# Statistic tables and figures

## 3. Describing data by tables and graphs

## 3.1 Qualitative variable

**1- Frequency (or count):** The number of observations that fall into particular class (or category) of the qualitative variable.

**2- Frequency distribution:** A table listing all classes and their frequencies**.**

**3-Relative frequency (percentage):** find the percentage by dividing the frequency of the class by the total number of observations and multiplying the result by 100**.**

$$\text{Relative frequency of the class} = \frac{\text{Frequency in the class}}{\text{Total number of observation}}$$

**4- Relative frequency distribution:** A table listing all classes and their relative frequencies.

**5- Cumulative frequency (cumulative relative frequency)**: is obtained by summing the frequencies (relative frequencies) of all classes up to the specific class. It takes only for ordinal variables, not for nominal variables.

*The qualitative data are presented graphically either as a pie chart or as a horizontal or vertical bar graph.

EXAMPLE 3.1. Let the blood types of 40 persons are as follows:

O O A B A O A A A O B O B O O A O O A A A A AB A B A A O O A O O A A A O A O O AB

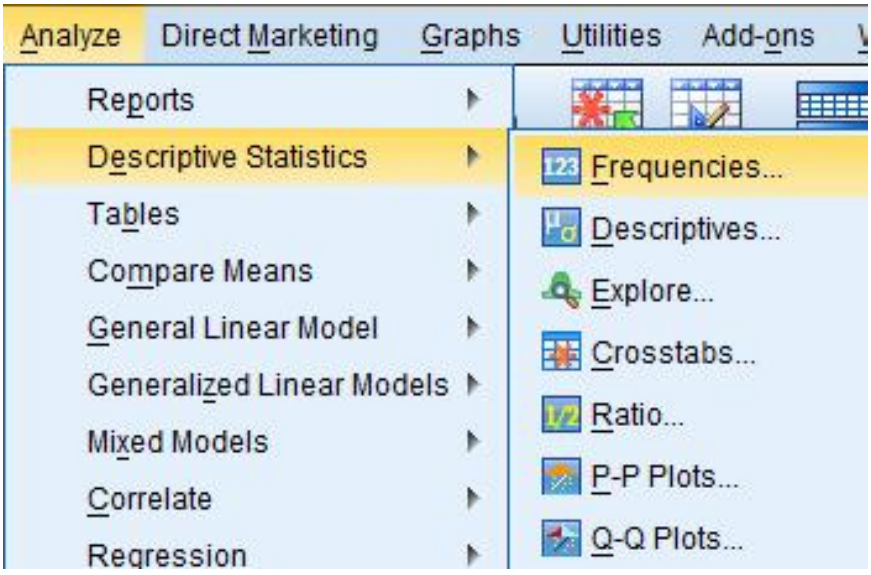
Summarizing data in a frequency table by using SPSS:

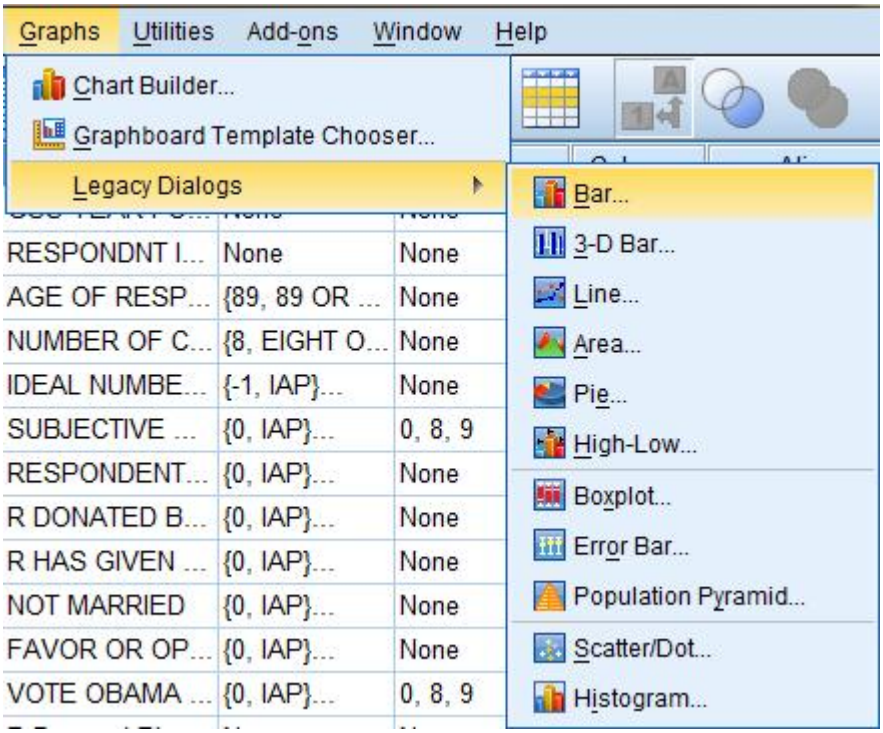
**Analyze -> Descriptive Statistics -> Frequencies,**
**Analyze -> Custom Tables -> Tables of Frequencies**

Table 1: Frequency distribution of blood types

**BLOOD**

| BLOOD | | Statistics | |
|---|---|---|---|
| | | Frequency | Percent |
| Valid | O | 16 | 40.0 |
| | A | 18 | 45.0 |
| | B | 4 | 10.0 |
| | AB | 2 | 5.0 |
| | Total | 40 | 100.0 |




Graphs
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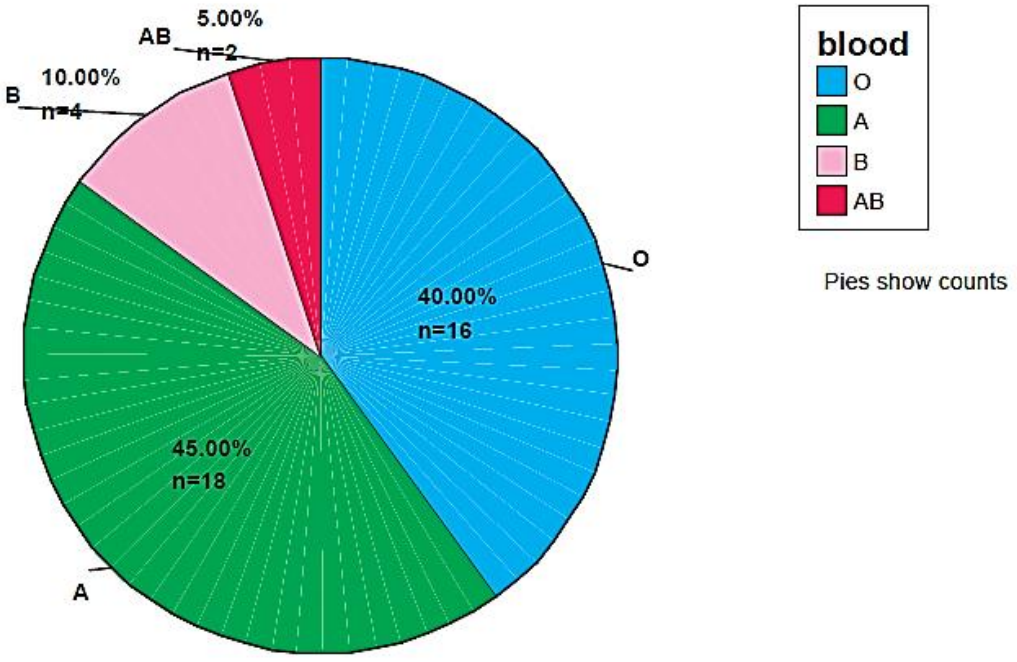
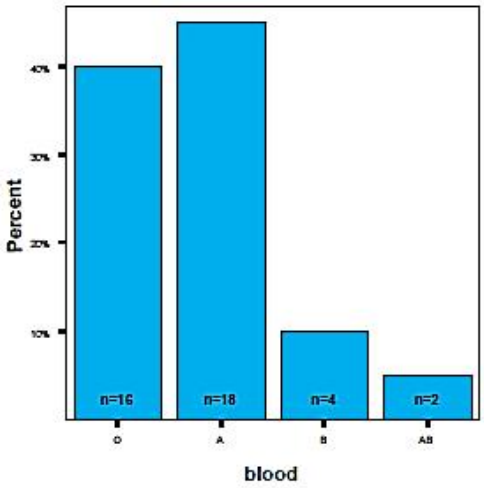
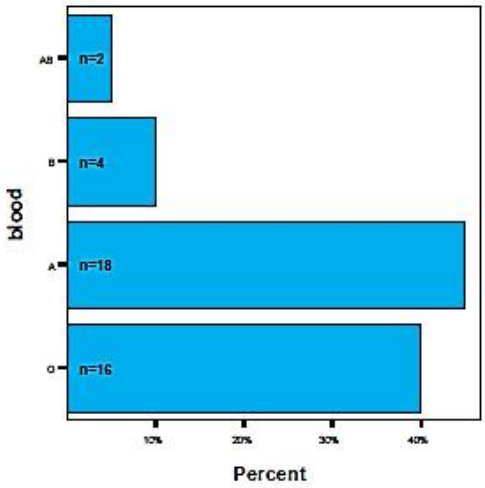
Pie...
High-Low...
Boxplot...
Error Bar...
Population Pyramid...
Scatter/Dot...
Histogram...
RESPONDNT I... None None
AGE OF RESP... {89, 89 OR ... None
NUMBER OF C... {8, EIGHT O... None
IDEAL NUMBE... {-1, IAP}... None
SUBJECTIVE ... {0, IAP}... 0, 8, 9
RESPONDENT... {0, IAP}... None
R DONATED B... {0, IAP}... None
R HAS GIVEN ... {0, IAP}... None
NOT MARRIED {0, IAP}... None
FAVOR OR OP... {0, IAP}... None
VOTE OBAMA ... {0, IAP}... 0, 8, 9


5.00%
n=2
AB
10.00%
n=4
B
40.00%
n=16
O
45.00%
n=18
A
blood
O
A
B
AB
Pies show counts




## 3.2 Quantitative variable

If the discrete variable can have a lot of different values or the quantitative variable is the continuous variable, then the data must be grouped into classes (categories) before the table of frequencies can be formed.

**The main steps in a process of grouping quantitative variable into classes are:**

(a) Find the **minimum and the maximum values** variable have in the data set.

(b) Choose intervals of equal length that cover the range between the minimum and the maximum without overlapping. These are called **class intervals**, and their end points are called class limits.

(c) Count the number of observations in the data that belongs to each class interval. The count in each class is the **class frequency**.

(d) Calculate the **relative frequencies** of each class by dividing the class frequency by the total number of observations in the data.

- The quantitative data are usually presented graphically either as a histogram or as a horizontal or vertical bar graph.

Example 3.2. Age (in years) of 102 people:

34,67,40,72,37,33,42,62,49,32,52,40,31,19,68,55,57,54,37,32,
54,38,20,50,56,48,35,52,29,56,68,65,45,44,54,39,29,56,43,42,
22,30,26,20,48,29,34,27,40,28,45,21,42,38,29,26,62,35,28,24,
44,46,39,29,27,40,22,38,42,39,26,48,39,25,34,56,31,60,32,24,
51,69,28,27,38,56,36,25,46,50,36,58,39,57,55,42,49,38,49,36,
48,44

**Summarizing data in a frequency table by using SPSS:**

Analyze -> Descriptive Statistics -> Frequencies,

Analyze -> Custom Tables -> Tables of Frequencies

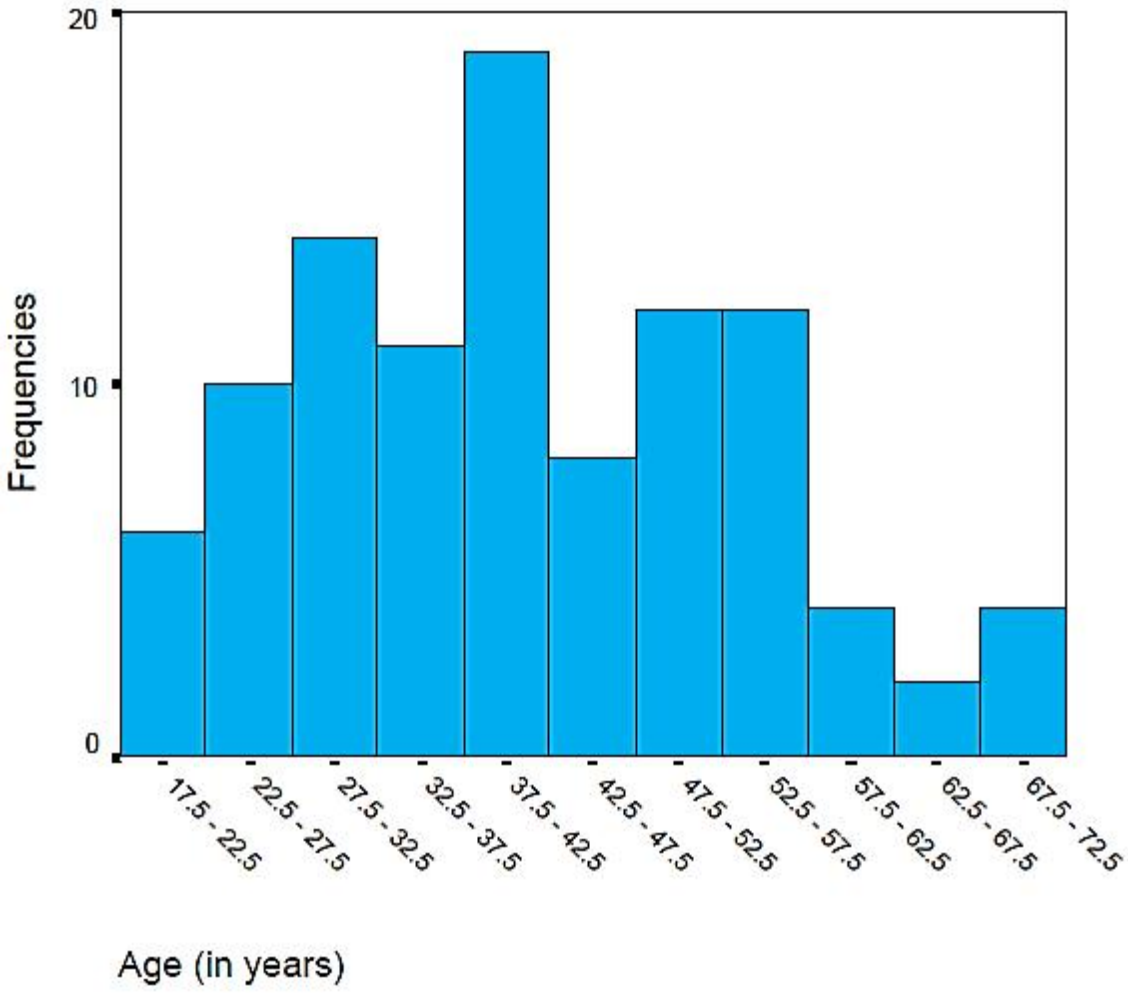
**Frequency distribution of people's age**

| | | Frequency | Percent | Cumulative Percent |
|---|---|---|---|---|
| Valid | 18 - 22 | 6 | 5.9 | 5.9 |
| | 23 - 27 | 10 | 9.8 | 15.7 |
| | 28 - 32 | 14 | 13.7 | 29.4 |
| | 33 - 37 | 11 | 10.8 | 40.2 |
| | 38 - 42 | 19 | 18.6 | 58.8 |
| | 43 - 47 | 8 | 7.8 | 66.7 |
| | 48 - 52 | 12 | 11.8 | 78.4 |
| | 53 - 57 | 12 | 11.8 | 90.2 |
| | 58 - 62 | 4 | 3.9 | 94.1 |
| | 63 - 67 | 2 | 2.0 | 96.1 |
| | 68 - 72 | 4 | 3.9 | 100.0 |
| | Total | 102 | 100.0 | |

Graphical presentation of data in SPSS:

Graphs -> Interactive -> Histogram,

Graphs -> Histogram



# Questions

## QI- The pneumonia types of 30 patients are as follows:

AAACCAACCACACAACACACAACACCCAAA

Summarizing data in a frequency table with its percentages.

## Q2- The mathematics' degrees of 30 students are as follow:

50, 66, 30, 40, 33, 45, 21, 18, 71, 19

22, 31, 20, 44, 27, 61, 50, 34, 70, 41

18, 12, 43, 25, 39, 41, 60, 67, 51, 50

1- Find **the minimum and the maximum** values variable have in the data set.
2- Choose **interval classes**.
3- Find **class frequency**.
4- Calculate the **relative frequencies** of each class.

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