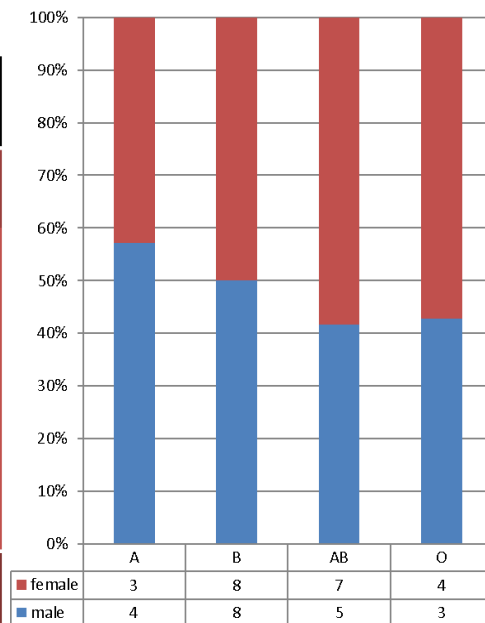
Blood Group	Frequency
A	4
B	8
AB	5
O	3
Total	20



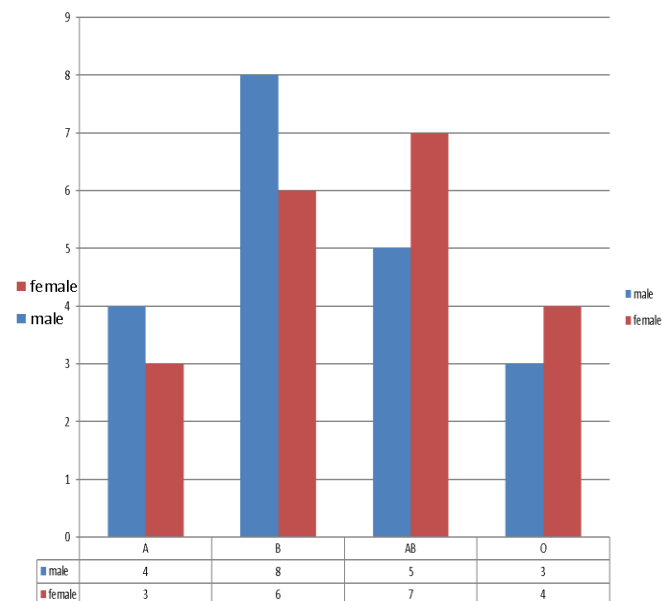
N.B: sometimes a complex table can be represented by means of a bar graph, in such case a key must be added to the graph to show different types of bar

Stacked bar chart

Blood Group	sex	
	Male	Female
A	4	3
B	8	6
AB	5	7
O	3	4
Total	20	20

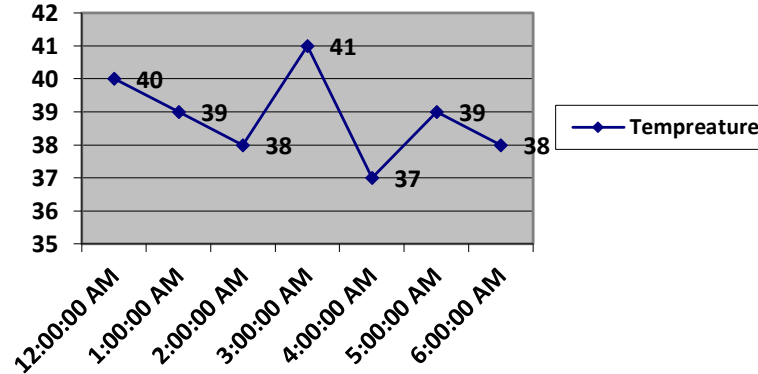


Clustered bar chart



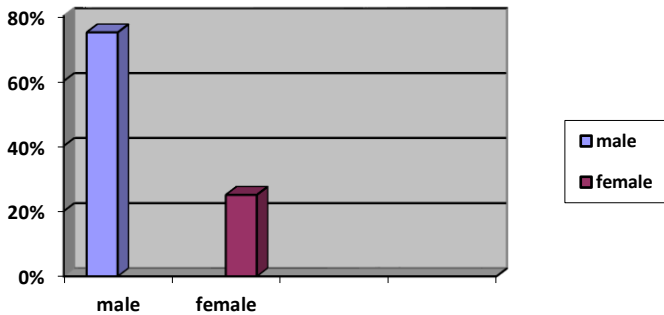
**مثال:** قمنا بقياس حرارة مريض بدءا من الساعة 12 صباحا و استمررنا بأخذ قياس لدرجة الحرارة كل ساعة فكانت القيم كالتالي 40 , 39 , 38 , 41 , 37 , 39 , 38

### line chart



**مثال:** عدد الطلاب 200 منهم 150 ذكور و 50 اناث

• لا نستخدم clustered bar chart بل نستخدم simple bar chat  
لانه لا يوجد الا عمودان



### 3- THE HISTOGRAM

The histogram is suitable for **continuous quantitative** variable, it is used **only** when the table is of a simple frequency distribution type.

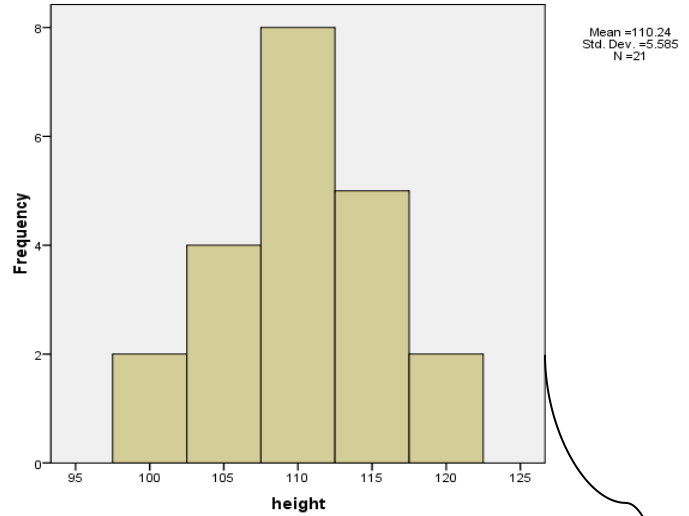
In the histogram each interval in the table is represented by a **column**,

the height of which is opposite the frequency **on Y axis**. One side of the column should arise from **the lower limit** of the interval and the other from **the upper limit** of the interval on the **X axis**.

So, **NO** space between the consecutive columns.

N.B: Sometimes in histogram a scale break is used when the lower limit of the first interval is far from zero, this is allowed only on the horizontal axis, it should not be used on the vertical axis

Height in (cm)	No. of children
100-	2
105-	4
110-	7
115-	5
120-125	2
Total	20



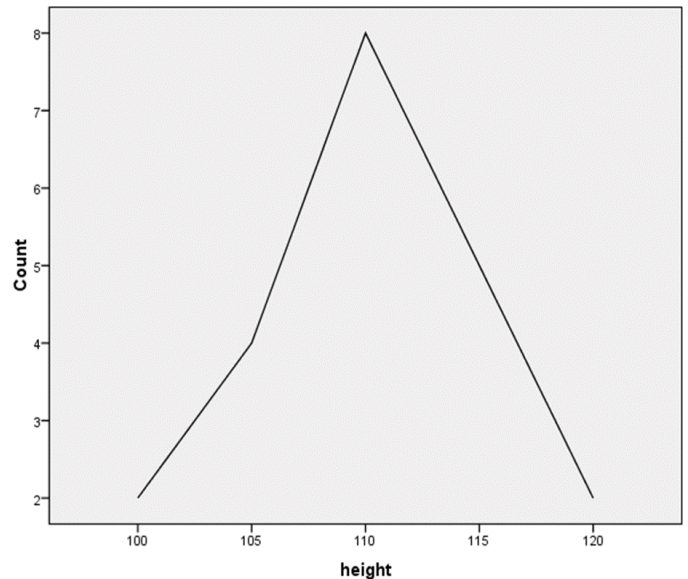
**FREQUENCY POLYGON** إذا وضعنا نقطة في منتصف كل عمود و قمنا بتوصيلها مع بعضها البعض سينتج ما يسمى

This type is used when the variable is of continuous quantitative type and the table is of simple or complex type.

Each category on the table represented by single point opposite its frequency on Y axis **and the mid-point of the interval on X axis.**

Then every two consecutive points are joined to gather by a straight line.

\*the scale break may be used, also key may be used when necessary.



## 5- THE PIECHART

It can be used for all of the four types of variables,

the circle is divided into a number of sectors equal to the number of categories or intervals in the table,

usually the division of the circle starts from 12 O'clock and it goes in a clockwise direction. Each sector is proportional to the frequency of the category.

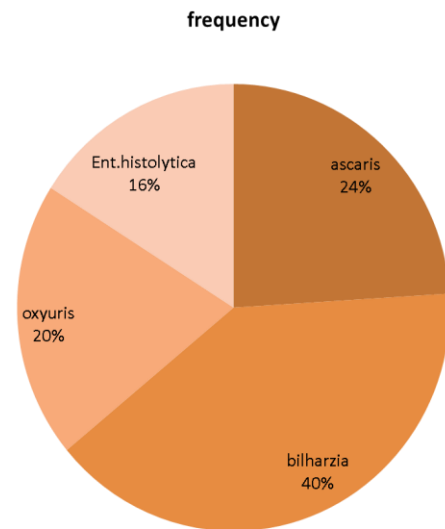
This is changed by calculating the angle of each sector.

frequency of the category or interval | **X 360**

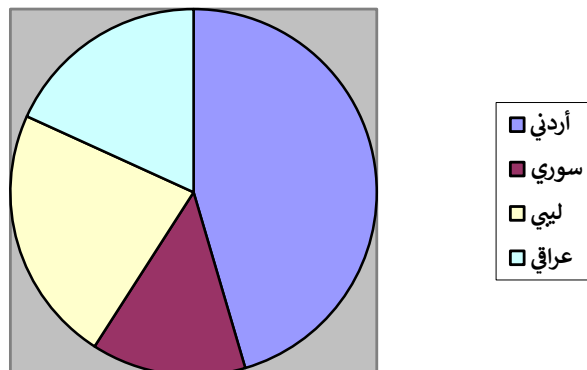
Angle = \_\_\_\_\_

Total frequency

types of parasite	frequency	angle
ascaris	6	86.4
bilharzia	10	144
oxyuris	5	72
Ent.histolytica	4	57.6
total	25	360



**مثال:** ارسم pie chart لتوزيع الجنسيات التالية 30 سوري , 40 عراقي , 50 ليبي, 100 أردني



# Review

## Review

1. **INFERENCEAL STATISTICS** An area of statistics that is concerned about methods of drawing conclusions about a population based on a sample.
2. A **PARAMETER** is a piece of numerical information about a **POPULATION**, and a **STATISTIC** is a piece of numerical information about a **SAMPLE**.

N.B. The random variable from which a statistic is calculated is referred to as an **ESTIMATOR**.

- **Diagrams**
  - Pie Charts
  - Bar Graphs
  - Histograms
- **Measures of central tendency**
  - mean
  - median
  - mode
- **Measures of dispersion**
  - sample variance
  - sample standard deviation