SAMPLING IN NURSING RESEARCH

Abstract

The sampling in nursing is the most crucial part of the nursing research. To acquire this there is need to apprehend various types of sampling methods. Knowledge of sampling designs is fundamental for growing a research plan. Sampling is defined as a process in which we select a sample or a component from large groups of population to fulfil our research objectives. There are basically two kinds of sampling: Probability sampling and non-probability sampling. Probability sampling is also known as random sampling and is considered as the gold standard approach of sampling. In non -probability sampling each member of the population does not have known probability of being selected in the sample. To yield good results sampling should be planned carefully.

Keywords: Sampling, Nursing Research, Probability sampling, non-probability sampling

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I. SAMPLING IN NURSING RESEARCH

Sampling in nursing is the most crucial part of the nursing research. To acquire this, there is a need to apprehend various types of sampling methods. Knowledge of sampling designs is fundamental for growing a research plan.

II. SAMPLING

Sampling is defined as a process in which we select a sample or a component from large group or groups of population to fulfil our research objectives. This selected sample can be any events, individuals, actions, measures required to perform research. Thus a Sample is representative of the larger population from which it is derived.

The process of sample selection from a large population is known as sampling plan.

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Advantages:

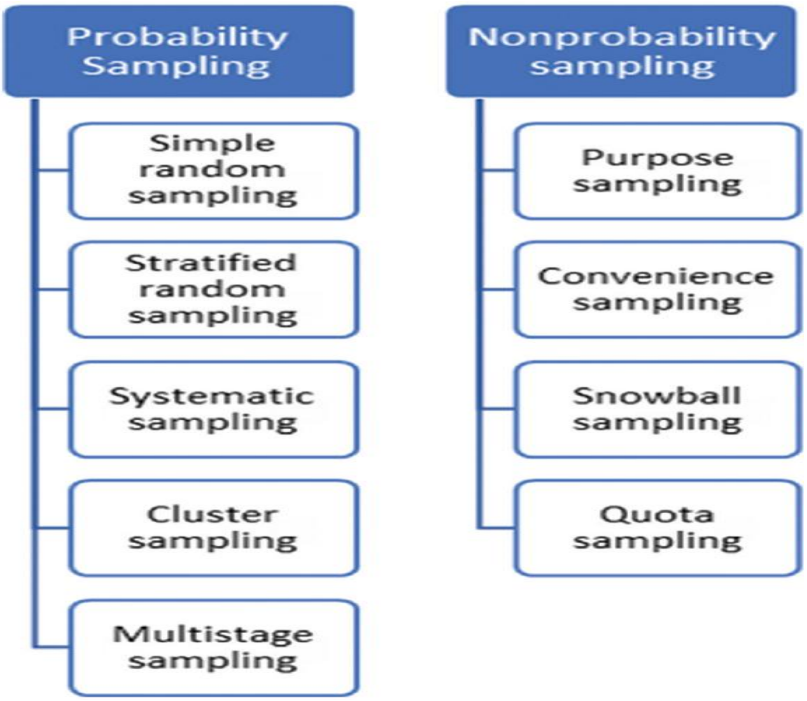
- Since it is small in size it requires less area to be covered.
- It is a time saving and cost effective process and yields faster results.
- We can estimate sampling errors by means of sample.
- Accuracy is more as sampling is done by skilled investigators.

Limitations:

- Probability of bias.
- In some cases we cannot yield significant finding from sample

III. TYPES OF SAMPLING

- Probability Sampling
- Non Probability Sampling



Source: Kandola D, Banner D, O'Keefe-McCarthy S, Jassal D. Sampling Methods in Cardiovascular Nursing Research: An Overview. Canadian Journal of Cardiovascular Nursing. 2014 Aug 1;24(3).

1. **Probability Sampling:** Probability Sampling is also known as random sampling i.e. it is a method of sample selection by chance. Here the sampling unit has a probability to be selected as sample. It is considered as "gold standard approach" of sampling. In case of homogenous population probability of selection of each member in the sample is very high.

   Example: Think of a pot of cooked rice, if we want to check if the rice is cooked or not, we will pick some rice in the spoon and check whether it is cooked or not, this spoon of rice will symbolize the whole population of rice in the pot and each and every rice grain has the same chance of selection. Subtypes of Probability Sampling are:

   - Simple random sampling
   - Stratified random sampling
   - Systematic sampling
   - Cluster sampling
   - Multistage sampling

- **Simple Random Sampling:** In simple random sampling there is similar opportunity for each and every unit of the population to be selected. Sample selection is simple and random only. This is the first-class method of sampling for the homogenous population.

  Example: let us assume total number of students in a classroom is 300 and we need to select 60 students from them using simple random sampling. Sampling frame is the

list of all students (n=300). Sample size (n=60) can be selected by using lottery method or random number table for simple random sampling;

- Lottery method
- Random number table method

Advantages:

- Easy method
- An unbiased and fair way of selecting the sample
- Each and every part of the population has similar chance of selection
- Sample is representative of the population

Disadvantages:

- In case of large population it is not possible to have full list of all the members

- **Stratified Random Sampling:** In this sampling, the population is split into homogenous groups known as strata. Sample is then selected by means of simple random sampling from these homogenous strata.

  Example: In studying the prevalence of diabetes in an elder population, we can stratify the population on the basis of gender and obtain sex-wise prevalence of diabetes. We can further stratify by means of residential area such as city, village, town and can obtain area-wise prevalence of diabetes having equal representation from each group of patients.

  Advantages:

  - Outcomes with more accuracy than other sampling methods
  - Good results can be obtained from small sample using strata
  - Representative sample
  - Ease of generalizations of findings from the sample to population
  - Less biased method

  Disadvantages:

  - Not relevant in the population which can't be divided into subgroups.

  Indications:

  - In case of focus on a specific strata
  - In case when difficult to get in touch with sample population
  - To create association between two strata

- **Systematic Sampling:** This sampling involves the participant's selection in a predetermined and orderly mannere. Here the participants are selected after a regular time interval.

Steps:

- Start sampling with a well-defined structural population
- Define the idyllic sample size
- Do sequencing of samples
- Select sample interval

E.g. First sample is randomly selected the, every 10^{th} student sitting in classroom is included in the study.

Advantages:

- Easy to generate, perform and evaluate the sample
- Minimal risks
- Preferred in case of diverse participants

Disadvantages:

- Hidden periodicity within the population resulting in sample no longer random and representative

- **Cluster Sampling:** In this type of sampling, population segments are taken as the clusters and participants are selected from each cluster in a random manner. This is distinct from other probability sampling where population is further divided based on the age, gender, career etc. But here sample is selected in a random way from natural cluster e.g. villages within a district, schools within a town.

  Example: list of individuals suffering from gout, if we search area wise, the regions acts as clusters and participants can be selected from clusters.

  Advantages:

  - Inexpensive as prices of travelling and list are significantly reduced through this method
  - Very feasible method of sample selection

  Disadvantages:

  - Sampling Bias: Population will have biased opinion if the group selected has biased opinion
  - Sampling Errors: It has high chances of error as compared to the other methods of probability sampling

- **Multi Stage Sampling:** In multi stage sampling is performed in many stages.

  Example: for a national health survey, randomly cities are selected from all states followed by random colonies and streets. In the third stage, selection of houses is done.

Advantages:

- Suitable in primary data collection for geographically dispersed area
- Flexible data collection as per need of investigator
- Different sampling methods can be used at different stages
- Minimal cost and time for collection of data
- Accuracy more than cluster sampling in spite of using with the same sample

Disadvantages:

- Introduces considerable degree of subjectivity
- Non-representative sample
- Sample highly prone to bias

2. **Non Probability Sampling:** Here each and every unit of the population does not have similar chance of selection as a sample. It is opposite to probability sampling and is used in both qualitative and quantitative researches. This type of sampling is less expensive but chances of selection bias are more as compared to probability sampling. Sample selected don't represent the entire population. Its types are:

    - Convenience Sampling
    - Purposive sampling
    - Quota sampling
    - Snow ball sampling

- **Convenience Sampling:** In convenience sampling members are selected on the basis of their convenience and easy approachability for a researcher. This method is most commonly used in pilot study.Example- People in the neighbourhood or street.

  Advantages:

  - Sample selection by this method is very easy and inexpensive.
  - Suitable for pilot research and generation of hypothesis
  - Quick method of sample selection

  Disadvantages:

  - Higher chance of sampling error

- **Purposive Sampling:** Purposive sampling is also known as subjective/selective /judgmental sampling. Here purpose of study defines the selection of sample units. This method can be used in case of less number of participants and is based on the knowledge skills and clinical experience of a researcher. This method is also used to filter the samples selected by other techniques.

Advantages:

- Gives opportunity to researchers to justify their sample selection
- Provides several non- probability sampling techniques for a researcher to draw on

Disadvantages:

- prone to researcher's bias
- representativeness of the sample is not maintained

- **Quota Sampling:** This method is based on the selection criteria defined by the researcher on the basis of definite characteristics which serve as a quota for sample selection. This method is like stratified random sampling but is a non random method.

  Example: In a sample of 200, the researcher wants 30% women & 70% men in the sample and would continue selecting the sample until his quota for men is complete i.e. 70%

  Advantages:

  - Useful in case when there is need of representative sample but probability sample can't be obtained
  - Quicker and easier to carry out as there is no need of sampling frame
  - Avoids over presentation of data and improves strata representations within the population
  - Provides easy comparison of groups.

  Disadvantages:

  - Sampling error can't be determined as sample has not been chosen by random selection.
  - Can cause sample bias
  - Cannot make generalization of findings
  - Results in overall increase in sample size which would increase costs of the research and time duration.

- **Snow Ball Sampling:** Snow ball sampling is also known as sequential or chain sampling. Here existing study subjects helps in recruitment of other subjects from their links. Thus, the sample size increases in number like a rolling snow ball.

  Example: In case of drug addicts or in case of sex workers or HIV patients

  Advantages:

  - Quick and easy method of sampling
  - Cost-effective

Disadvantages:

- Chances of sample bias and sample error can be high
- It is difficult method of sample collection if the target population is uncooperative

Important Points:

- Selection of a sample depends on the population of interest.
- To yield good results sampling should be planned carefully.
- Gold standard in sampling methodology - Probability sampling
- Generalisation of the findings – Probability sampling
- No generalisation of findings - Non-probability sampling

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