University of Salahaddin

College of Basic Education

Department of Kindergarten

ئاماری پەروەردەیی

Statistics

Lecturers
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Second Semester
Second Stage - Kindergarten

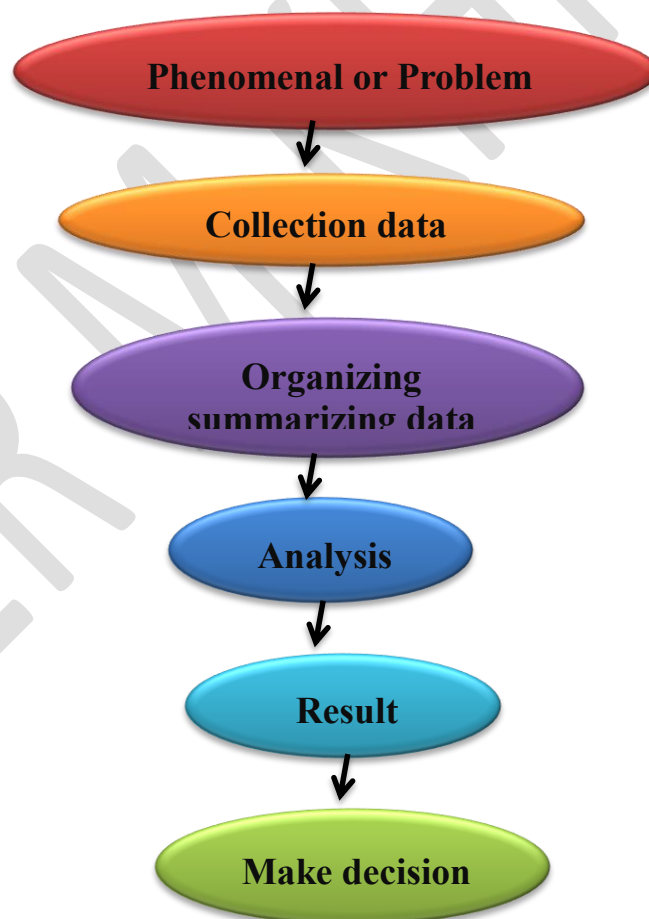**Academic Year: 2021-2022**

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Chapter One

Definition of Statistics:

Statistics is the scientific method concerned with collecting, organizing, and analyzing data for a particular phenomenon. As well as making the reasonable decisions.

The steps of scientific research:

Phenomenal or Problem

↓

Collection data

↓

Organizing summarizing data

↓

Analysis

↓

Result

↓

Make decision

Types of statistics:

1. **Descriptive statistics:** Consists numerical and graphical technique to summarize and present the data.

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2. **Inferential statistics:** Consists hypothesis testing, and estimations for generalizing sample results on population, and prediction.

Variable(data):   Variable is any characteristic that takes different values.

Types of Data (Variables)

First: Qualitative Data (Variables): are variables which assume non-numerical values.

Example:

- Gender (male or female).   - Blood group (A , B , AB , O)

- Economic state (v. good , good , bad)   - Level of education (primary , secondary , high school)

- Religious (Muslim , Christian , Jewish , etc.)

❖ Types of Qualitative Variables

1- Nominal Data (Variables): There is no order among characteristics of variable.

For example:

- Gender (male , female).   - Blood group (A , B , AB , O)

2- Ordinal Variable: There is order among characteristics of variable.

Example: - Level of education (primary, secondary, high school)

          - Economic state (v. good, good, bad)

Second: Quantitative Variables: are variables which assume numerical values.

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For example: - The number of students - Age (54 , 65.6 , 43 , …….). - Grades of students (78 , 89 , 54 , ……)
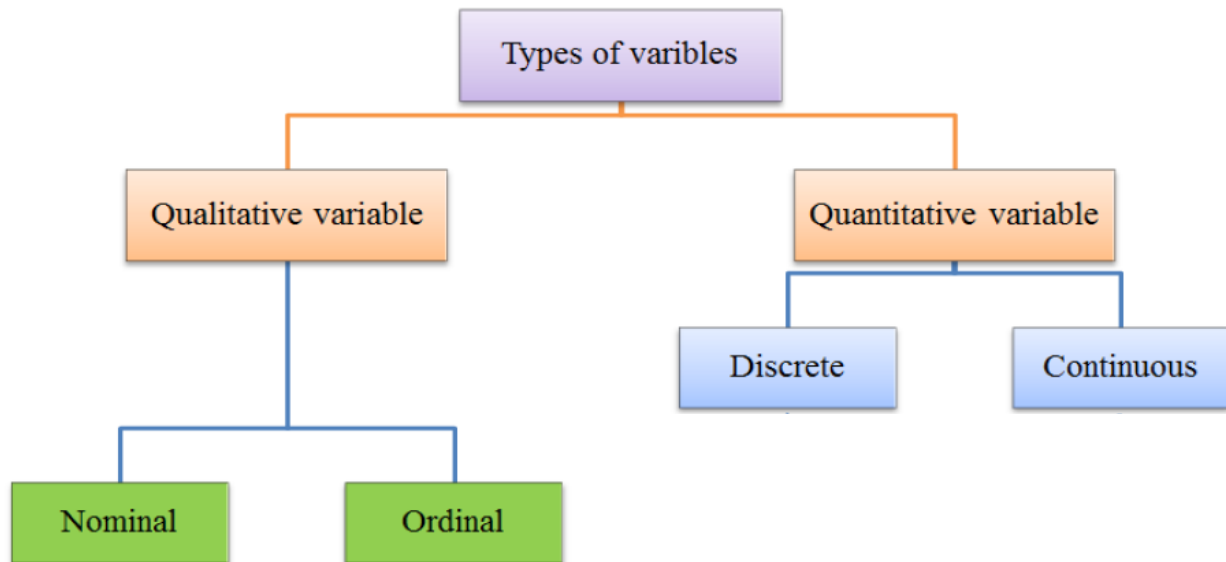
❖ Types of Quantitative Variables:

1- Discrete Variables: Usually obtained by counting.

For example: - The number of students - The number of bacteria on a plate, - The number of children in a family

2- Continuous Variables: Usually obtained by measurement.

For example: - Blood pressure (14, 17, 12, ….) - Age (54, 65.6, 43, …….). - Height (154, 165.6, 143, …….).

Classification for the Types of Variables

➢ ==Sources of Data:==

1- **Historical sources:** Data and information stored and collected by the organs and institutions

of the State or organizations.

2- **Field sources:** Data and information can be obtained from their original sources by

correspondence, confrontation or any other way of communication.

❖ ==Methods of Collection the data:==

1- **Census method:** the collection of data from every element in a population.

2- **Samples method:** the collection of data from a set of elements in a population.

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Definitions:

Population (Statistical population): It's all the elements or values under a statistical study.

Sample: is a part from the population.

Finite population: is possible to count individually

Infinite population: is impossible to count individually

Homogenous population: is any population which every element has joint specified characteristics

Non-homogenous population: is any population which every element hasn't joint specified characteristics

Sampling: It is the process of selecting a part from the population.

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Types of Sampling Techniques:

First: Probability (Random) Sampling: Taking the sample from the population in such a way that every element in the population has the same probability (chance) at selection.
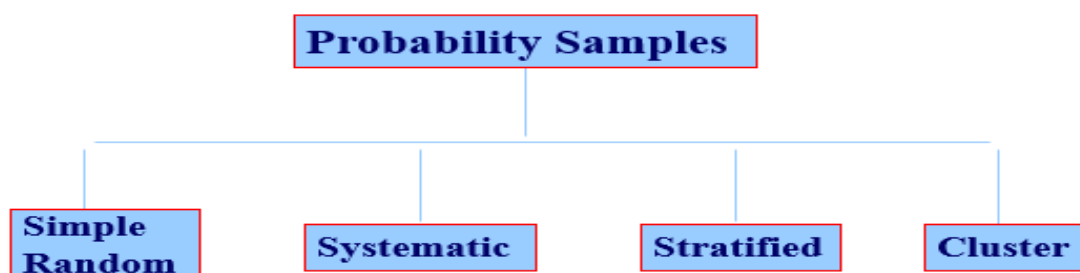
Second: Nonprobability Sampling: Every element in the population does not have equal probability of being chosen.

Types of Probability (Random) Sampling

1. Simple Random Sampling   2. Systematic Sampling

3. Stratified Sampling   4. Multistage (Cluster)
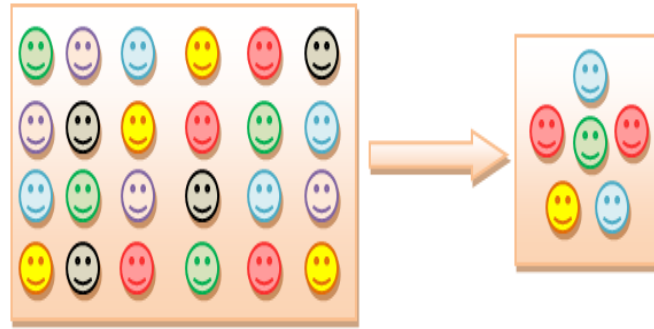
Probability Samples

Subjects of the sample are chosen based on known probabilities.

1- Simple Random Sampling:

Uses this Technique when the population is homogenous.

Example: Select 6 students out of 24 students in Statistic class.

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2- <u>Systematic Sampling:</u>

- Numbering each element in the population.

- Dividing the population (N) to (n^{th}) group each group contains (K=N/n) elements and then one element selection from first group randomly as a starting point.

Example: Select (6) students out of (24) students by <u>systematic sampling</u>.

     Step 1 : Numbering each element in the population.

     Step 2: Dividing the population to (n=6) groups

1	5	9	13	17	21
2	6	10	14	18	22
3	7	11	15	19	23
4	8	12	16	20	24
Group 1	Group 2	Group 3	Group 4	Group 5	Group 6

Step 3 : $K = \dfrac{N}{n} = \dfrac{24}{6} = 4$

     Step 4 : Select a number in group (1) randomly and suppose it is **2** as a starting point.

     Step 5 : The second number is 2+4=**6** , the third number is 6+4=**10** , **.......**

     Then your sample is **2**nd, **6**th, **10**th, **14**th, **18**th, and **22**nd students.

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3- <u>Stratified random sampling:</u>

Uses this method when the population is non-homogenous. The sample select by dividing the population into groups (strata) according to some characteristic and then taking samples from each group by using simple random sampling according to the weight of each group.
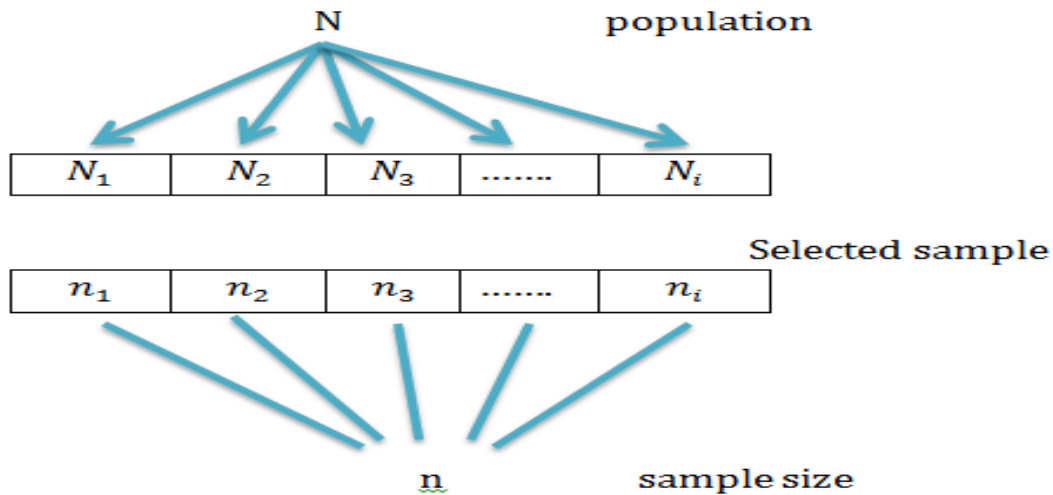
The sample of each group

$$n_i = \frac{n}{N} \ N_i$$

Example: In a company there are the following staffs:

Male (full time) = 90   Male (part time) = 18

Female (full time) = 9   Female (part time) = 63

We Select (n=40) of the staff by <u>stratified Sampling</u>:

<u>Solution:</u> $N_1 + N_2 + N_3 + N_4 = N$ $\Rightarrow 90 + 18 + 9 + 63 = 180$

$$n_i = \frac{n}{N} \ N_i$$

$) = 20$

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The sample of Male (full time)

The sample of Male (part time)

The sample of Female (full tin $= 2$

The sample of Female (part tii $= 14$

                                                 $= 4$

$$n_1 + n_2 + n_3 + n_4 = n \implies 20 + 4 + 2 + 14 = 40$$

Note:

Example: We selected sample size of 75 students from all College Basic educations to participate in computation between universities. If you know each department have a number of students;

Kindergarten 135, Mathematic 185, Kurdish 230, General Sciences 170, English 400 and Social Science 245.

Find Sub sample for each department?

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Multi-Stage Sampling Design

- Most commonly used sampling design in practice

- Involves more than one stage of sampling and/or a combination of two or more sampling designs

Types of non-probability sampling

➢ Convenience sampling

➢ Judgment (Purposive) sampling

➢ Quota sampling

➢ Snowball sampling