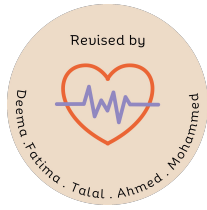


Research
442



How to apply sampling techniques

Tutorial No. 8

Objectives:

- ~ This lecture was presented by **Dr. Abdulaziz Almezam**
- ~ It is included in the **Midterm Exam**
- ~ We highly recommended reading the **Ayah** in the first page

Slides

Color code

Original text

Dr. Notes

Important

Golden note 

Extra

Editing file

What is Sampling?

Sampling is the process or technique of selecting a study sample of appropriate characteristics and of adequate size.

Population

Group of things (people) having one or more common characteristics.

Population:

A set which includes all measurements of interest to the researcher.

(The collection of all responses, measurements or counts that are of interest).

Sample

Representative subgroup of the larger population:

- Used to estimate something about a population (generalize)
- Must be similar to population on characteristic being investigated

Sample:

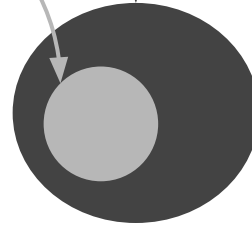
A subset of the population

سُورَةُ الْأَجْرَانِ

يَا أَيُّهَا النَّبِيُّ قُلْ لَأَزُوجِكُمْ وَبَنَاتِكُمْ وَنِسَاءَ الْمُؤْمِنِينَ يُدْنِينَ عَلَيْهِنَّ مِنْ جَلِيبِهِنَّ ذَلِكَ أَذْنًا أَنْ يُعْرَفْنَ فَلَا يُؤْذِينَ وَكَانَ اللَّهُ غَفُورًا رَحِيمًا

المختصر في التفسير

يا أيها النبي قل لأزواجك، وقل لبناتك، وقل لنساء المؤمنين: **يُرْجِينَ** عليهنّ من الجلابيب التي يلبسها حتى لا تنكشف منهن عورة أمام الأجانب من الرجال! ذلك أقرب أن يُعرفنّ حرائرهنّ فلا يتعرض لهنّ أحد بالإيذاء كما يتعرض به للإماء، وكان الله غفورًا لذنوب من تاب من عباده، رحيمًا به.



How to select a simple random sample

1. Define the population
2. Determine the desired sample size
3. List all members of the population or the potential subjects

Probability Sampling

Simple Random Sampling (SRS)

Stratified Random Sampling

Systematic Random Sampling

Cluster Random Sampling

Multistage Random Sampling

1 What do you mean by 'sample' and population? Explain with a simple example.

A small portion/group of subjects selected from a wider group of subjects is called a **sample**. This wider group is called **population**.

Example: In particular hospital 1000 deliveries occurred in particular year and out of these we take 100 deliveries for our research study. These 1000 deliveries is our population and these 100 deliveries is our sample.

مثال: انا ابي ادرس عن مضاعفات الأنسولين

General population (T2DM patients) → Patients who use insulin → accessible population (KSUMC) → sample

2 Why do you study only a sample of patients? Write down points only.

- To facilitate Data collection that we use for research analysis particularly when the population being studied is large
- To save **money and time**
- Sampling permits you to **draw conclusions** about complex situations
- To obtain enough data to answer the research questions without having to query the entire population

3 a) What do you call that sample where subjects are selected as you wish? b) What do you call that sample where subjects are selected without any bias?

- a) **Convenience sample** (non-random sample)
- b) **Random sample**

4 Give names of some of the random sampling techniques you know.

- Simple Random Sampling (RS), Stratified RS, Systematic RS, Cluster RS, Multistage RS

Study No. 1

In a big hospital, every year 500 cases of MI (myocardial infarction) are reported. We want to study their physiological profile-their BP, cholesterol level, lipoprotein level, BMI, etc. Resources permit us to do investigations only for 50 cases. How do you select a **simple random sample (SRS)** of 50 cases out of these 500 cases. **Explain the crude way as well as easy way to select this sample.**

- We will write ID numbers of these 500 cases in 500 similar looking slips and roll them and put in a bowl and shuffle well and then take 50 slips one by one. The patients whose ID numbers are picked up is our sample. This method of sampling is called **simple random sampling**. This is the **crude way** and difficult to do.
- **Easy way** is take 50 random numbers within 1 to 500 from the computer or from the random number tables and the patients whose ID numbers are selected, will be our sample.
- crude (lottery) نكتب أسماءهم بورقة ونختار عشوائي
- Easy way: random number table موجود شرحه بالمحاضرة النظرية

Study No. 2

A researcher wants to take a random sample of 100 cases from 1000 deliveries that occurred in maternity hospital in the last year. He has taken one random number out of 1 and 10 say, 5. Then he took a case having ID No. 5. Then he took cases having ID numbers 15,25,35,45...995 as his sample. **What method of sampling the researcher adopted here?**

- The research has adopted **systematic Random sampling**.
- Why? There is an interval

Study No. 3

Consider one more hospital where 1000 MI cases were reported last year. He wants to do a study on these cases. As this number of cases is large, he wants to take a sample of 100 cases. And also, as the physiological parameters of these cases would be different in overweight and less weight cases, the researcher wants to divide these 500 MI cases into two groups: one with overweight/obese (that is $BMI \geq 25$) cases and the other less weight ($BMI < 25$) cases and that both these groups to represent in his sample of 100 cases. Then he took a sample of 50 patients at random from each of these two groups.

→ **What are these two groups called in sampling?**

These groups are called **strata in sampling**.

→ **What is the sampling method adopted here to select a sample of 100 cases?**

This method of sampling is called **stratified Random sampling**.

→ **Why did the researcher adopt this sampling method?**

He adopted this sampling method because that both strata that is, overweight and less weight, cases to be represented in the sample.

(one strata is underweight and the other strata is overweight)

Stratified sampling:

The sample has a **homogeneous** factor

(each sample (**Strata**) selected according to a shared characteristic from the population)

E.g., Strata 1: male, Strata 2: Female

Cluster sampling:

The sample has a **heterogeneous** factor

(each sample selected according to shared area (**Cluster**))

E.g., Cluster 1: North of Riyadh, Cluster 2: South of Riyadh

Study No. 4

It was decided to estimate prevalence of diabetes in KSA. He had limited resources. So, he divided entire KSA into 5 regions as north, south, east, west and central. Then he made 10 contiguous geographical areas in each of these five regions. Then he selected one area at random from each region. He collected data from all the eligible individuals from each selected area and he found 5000 individuals from these five selected areas. Then he collected relevant data from all these individuals.

What type of sampling method he used here?

- **Cluster sampling**
- What's the keyword for cluster sampling? All individuals in an area

Why did he adopt this method?

- He used cluster sampling because he had **limited resources** and he **does not has sampling frame (that is list of all the individuals of entire KSA)**, which is difficult to get.
- It's enough if he has list of clusters, and he could collect the data from all individuals of the selected clusters only. In this way, he saves lot of resources by not traveling widely to take a simple random samples.

Study No. 5

Health authorities asked an epidemiologist to find out the prevalence of anemia in high school children of standard VI to X in a district of an African country. There are 60 schools in this district. And each school has standard VI to X classes. He wanted to use multistage sampling method to estimate the prevalence of anemia in high school children of standard VI to X in that district. **How he would have done multistage sampling method in this situation?**

- First, he needs only the list of these 60 schools. **In the first stage**, he select 5 schools among 60 schools at random, and from each of the selected school, out of five standards VI to X, select two standards at random, **this is second stage of selection**. And from each of the selected standard select 20 students at random, **this the third stage of selection**. So our sample consists of 200 students (5x2x20). This is his sample of students from whom he has to collect data to estimate the prevalence of anemia of high school children of that district.

القارة:
عبدالله الشهري
وهي التحمي

نواف التركي

ريان الفنامي

الأعضاء:

رغد النظيف
ريما الجريبة
شهد البخاري
نوف الضلعان
أثير الاحمري
وعد ابونخاع
نراء الهويش
في الدوسري
منار الزهراني

عبدالله التركي
محمد الزير
عثمان الدريهم
عبدالعزیز القططاني
ناصر الفيت
سعد السهائي
رائد الماضي
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محمد الحصيني