International Journal of Atharva
Vol. 4, No. 1, February, 2026. Pages: 113-129
ISSN: 3021-9205 (Print) ISSN:3021-9299 (Online)
DOI: 10.3126/ija.v4i1.92377

Choosing the Right Non-Probability Sampling Design in Research

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Received: December 22, 2025 Revised & Accepted: March 27, 2026

Abstract

Background: Sampling, a process of selecting a representative subset of a population, is an essential phase in research. A sampling design is a structured plan for obtaining a sample, and non-probability sampling designs are commonly used in qualitative research. Selecting an appropriate sampling design is crucial for conducting methodologically sound research, yet researchers frequently lack clear guidance on choosing the most suitable design for a given study context.

Objective: This study examines various non-probability sampling designs and provides guidelines for selecting the most appropriate design based on research context and purpose.

Methods: Through a systematic review of literature from secondary sources, the study analyzed secondary data / texts from books, journal articles, and online sources published between 2021 and 2025.

Findings: The findings indicate that no single non-probability sampling design is suitable for all research studies and offer researchers clear guidance on the types of non-probability sampling designs and their appropriate applications.

Conclusion: The study highlights that no single non-probability sampling design can universally fit all research contexts. Instead, the choice of design should be guided by the specific objectives, nature of the study, and available resources. The findings provide researchers with practical guidance on the strengths, limitations, and appropriate applications of different non-probability sampling methods, enabling more informed decisions that enhance the validity and relevance of their research outcomes.

Novelty: The novelty of this research is its practical guidance, showing that non-probability sampling designs should be chosen based on study objectives and context to improve validity and relevance.

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Keywords: non-probability sampling designs, research, sample, sampling design

Introduction

Research is one of the most prestigious systematic tasks of our time. It is a disciplined inquiry (Pinto & Koichu, 2021; Cinnamon et al., 2021), and a systematic process of collecting and analyzing information to develop a better understanding of a phenomenon and answer the specific question or problem under investigation (Spigel et al.,2023; Gbore et al., 2024). It is a truly intellectual and creative activity (Akmaljonovich, 2021; Lebedova & Sapundzhiev, 2023). Research writing is typically an academic writing (Chauhan, 2022; Mondal & Mondal, 2023). and should be as a process of steps designed to gather and analyze information to develop a better understanding of a topic or problem. This is a systematic survey of the topic. The step-by-step research process includes: formulating the research question, devising the study design, constructing the equipment to collect the data, selecting the sample by sampling design, collecting the data, interpreting the data, and analysis, and writing the research report. The design describes how the researcher intends to conduct the research study.

Sampling design is an important aspect of any research study. It is an explicit plan for obtaining a sample from a specific population (Cash et al., 2022; Hossan et al., 2023). A sample is a portion of a population (Casteel & Bridier, 2021; Nanjundeswaraswamy & Divakar, 2021). Researchers should carefully select only a few elements from the population. There are two main types of sampling designs: probability design sampling and non-probability sampling design. Probability sampling is widely recognized as the most suitable method for drawing inferences that can be generalized to a finite population (Beaumont & Haziza, 2022; Raifman et al., 2022). In probability sampling, each unit in the population has a known non-zero sampling probability, and in design-based frameworks these probabilities are the basis for conclusions (Andridge & Valliant, 2021; Kalton, 2023). Proper choice of sampling design is necessary to form a sample size that allows researchers to draw representative conclusions about the population. Sampling is a highly debated and discussed topic in research circles. Such discussions inspired the author to write this article on probability sampling design. This article presents some major non-probability sampling designs, such as convenience sampling, purposive sampling, quota sampling, snowball sampling, etc. It is anticipated that researcher and students will benefit from perusing this brief journal article.

Literature Review

This article comprehensively reviews the theoretical literature on non-probability sampling design, including its major types, advantages, and disadvantages.

Non-probability sampling

Probability sampling design is frequently associated with quantitative research, whereas non-probability sampling is often associated with qualitative research (Pace, 2021; Mukti, 2025). One disadvantage of a non-probability sampling design is that researchers are unable to provide statistical support for the sampling error (Pace, 2021; Shamsudin et al., 2024). Its main advantages are convenience and economy. Though a sample of participants in case of non-

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random sampling design does not require to be representative, there must be a clear rationale of inclusion of the participants (Khalefa & Selian, 2021; Shamsudin et al., 2024). It is a sampling method that uses non-random criteria like the accessibility, geological immediacy, or specialist knowledge of the individuals you want to research in order to answer a research question (Mulisa,2022). It is used when the population parameters are either unidentified or impossible to independently categorize.

Advantages of non-probability sampling

Depending on the research design, the advantages of choosing non-probability sampling are as follows:

- No sampling frame required.
- Topics are often readily available.
- Faster and easier to do.
- This allows researchers to target specific groups within a population.
- Non-probability sampling techniques can provide researchers with data for making other types of generalizations from the sample under study, but cannot draw statistical inferences from the sample to the population (Bangdiwala, 2021; Hirschauer et al., 2022).

Disadvantages of non-probability sampling

Non-probability sampling has the following demerits:

- Non-probability samples are extremely unlikely to be representative of the population studied.
- This undermines the generalizability of your results.
- Non-probability samples are at risk of several kinds of research bias.

Non-probability sampling designs are convenient to use, but there are not any statistical techniques to compute their sampling error (Rahman, 2023; Stratton,2021).

Types of non-probability sampling designs

Non-probability sampling designs have varied nomenclatures. Some of them are as follows:

Quota sampling: Quota sampling is a non- random sampling procedure in which participants are selected on the basis of predetermined characteristics so that the total sample will contain the same distribution of characteristics as the wider population (Iliyasu & Etikan, 2021; Hossan et al., 2023). It is a non-probability sample which is most often used in survey research when it is not likely to list all the members of population of interest and the participants are selected non-randomly for inclusion in the study (McKechnie & Fisher, 2025; Fadele & Rocha, 2025). It involves assortment of the sample units within each stratum or quota on the basis of the judgement of the researcher rather than on quantifiable chance of being included in it. It is particularly helpful when a researcher is not capable to get a probability sample, but is still trying to generate a sample that is as representative as likely of the population being studied (Einarsson et al., 2022). It involves selecting distinctive cases from diverse strata of a population. The quotas are based on known characteristics of the population to which the researcher wishes to generalize. Elements are drawn so that the consequential sample is a tiny approximation of the population with respect to the chosen characteristics.

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There are two types of quota sampling:

Proportional quota sampling: It is executed when the size of the population is identified. This allows the researcher to determine the quota of individuals that he or she needs to include in the sample in order to be representative of the population (Choi & Jeong, 2023; Kim et al., 2024)

Non-proportional quota sampling: It is implemented when the size of the population is unknown. It's up to the researcher to resolve the quota of individuals that he/ she is going to include in the sample in advance (Pace,2021; Khalefa & Selian,2021).

The steps in quota sampling involve:

1. Determining a number of variables, strongly related to the question under investigation,
2. Using census or other available data, determining the size of each segment of the population.
3. Computing quotas for each segment of the population proportional to the size of each segment.
4. Selecting typical cases from each segment of the population to fill the quotas.

Advantages of quota sampling

Quota sampling is principally useful when the researcher is incapable to obtain a probability sample, but he/she is still trying to create a sample that is as representative as possible of the population being studied. It is much quicker and easier to carry out because it does not require a sampling frame and the strict use of random sampling techniques (Adeoye, 2023, Makwana et al., 2023). The quota sample advances the representation of particular strata (groups) within the population, as well as ensuring that these strata are not over-represented.

Disadvantages of quota sampling

In quota sampling, the sample has not been selected using random selection, which makes it impossible to determine the possible sampling error (Coelho et al., 2022; Adeoye, 2023). Indeed, it is possible that the selection of elements to be included in the sample will be based on ease of access and cost considerations, resulting in sampling prejudice. It also means that it is not possible to make statistical inferences from the sample to the population. This can lead to problems of generalization.

Snowball sampling: Snowball sampling is a non-random sampling technique that uses a few cases to help support other cases to take part in the study, thereby escalating sample size (Ahmed, 2024; Kamuzora,2025). This approach is most appropriate in small populations that are intricate to access due to their closed nature, e.g., secret societies and inaccessible professions. It involves picking up a few people who can identify still others who might be good participants for a study. It involves asking participant to refer researchers to other people who can serve as participants. It is the procedure of selecting a sample using networks. It is used when the population a researcher wants to research is hard to reach, or there is no existing database or other sampling frame to help him/her find them (Winton & Sabol, 2022). Research about socially marginalized groups such as drug addicts, homeless people, or sex workers often use snowball sampling. To conduct a snowball sample, a researcher starts by finding one person who is willing to participate in the research. The researcher then asks the related persons to

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introduce him/her to appropriate members of the population (Kubiciel-Lodzińska, 2021; Scârneci-Domnișoru, 2024).

Advantages of snowball sampling

Snowball sampling is a useful choice of sampling strategy when the population a researcher is interested in studying is hidden or hard-to-reach (Khoury et al., 2024; Adejare,2024). It is useful in the following scenarios:

- When it is not easy to identify units to include in the sample due to lack of an obvious list of the population in which the researcher is interested.
- When the sensitivity of coming forward to take part in research is more acute in such research contexts.
- The secretive nature of some social groups may also make it difficult to identify strata that warrant investigation.
- There may be no other ways of accessing the sample.

Disadvantages of snowball sampling

It is impossible to determine the possible sampling error and make statistical inferences from the sample to the population (Hussain & Raihan, 2022; Pasikowski, 2023). The snowball samples are not considered to be representative of the population being studied.

Purposive or judgmental sampling: Purposive or judgmental sampling is a strategy in which persons or events are selected deliberately in order to provide important information that cannot be obtained from other choices (Thomas, 2022; Alordiah &Oji, 2024). It is where the researchers include cases or participants in the sample because they believe that they warrant inclusion. This type of sample is chosen because there are good reasons to believe that it is a representative of the total population (Andrade, 2021; Das et al., 2023). The members for a sample are selected according to the purpose of the study in the purposive sampling design. A purposive sample is arbitrarily selected because there is good evidence that it is a representative of the total population. The evidence is based on researcher's experience. It is different from convenience sampling because the researchers do not simply study whoever is available but rather use their judgment to select a sample that they believe, based on prior information, will provide the data they need. Purposive sampling is a blanket term for several sampling techniques that choose participants deliberately due to qualities they possess (Sebele-Mpofu, 2021; Akkas & Meydan, 2024). It is general in qualitative and mixed methods research designs, especially when reflecting on specific issues with unique cases.

Types of purposive sampling

Maximum variation sampling: The idea behind maximum variation sampling is to look at a subject from all possible angles in order to achieve greater understanding. It is also taken as heterogeneous sampling. It grips selecting candidates across a wide spectrum relating to the topic of study. This assists a researcher in capturing a wide range of perspectives and identifies common themes obvious across the sample (Derakhshan et al., 2021; Thomas, 2022).

Homogeneous sampling: It aims to achieve a sample whose units share characteristics, such as a group of people that are similar in terms of age, culture, or job. It is to focus on this similarity; investigating how it relates to the topic you are researching. It is a purposive

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sampling technique that aims to achieve a homogeneous sample; that is, a sample whose share the same or very similar characteristics **or** traits (Bekele & Ago, 2022; Nyimbili & Nyimbili, 2024).

Typical case sampling: It is a purposive sampling technique used when the researchers are interested in the normality/typicality of the units (e.g., people, cases, events, settings/contexts, places/sites. They are interested, because the units are normal/typical (Staller,2021; Cash et al., 2022).

Extreme or deviant case sampling: It is a type of purposive sampling that is used to focus on cases that are special or unusual, typically in the sense that the cases highlight notable outcomes**,** failures or successes. These extreme cases are useful because they frequently provide considerable insight into a particular phenomenon, which can act as lessons to guide future research and practice. In some cases, extreme case sampling is thought to reflect the purest form of insight into the phenomenon being studied (Meyer & Mayrhofer, 2022; Corradi,2025).

Critical case sampling: It is a type of purposive sampling method that is predominantly useful **in** exploratory qualitative research, research with limited resources, as well as research where a particular case (or small number of cases) can be decisive in explaining the phenomenon of interest (Staller, 2021; Nyimbili & Nyimbili, 2024).

Total population sampling: It is a type of purposive sampling technique where the researchers choose to examine the entire population that have a particular set of characteristics (Thomas, 2022, Golzar et al., 2022). In such cases, the entire population is often chosen because the size of the population that has the particular set of characteristics is very small.

Advantages of purposive sampling

- One of the major benefits of purposive sampling is the wide range of sampling techniques that can be used across such qualitative research designs (Thomas, 2022; Tajik et al., 2024).
- While the various purposive sampling techniques each have different goals, they can provide researchers with the justification to make generalizations from the sample that is being studied, whether such generalizations are theoretical**,** analytic and/or logical in nature (Adebayo & Ackers, 2021; Merkebu et al., 2025).

Disadvantages of purposive sampling

- Purposive samples can be highly prone to researcher bias. The idea that a purposive sample has been created based on the judgement of the researcher is not a good defence when it comes to improve possible researcher biases (Thomas, 2022; Nyimbili & Nyimbili, 2024).
- The subjectivity and non-probability-based nature of unit selection in purposive sampling means that it can be difficult to defend the representativeness of the sample (Ebenezer & Piate, 2023; Khoei & Singh, 2025).

Convenience sampling: Convenience sampling, sometimes called accidental sampling, is selecting participants because they are often readily and easily available (Stratton, 2021; Golzar et al., 2022). The samples are based on their availability. Typically, it tends to be a favored

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sampling technique among students as it is inexpensive and an easy option compared to other sampling techniques. A convenience sample is any set of individuals that is easily available to be studied (Emerson, 2021; Golzar et al., 2022). It often helps to overcome many of the limitations associated with research. The members of the target population are selected if they meet certain practical criteria like geographical proximity, availability, easy accessibility or the willingness to volunteer.

Advantages of Convenience sampling

- Convenience sampling is very easy to carry out with few rules governing how the sample should be collected (Winton & Sabol, 2022; Adeoye, 2023).
- The relative cost and time required to carry out a convenience sample are small in comparison to probability sampling techniques. This enables researchers to achieve the sample size they want in a relatively fast and inexpensive way.
- The convenience sample may help researchers gathering useful data and information that would not have been possible using probability sampling techniques, which require more formal access to lists of populations (Andrade, 2021; Sarker & AL-Muaalemi, 2022).

Disadvantages of Convenience sampling

- The convenience sample often suffers from biases from a number of biases.
- Since the sampling frame is not known, and the sample is not chosen at random, the inherent bias in convenience sampling means that the sample is unlikely to be representative of the population being studied (Sharma et al., 2022; Winton & Sabol, 2022).
- This undermines researchers' ability to make generalizations from the sample to the population they are studying.

Voluntary response sampling: Similar to a convenience sample, a voluntary response sample also known as self-selection sampling, is mainly based on ease of access (Tiit, 2021; Stratton, 2021). Instead of the researcher choosing participants and directly contacting them, people volunteer themselves by responding to a public online survey. Voluntary response samples are always at least somewhat biased, as some people will inherently be more likely to volunteer than others (Fessinger & Kovera, 2022). Volunteers are usually invited to participate through advertisements asking those who meet the requirements to sign up. Volunteers are recruited until a predetermined sample size is reached. It is efficient sampling design in terms of cost and time.

Self-selection or volunteer sampling involves two steps:

1. Publicizing the researchers' need for subjects
2. Checking the suitability of each subject and either inviting or rejecting them

Advantages of self-selection sampling

Since the potential research subjects (or organizations) contact the researchers:

- This can **reduce** the amount of **time** necessary to search for appropriate units.

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- The potential units or cases are likely to be committed to take part in the study, which can help in improving attendance, and greater willingness to provide more insight into the phenomenon being studied (Minárová et al., 2021; de- Wit et al., 2022).

Disadvantages of self-selection sampling

- There is likely to be a degree of self-selection bias**.**
- This can either lead to the sample not being representative of the population being studied, or exaggerating some particular findings from the study (Navarrete et al., 2022; Adeoye, 2023).

Consecutive sampling (also known as total enumerative sampling): Consecutive sampling is the process of doing research with the sample members that meet the inclusion criteria and are conveniently available (Lytvyak et al., 2022; Bujang et al., 2025). Researchers conduct researches after the other until they reach a conclusive result. Samples are chosen based on availability and each result is analyzed before they move onto the next sample or subject.

Expert sampling: Expert sampling is a type of purposive sampling technique that is used when the research needs to collect knowledge from individuals that have particular expertise (Liu et al., 2021; Huang et al., 2022). This expertise may be required during the exploratory phase of qualitative research, highlighting potential new areas of interest or opening doors to other participants. When research goals call for a panel of specialists to help understand, discuss and elicit useful results, expert sampling could be useful. With expert sampling, the sample is chosen based on the knowledge of prospective sample members in given vicinity (Amini, et al., 2021; Ahmed, 2024).

Dimensional Sampling: In this sampling design**,** the researcher makes sure that at least one representative of every combination of diverse parameters in the sampling frame is integrated in the sample (Jin et al., 2021; Zhong et al., 2021ninty_two).

Non-random sampling designs are appropriate when researchers aim to gather insights from specific subgroups or hard-to-reach populations, or when probability sampling is impractical due to time, cost, or accessibility constraints. They are particularly useful in exploratory, qualitative, or pilot studies where the focus is on understanding patterns, behaviors, or experiences rather than making generalizable statistical inferences. Although non-random sampling limits generalizability, it provides efficient and focused data collection for context-specific research.

Materials and Methods

This study employed a qualitative exploratory research design to examine non-probability sampling designs and provide guidelines for their appropriate use in research. Secondary data were collected from a range of books, journal articles, and credible online materials published between 2021 and 2025. Through a systematic literature review, the study focused on analyzing commonly used non-probability sampling designs, such as purposive, snowball, quota, and convenience sampling. Data were systematically reviewed and categorized to identify the characteristics, strengths, limitations, and suitable applications of major designs. The analysis emphasized the relationship between research objectives, population characteristics, and design

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OPEN ACCESS

selection, aiming to develop practical guidance for researchers in choosing the most appropriate non-probability sampling design for their studies.

Brief Analysis

This brief analysis focuses on identifying the specific scenarios and rationales that justify the use of a particular non-probability sampling design in research.

Table 1

Apt Use of Sampling Designs

Type of Sampling Technique	When to Use	Citations
Quota Sampling	To ensure subgroup representation	(Futri et al., 2022; Mulisa, 2022)
Proportional Quota Sampling	When sample subgroups match population proportions	(Choi & Jeong, 2023; Kim et al., 2024)
Non-proportional Quota Sampling	When equal subgroup sizes are required	(Khalefa & Selian, 2021; Iliyasu & Etikan, 2021).
Snowball Sampling	For hidden or hard-to-reach populations	(Leighton et al., 2021)
Purposive Sampling	To select participants with specific traits	(Thomas, 2022; Ahmad & Wilkins, 2024)
Maximum Variation Sampling	To capture diverse perspectives	(Derakhshan et al., 2021; Pyo et al., 2023)
Homogenous Sampling	To study a uniform group	(Douglas, 2022; Hennink & Kaiser, 2022)
Typical Case Sampling	To select average/representative cases	(Staller,2021; Başaran, 2024)
Extreme or Deviant Case Sampling	To study unusual or outlier cases	(Burton et al., 2023; Nyimbili & Nyimbili, 2024)
Critical Case Sampling	When one key case is most informative	(Staller, 2021; Cleland et al., 2021)
Total Population Sampling	When population is small and all are included	(Ghosh, 2021; Rahman et al., 2022)
Convenience Sampling	For easily available participants	(Stratton, 2021; Golzar et al., 2022)
Volunteer Response Sampling	When participants self-select	(Stratton,2021; Van- Alten et al., 2024)
Consecutive Sampling	To include all eligible subjects over time	(Khan et al., 2022; Bujang et al., 2025)
Expert Sampling	To gain insights from specialists	(Irwin & Mandel, 2023; Ahmed, 2024)
Dimensional Sampling	For balanced representation across dimensions	(Jin et al., 2021; Chen et al., 2023)

The table outlines various non-random sampling techniques and their specific applications, highlighting how each method serves different research purposes. Some techniques, such as quota, proportional, and dimensional sampling, are designed to ensure subgroup representation,

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either in equal numbers or in proportion to the population. Others, like purposive, expert, and critical case sampling, focus on selecting participants with particular characteristics or knowledge relevant to the study. Methods like snowball and convenience sampling emphasize accessibility, making them useful for reaching hidden populations or gathering data quickly. Moreover, approaches such as maximum variation, homogeneous, typical, and extreme case sampling allow researchers to capture a spectrum of perspectives from the most diverse to the most uniform or unusual. The table demonstrates how non-random sampling designs provide flexibility, and enable researchers to fit participant selection according to the nature and goals of their study.

Conclusion

Sampling designs are fundamentally classified into probability and non-probability ones. Non-probability sampling includes major techniques such as quota, snowball, purposive, and convenience sampling, along with subsidiary methods like expert, volunteer, consecutive, heterogeneous (maximum variation), and homogeneous sampling. Quota sampling selects participants based on predetermined characteristics to match the population distribution. Snowball sampling expands the sample by using existing participants to recruit others. Purposive sampling deliberately targets specific cases, people, or events to gather relevant information, while convenience and voluntary sampling rely on readily available participants. Expert sampling involves individuals with specialized knowledge, consecutive sampling includes all eligible participants meeting inclusion criteria, heterogeneous sampling aims for maximum variation, and homogeneous sampling focuses on units sharing similar characteristics. This article provides an overview of non-probability sampling designs, describing their main and subsidiary types along with the specific purposes and selection criteria for each design.

Funding: This study received no specific financial support.
Transparency: The author declares that the manuscript is honest, truthful and transparent, that no important aspects of the study have been omitted and that all deviations from the planned study have been made clear. This study followed all rules of writing ethics.
Competing Interests: The author declares that they have no competing interests.
Authors' Contributions: The author has solely completed this work.

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