Sampling and Sample Size

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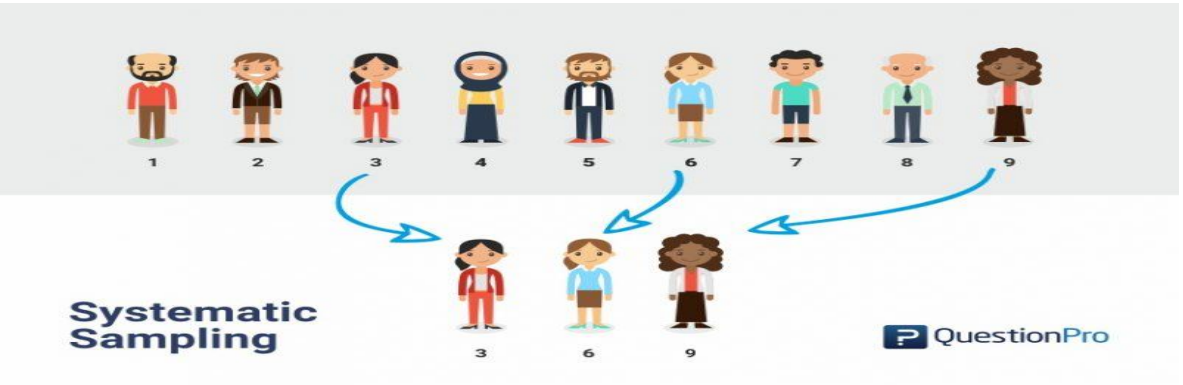
Sampling

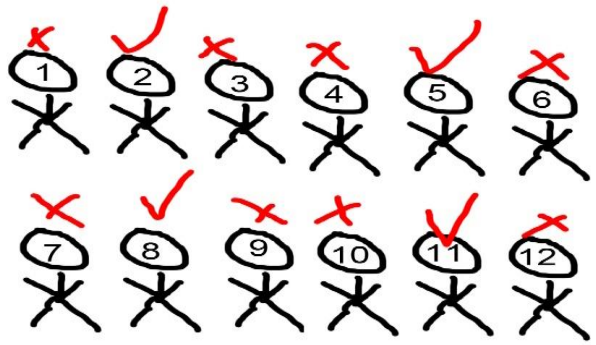
The process of selecting units from a population of interest.
Could be selected from inpatients, outpatients, health centers, households, schools, TB, or cancer centers.

Types

- **PROBABILITY SAMPLING;**
  a. quantitative data
  b. selection in a random way & giving chance to every person to participate in the study.
  c. results can be generalized to the total population
- **Simple random Sampling;**
- - lottery method.
- - random numbers from the table.
- - computer method.

Systematic Random Sampling

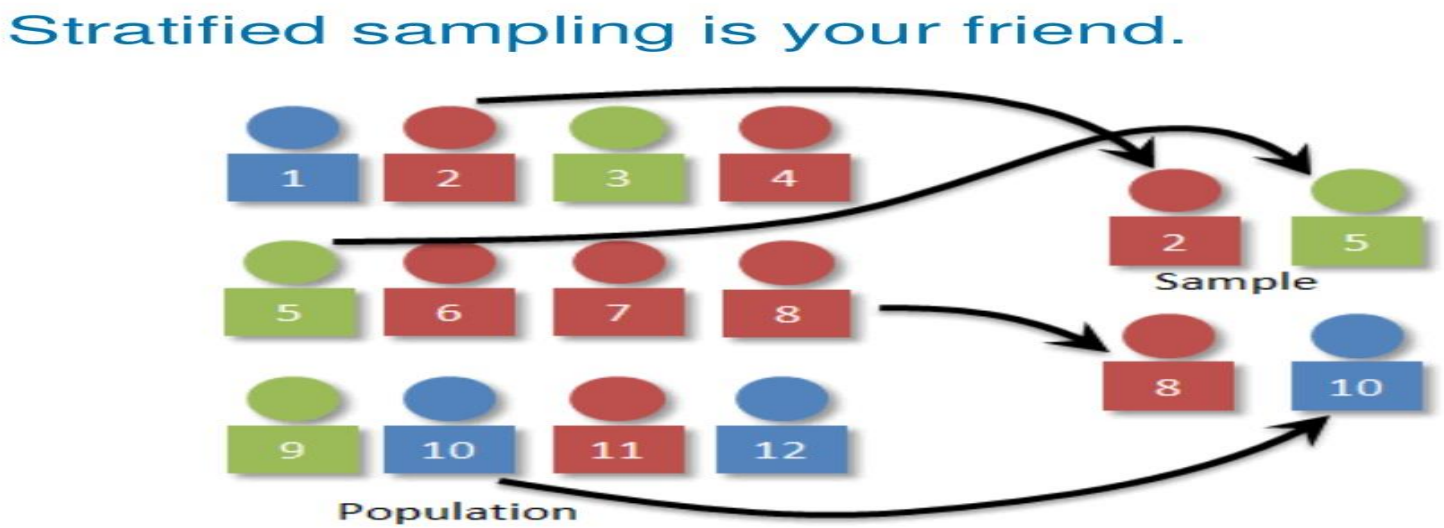




from the target population the sample is selected in a systematic way by using sampling fraction: K, K = N (population frame)/n (sample size)

- Ex; N= 12,000 n = 4,000
- K= N/n = 12,000/ 4,000 = 3 ; Can pick any person & if pick number (1) the systematic sampling will be as the following ;
- 1,2,**3**,4,5,**6**,7,8, (**9**),10,11,(**12**),13,14,**15**,16,17,(**18**),19,20,**21** ------- reach sample size
- (mostly used in household surveys or hospital studies)
- **Or use** banknote that choose the last odd number

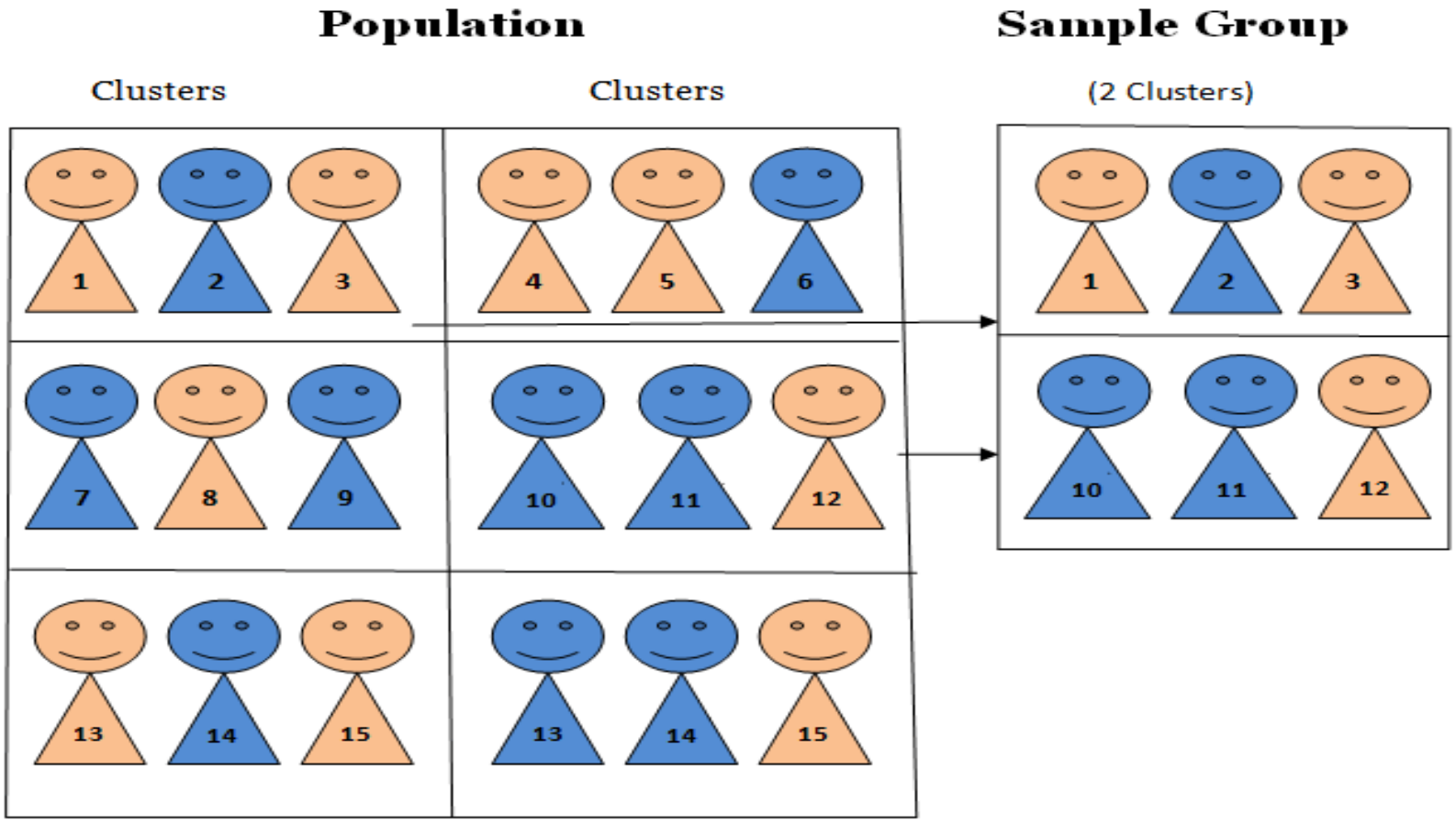
Stratified sampling



- divide the population into strata as; age, sex, social class, and marital status & pick every stratum by using Simple R.S or Systematic R .S

Cluster sampling

- Divide groups of elements into clusters such as classes, schools, districts, streets, places, houses, and each cluster can select a subsample by using simple random S or systematic (school surveys).



Multi stages sampling

Draw the sample from the target population, continue drawing till reaching the required sample by using simple R.S or systematic R.S that get the primary sample then continue to draw another sample until getting the required sample

Stage 1 = 1000 from 10,000 Stage 2 = 500 from 1000 Stage 3 = 100 from 500

Multi- Stage Sampling

- When sampling procedure is carried out in several stages
- This procedure is used in large scale country wise or region wise surveys.
  - First stage- preparation of large sized sampling units
  - Randomly selecting a certain number
  - Second stage- Another list prepared from them
  - Sub-samples drawn by random sampling and so on....

Stages	1	2	3	4	5	6
	Country	State	District	Taluka	villages	individuals

Non probability sampling

- a. qualitative data
  b. selection in a non-random way
- **a. Accidental sampling (convenience);** called haphazard, that the researcher interviews the respondents for the study who come in contact accidentally during the research time(health centers, hospital)

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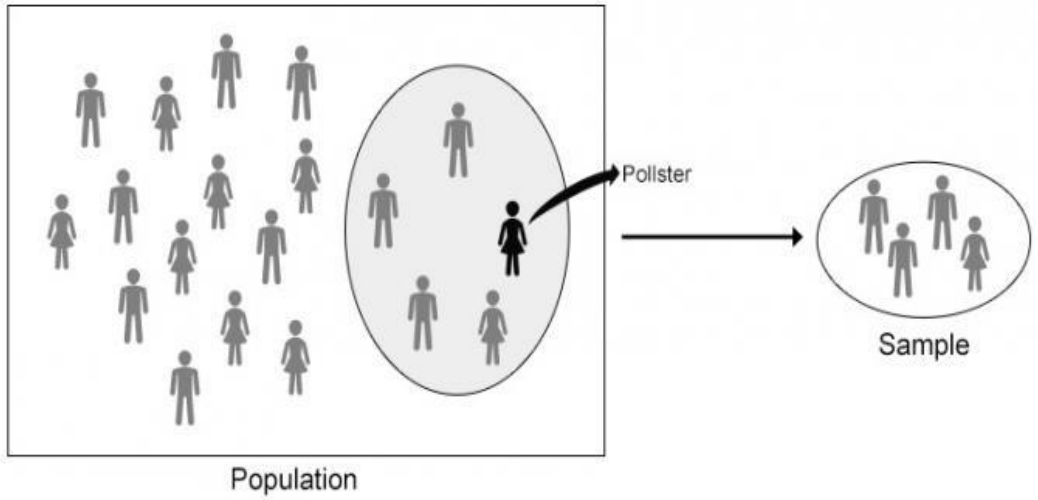


Convenience Sampling

Purposive sampling

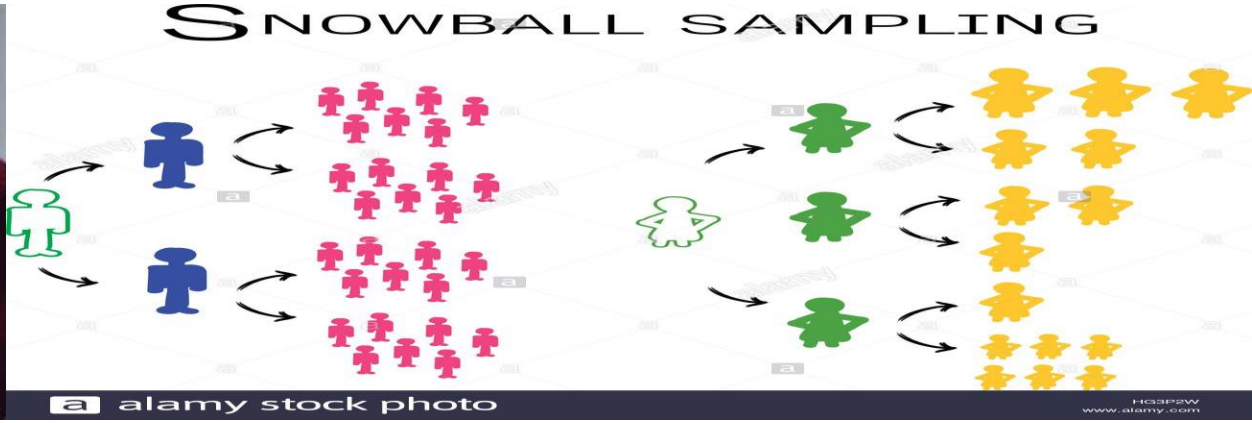
the researcher chooses respondents who in the opinion of the researcher thought to be relevant to the subject under the study.

snowball

The researcher begins with a few respondents who are available

Then ask the respondent to recommend other persons who meet the criteria of the research & who are willing to participate in the study.

(As in Aids or T.B cases, corona 19 ---)



Volunteer sampling; based on the acceptance (**in drug, and vaccine clinical trials)**

Most studies use either probability simple random sampling or convenience

Confidence interval

- is the number of percentage points above or below the proportion that find in the study that the true proportion should be within.
- For example, if the confidence interval is 3.5 % and the study reveals a proportion of 57 %, the true proportion is likely between 53.5 %and 60.5 %. Wide C. I mean a small sample size.

- **The general expression for confidence interval is:**
- Confidence interval = point estimate(mean) ± (critical factor x SE)

- For 95%, 99% confidence levels the critical factor is 1.96, 2.58 respectively.

Sample size

A sample size of known prevalence:

The appropriate sample size is determined by estimating the proportion of the variable of interest, the desired confidence level, and the acceptable margin of error.

$$\text{(Cochran) sample size} = \frac{(1.96)^2 \times P(1-P)}{m \text{ (standard value of 0.05)}^2}$$

Ex: An estimation that 60% (0.6) of the pregnant females suffered from anemia at confidence level=95% ((Population (N)=700000))

$$= \frac{3.84 \times (0.6 \times 0.4)}{0.0025} = 369 \text{ (at least)}$$

(1.96) = critical factor at level 95% (standard value)

P = estimated proportion of the disease in the project area

m = margin of error at 5% (standard value of 0.05)

Or: - Using 10% of the Prevalence of certain diseases or problems.

Sample size of known population and prevalence

Example:

An estimation that 60% (0.6) of the pregnant females suffered from anemia at confidence level=95% ((Population (N)=700000))

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- **P=0.6, Confidence Interval=95%, CF =1.96,**
- **N=700000**

$$= (N) \times \frac{1.96^2 \times P(1-P)/0.05^2}{(N-1+\frac{1.96^2 \times P(1-P)}{(0.05)^2}} = 371 \text{ (at least)}$$

Sample size of unknown population and prevalence

$$\frac{\text{(C.F of 95\%(1.96)}^2 \text{ X SD(1-SD)}}{\text{m (standard value of 0.05)}^2}$$

- **Example:**

Assuming chose a 95% confidence level, (0.5) standard deviation, and a margin of error (confidence interval) of 5%.

- **((1.96) ² x 0.5(0.5)) / (.05) ²**
- **(3.84 x 0.25) / 0.0025**
- **0.9604 / 0.0025**
- **384.16**
- **385 respondents are needed**