**METHODOLOGY IN NURSING RESEARCH**

**Author details**

Mrs. Manisha Praharaj. Assistant Professor. SUM Nursing College. Siksha ‘O’ Anusandhan (Deemed to be University). Bhubaneswar. Odisha

Mail Id: [manishapraharaj21486@gmail.com](mailto:manishapraharaj21486@gmail.com)

Contact no: 9937463998

Editor id: IIPER1655891646

**What is Research Methodology?**

The exact steps or methods used to collect, select, organize, and analyse data pertaining to a topic are known as research methodology. The methodology part of a research paper gives the reader the chance to assess the general validity and reliability of a study.

For instance, How did the researcher decide,

• What Information to gather

• Who to gather it from (this is known as "sampling design" in research);

• How to collect it (data collecting methods).

• Data analysis methods, which describe how to analyse it.

**Definition**

Research can be defined as “an activity that involves finding out, in a more or less systematic way, things you did not know”

* Walliman and Walliman,2011

“Methodology is the philosophical framework within which the research is conducted or the foundation upon which the research is based”

* Brown, 2006

**Importance of research methodology**

A research approach offers the study credibility and yields reliable scientific results. Additionally, it offers a thorough strategy that aids in keeping researchers on target, facilitating a simple, efficient, and manageable approach. The reader may comprehend the strategy and procedures utilised to reach at results by understanding the researcher's methodology.

The advantages of using a reliable research methodology are as follows:

* The research is sufficiently well-documented for replication by other researchers.
* Researchers can use the methodology to defend their methods if they face criticism.
* It can assist in giving researchers a clear strategy to adhere to throughout their research.
* Researchers may choose the best methods for their aims with the aid of the methodology design process.
* It enables researchers to clearly state their objectives for the study from the beginning.

**Types of research methodology**

A researcher must make various choices while developing a research methodology. One of the most critical decisions is whether to adopt qualitative, quantitative, or a combination of the two data methodologies. The data obtained will always be in the form of numbers or descriptions, and researchers can choose to concentrate on gathering either words, numbers, or both.

The following are different methodologies used in research:

1. **Qualitative Research**

Quantitative research is formal, objective, and systematic process for gathering information about the world. Quantitative research is conducted to describe new situations, events, or concepts. In quantitative research study, variables are preselected and defined by the investigator, the data is collected and quantified and then statistically analysed often with the view to establish cause-and-effect relationship among the variables. This process is an orderly way of dealing with a research problem, where variables are generally studied in numerical (quantitative) form. The research process starts with the identification and formulation of the research problem and ends with the dissemination of research findings.

1. **Qualitative Research**

Qualitative research is a systematic and subjective approach to describe events or life experiences, and to give them intended meanings. It is an interdisciplinary, transdisciplinary, and sometimes counter disciplinary field. It is committed to the naturalistic perspective to the interpretative understanding of human experiences. It not only helps to unearth hidden facts, but also to explore attitude, emotions, beliefs, sensitive issues, opinions, concepts processes, and relationships of people. The process of qualitative research is relatively less formally planned, where planning and execution of research moves hand in hand. Therefore, the steps of qualitative research process are slightly different from that of quantitative research.

1. **Mixed-method**

Mixed method research approaches have been continuously used by the investigators in all the spheres of research without realizing its use. However, since last two decades mixed method research designs have methodologically evolved and now recognized as systematic approach to study a complex phenomenon. Nursing research deals with several complex phenomena, which cannot be answered completely by quantitative or qualitative research methods alone. Therefore, increasing use of mixed method research has been observed in nursing research.

'Mixed method research is an integrated approach to answer a research question, where quantitative and qualitative research methods are mixed at data collection, data analysis and data interpretation to obtain better understanding of phenomenon and to provide a complete answer to a research question than either approach alone'. Following are the uses of mixed method research designs:

* In mixed method research, quantitative and qualitative research act as supplementary and complimentary to each other for overcoming the weakness of one by using other in combination.
* Mixed method researches are helpful in enhancing comprehensiveness and completeness of a study results.
* Mixed method research provides better understanding and explanation for unexpected study results generated with quantitative and qualitative method alone.
* Mixed method research also helps in instrument and taxonomy/theory development.
* Mixed method research improves the credibility and usefulness of the data.

**Types of sampling design in research methodology**

Sampling is the process of selecting a representative part of population. Thus, a carefully carried out sampling process helps to draw a sample that represents the characteristics of the population from which the sample is drawn. There are several methods of sampling, however basically sampling techniques are classified into two main categories:

1. **Probability sampling**

This sampling method based on the theory of probability and uses a random selection of sample from the population. Every person or item in the population has an equal chance of being selected. Probability sampling technique is used to enhance the representativeness of the selected sample for a study. In probability sampling techniques, the chances of systematic bias are relatively less because subjects are randomly selected.

1. **Nonprobability sampling**

Nonprobability sampling is not random, as the researcher deliberately selects people or items for the sample. Every person or item in the population doesn't have an equal chance of being selected. Non – probability sampling is a technique wherein the samples are gathered in a process that does not give all the individuals in the population equal chances of being selected in the sample. In other words, in this type of sampling every subject does not have equal chance to be selected because elements are chosen by choice not by chance through non-random sampling techniques.

**Common data collection methods**

A researcher must choose how to gather data after deciding on their population sample. The best research approach to choose will depend on the study topic, methodology, data type, and population sample. There are various possibilities for data gathering. Although there are several techniques to gather data, they are sometimes grouped generically in the following ways:

* ***Interviews***: Depending on how formal the questions are, researchers can conduct interviews in a structured, semi-structured, or unstructured manner.
* ***Surveys***: Surveys can be completed in person or online and can include open-ended, essay-style or closed-ended, multiple-choice questions. A survey could also make use of a combination, depending on the data needed.
* ***Focus groups***: In focus groups, interviewees are asked to share their ideas, viewpoints, and impressions on particular subjects. A moderator generally takes the lead to facilitate the conversation and make sure everyone has a chance to speak.
* ***Records and documents***: Researchers get information from public reports, official documents from governments, commercial institutions, and international organisations, as well as from internal records like employee payroll, raw material amounts, and cash transactions.

**Common data analysis methods**

Depending on whether a set of information (data) is qualitative or quantitative, researchers will apply a different method of analysis.

For example: Qualitative data analysis

Written or spoken information, such as interview transcripts, video and audio recordings, notes, photographs, and text documents, are the most common forms of qualitative data. Qualitative data analysis entails detecting common patterns in participants' replies and critically examining them to attain research aims and objectives.

The most commonly used qualitative data analysis methods are:

* ***Content analysis***: One of the most popular techniques for analyzing written data is typically used to examine interviewee replies.
* ***Narrative analysis***: This technique is used by researchers to analyze data from surveys, observations, and interviews, among other sources. It emphasises leveraging people's experiences and tales to provide light on research problems.
* ***Discourse analysis***: This approach analyzes spoken or written language in the context of society and seeks to comprehend how people use language in everyday contexts.
* ***Grounded theory***: This approach develops or refines a hypothesis explaining why something occurred using qualitative data. In order to arrive at explanations, it compares data from examples with comparable characteristics in other contexts.

**Quantitative data analysis**

Through the use of logic and critical thinking, numbers are transformed into meaningful data in quantitative data analysis. The majority of researchers use analytical software to aid in the analysis of quantitative data. Validating, editing, and coding the data is the initial step in the analysis of quantitative data. Once it’s completed the data can be analyzed.

Commonly used quantitative data analysis methods are:

* ***Descriptive analysis***: This method uses descriptive statistics like mean, median, mode, percentage, frequency and range.
* ***Inferential analysis***: This method shows the relationships between multiple variables using correlation, regression and variance analysis.

**Factors to consider when choosing a research methodology**

* ***The research objective***: Take the objective of your study project into consideration. Researchers are better able to choose the appropriate methodology and research approach when they are aware of the data, they will need at the project's conclusion to achieve their goals.
* ***Statistics' significance***: Another thing to think about is whether you need succinct, data-driven study findings and statistical solutions. Or whether knowledge of causes, perceptions, attitudes, and motives is necessary to answer the study questions.
* ***Research's nature***: If its goals and objectives are exploratory, qualitative data gathering techniques will probably be used. However, the research will need quantitative data gathering techniques if the aims and objectives are to measure or test anything.
* ***Sample size***: How much of a sample must be taken in order to adequately address the objectives and research questions? Your data collection techniques, such as whether to conduct in-person interviews for smaller samples or online surveys for bigger ones, can be influenced by the sample size.
* ***Time available***: If there are time restrictions, take into account methods like convenience or random sampling as well as instruments that enable data collecting in a matter of days. In-person interviews and observations are options for data collecting if there is more time available.

**Steps of research methodology**

A researcher must do a number of closely connected tasks as part of the research process. The research process needs participants. No measure exists to demonstrate that your study is the best. It is an art rather than science. Following are the research steps to be followed while writing methodology.

**Step 1: Selection of research problem & focus on objectives**

It might be challenging to choose a study topic. Other tasks would be simple to complete after we have chosen a title or research statement. Therefore, it is necessary to discuss the issue with co-workers, friends, experts, and teachers in order to fully understand it. The study's problem or topic should be relevant, defensible, morally and politically acceptable, and of moderate importance. The methodology section should clearly show why your techniques are acceptable for your objectives and persuade the reader that you made the proper decision in regards to your approach selection in order to answer your research problem and study questions.

**Step 2: Describe selected approach**

All of the components required to convince the reader that the study in concern is both practical and valuable are included in a good research process. Typically, studies are conducted using one of two types of research methods: quantitative or qualitative. When your study is intended to analyse the relationship between the variables, quantitative research will be used; however, qualitative research will be used when your goal is to examine real-world awareness of a particular group of people's attitudes, social dynamics, and shared values.

**Step 3: Reason for selecting particular research design**

Once you've made the decision to choose a research method, you must explain why you did so and how it relates to achieving the goals of your study.

**Step 4: Explain methods of data collection**

When drafting the methodology, keep in mind the intended number of readers. Consider the kinds of data you can get and how it could be feasible. Data collection is considered to be the process of gathering information from pertinent sources in order to address research questions, test hypotheses, and assess results. They typically fall into one of two categories: primary data or secondary data. Basically, surveying and interviewing are used to get primary data, whereas previously published articles, reports, case studies, etc. are used to gather secondary data. Depending on the study methodology you have chosen, you can select either a primary or secondary data gathering strategy.

**Step 5: Describe methods of data analysis**

The tools that may be used to examine the data obtained must be determined once the data gathering method has been fixed. If the study is quantitative in nature, researcher must do statistical analysis utilising programmes like SPSS, Stata, or R, among others, to run statistical tests like the descriptive and inferential statistics such as two-tailed t-test, basic linear regression, correlation analysis, and so on. In contrast, words, images, and conclusions (typically incorporating some sort of textual interpretation) will all be part of the analysis in qualitative research. The three types of analysis are discourse analysis, content analysis, and thematic analysis.

**What Makes a Good Methodology?**

A good research approach should include

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