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Second Class-Statistics
محاضرة رقم 3

Populations and samples

1- Population

In statistics the term *population* is broaden used not only means the people or human residents who live in a certain region, but also refers to other group of living such as animals, insects, and plants. To embark more on this concept, the population can be used for subset specific group for instance, doctor, nurse, patients, children, elderly, and homeless people, pre-weaning and post-weaning calves etc….

However, the population mean is donated by μ (mu) given by probability distribution and the standard deviation is denoted by ς (low case sigma).

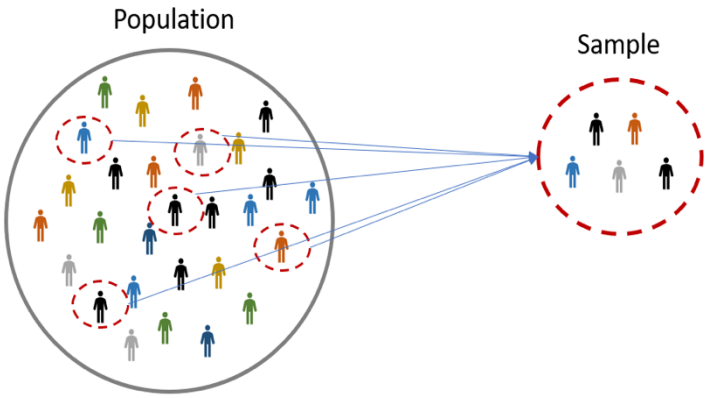

Illustration (1): Sample and Population.

2- Sample and Sampling

- Sample: is the unite or individual that may be chosen for participation in a study (people, families, household, institutions. People are referred to as subjects or participants.
- Sampling: the process of selecting a group of people, events, behaviours, or other elements can be involved for the study.
- In samples design process the questions it ask are what and who is the focus of the study, where, and when it is being done, and why.

-To clarify this by an example: focus on the cigarette-smoking behaviour (what) of the high school seniors (who) in a large metropolitan high school (where). So, this is very important to address our question in the study intend to conduct, as an essential part of the study design or plan it.

3-Target population

It can be referred to the group or groups derived from a population that a researcher has a desire to select the samples from it. Selecting the sample population is depended on type of study (ie: comparison group of animals with a disease and other group without disease).

4- Sampling frame

The sampling frame is the list of the target population from which the sample will be drawn. For example, it would be the list of students from high schools (who), the study will be conducted in the school (where), the study will be done at the beginning or end of the school year (when). Resemble, the list of the cattle owners who have been registered in the veterinary hospital may be selected for a study survey

5- Type of sample methods

1) Nonprobability sampling: Does not rely on random technique but the ability of a researcher to select elements for a sample, and that includes:
   a) Purposive sample

      Purposive sampling is a set of different methods that all involve using the researchers' judgment to choose a few subjects that can best answer their research question. Example, teacher ask students to give feedback about understanding class subjects.

   b) Convenient sample

      This can depend on costs, geographic distributions, or the facility of obtaining data. Some examples of convenience sampling could include recruiting friends to participate in your study, collecting data from nearby locations, sending a survey in the mail, or sharing a link on social media

   c) Judgment sample

      A judgement sample example is when a researcher wants to examine the motorcycle models the person buys by the age ratio of motorcycle owners.

2) Probability sampling
   a) *Simple random sample*: Every element has an equal chance of getting selected to be the part sample. Ex: select 20 numbers between 1 to 100, which numbers will be chosen? Or select 70 students from the veterinary medicine from all stages.

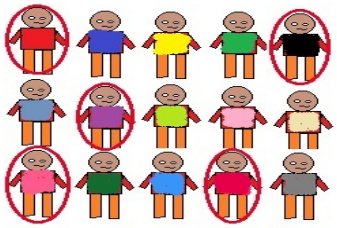

Illustration (2): random sample.

b) *Stratified random sample*: Population is divided into subgroups, called strata, according to some variable or variables in importance to the study. Variables often used include: age, gender, ethnic origin, diagnosis, geographic region, institution

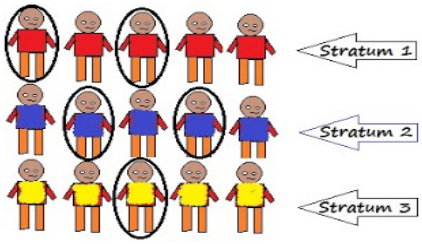

Illustration (3): stratified sample.

c) *Cluster sampling*: Dividing the sample into groups or (clusters) and then the clusters are randomly selected. The method has been used for community survey of people who live in certain geographical area. Clusters are identified in details such as age, sex, and location.

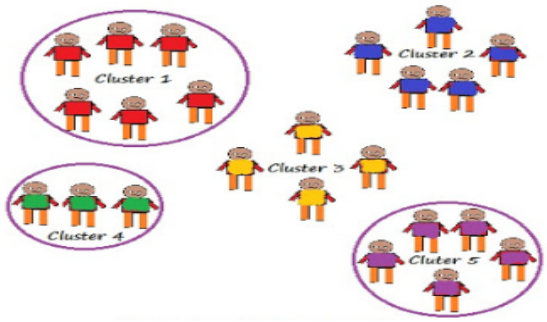

Illustration (4): Cluster sample.

d) *Systematic sample*: Elements of a sample are chosen at regular intervals of population. Ex: Every 4 or 3 element interval is selected among the entire samples.

Illustration (5): Systematic sample.

e) *Multi-Stage Sampling*: Similar to the cluster sample except that a secondary sampling unites (individual) is selected: example when chosen a province and district, subdistrict, and village and from village select household, and finally an individual.

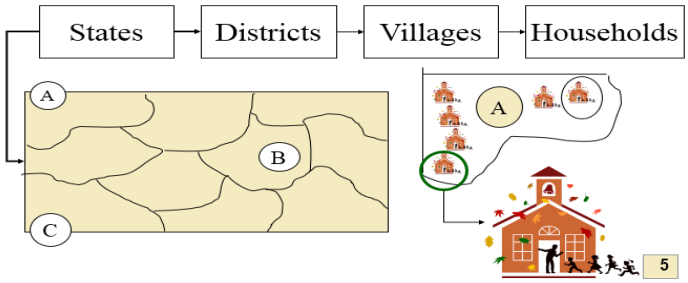

Illustration (6): Multistage sample.

Sampling Location In A Poultry House