**RESEARCH METHODOLOGY IN NURSING**

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1. INTRODUCTION

The topic or issue of study is the subject of research, which is the meticulous, scientific evaluation of studies related to that topic or problem. Research is a method of in-depth investigation that is usually tested or investigated to further the corpus of knowledge. Research is conducted in a variety of fields to support a goal. To find effective answers, new information is required. Nursing research with a focus on clinical issues can be very helpful in developing those answers. Nurses carry out a number of studies in order to develop clinical interventions that will help those who require nursing care. Interdisciplinary scientific support is frequently required due to the complexity and breadth of nursing research. The complexity and range of nursing research frequently calls for interdisciplinary scientific support. Nursing research enhances our understanding.

1. DEFINITION

The term "research methodology" refers to a justification of an investigator's planned mode of inquiry. It is a logical, methodical plan to deal with a research problem. A researcher's methodology should be explained in order to make certain that the study will yield accurate, reliable results that satisfy the researcher's goals and objectives.

1. IMPORTANCE OF RESEARCH METHODOLOGY
2. An investigation's credibility is increased and solid scientific results are produced through a research approach. ‘
3. The approach is simple, effective, and manageable because it also has a clear plan that aids researchers in staying on track.
4. Researchers may use their method to defend their approach when they receive unfavourable comments.
5. The investigator's methodology allows the reader to comprehend the approach and processes required to reach their conclusions.It can help researchers create a detailed plan to adhere to throughout their investigation.
6. The methodology design process helps researchers choose the best strategies for their objectives.
7. It enables researchers to outline their objectives for the study right away.
8. RESEARCH METHODOLOGY IN NURSING

A researcher must consider a range of options while developing a study strategy. It is necessary to follow a procedure known as methodology for research in order to obtain accurate and trustworthy data for problem analysis. Examples of research methods include the following:

* Research Design
* Research Approach
* The Population, Sample and Sampling Technique
* The Time, Place and Sources of Data collection.
* Tools and methods of data collection
* Methods of data analysis
1. **Research Design:** The research design is a methodical plan that specifies what must be done, how it must be done, and how the result has to be analyzed. The term "research design" is often employed synonymously alongside the word "methodology." The study's design can be referred to as the framework the investigators select to carry out their research study.
2. **Research Approach:** It provides a general description of how the topic under research will be studied utilizing a planned, unplanned, or hybrid technique. As result, the strategy aids in identifying if variables are that or not as well as modifying and regulating them. The choice of a data methodology—qualitative, quantitative, or a combination of the two—is among the most crucial. Whatever the research kind, researchers can choose to gather words, numbers, or both types of data. Data will be gathered in either the form or numbers or descriptions. The many research approaches are described below:
3. **Qualitative Research:** Qualitative research involves both gathering and analyzing textual material as well as spoken and written words. It may also pay attention to visual cues in order to accurately describe a researcher's observations. The research's approach can be more subjective and time-consuming than using quantitative data. When a researcher's objectives and goals are exploratory, they typically adopt a qualitative methodology.
4. TYPES OF QUALITATIVE RESEARCH

Conducting qualitative research necessitates choosing a study design approach that is suitable for your problem. Researchers usually employ several tactics during an investigation. The following five conventional design techniques:

1. **Historical Study:** A historical study is the most effective way to manage an in-depth investigation of the past, including individuals, occurrences, and records. Making predictions about today and future by using information from prior studies is the aim of a historical study. This model is based on reliable interview and historical sources. It is essential to locate primary sources and check the accuracy of the material. According to the researcher's goals, this type of research may result in a biography, which is why the phrases "historical study" & "biographical study" are occasionally used synonymously.
2. **Phenomenology:** The subject of study of phenomenology is incredibly diverse. The researcher uses this study methodology to look for information that describes how people come across phenomena and how they respond to them. This method recognizes that each person has a different view of the world and that there is no single objective reality. From the viewpoint of the participants, the conclusion is explained. However, the investigator might still reach a set of results that can be used to identify recurring patterns in the phenomena being studied.
3. **Grounded Theory:** A strategy for developing a theory concerning a social issue is known as "grounded theory." This theory seeks to describe how people deal with problems in social environments in along with identifying those problems. Grounded theory is different from other qualitative study methodologies since it solely makes use of the data that was acquired throughout the research process. Frequently, the original research topic is gradually formed and updated as more information is learned about the issue. In this way, people's input shapes the study.
4. **Ethnography:** Ethnography is the study of a certain subculture within a culture. This approach will allow researchers to fully integrate into the target culture. The qualitative data is gathered by carefully observing and conversing with people who belong to that culture. The information is then presented from their perspective of view. This study's main objective is to understand group culture.
5. **Case Study:** The case study is one of the most well-liked qualitative research techniques, and it can be used to look into a person, group, and society as a whole or institution. Researchers typically employ bounded theory approaches that confine the specific study in terms of time or location. For the case study, the researcher may employ a range of data sources, such as interviews, records, or observation. The study issue or topic under investigation must be shared by all participants, which requires that they are all connected to it in some way. The researcher will review the data after collecting it to look for recurrent or significant themes**.**
6. QUALITATIVE RESEARCH METHODS

A single qualitative investigation may employ a variety of approaches at various points during the data collection phase due to the numerous ways that qualitative data can be collected.

1. **Interview:** Researchers can conduct in-depth, face-to-face interviews with participants. By learning from them, they are therefore better equipped to understand the participants' experiences.
2. **Focus groups:** In the way they bring many individuals together at once, it is comparable to interviews. They offer an extra technique for conducting observational interviews and receiving feedback.
3. **Observation:** This method, which is less direct than interviews or focus groups, gathers information by closely observing participants' behaviors.
4. **Document analysis:** Print and digital records can both offer scholars pertinent data. Analysing the body of related documents carefully is necessary to draw conclusions from them.
5. DESIGNING OF QUALITATIVE RESEARCH

A research project can be organized using five processes, all of which is replicated into the planning phase of a quantitative study. Each of these steps must be carried out by the qualitative researcher in a manner that quantitative researchers would consider "unscientific," "imperfect," and "insufficiently rigorous."

1. **Literature Review:** Both quantitative as well as qualitative study designs begin with a literature review. In the quantitative framework, a literature review's goals are to identify existing knowledge and advance it. In the qualitative approach, the goal of a literature review is to identify what is unknown. As a result, the qualitative paradigm gives you the freedom to be uncertain. For example, nothing was known about the demography of Cambodian refugee populations.
2. **Formulation:** The study hypothesis must describe how a variety of independent variables affect any number of dependent variables in the quantitative paradigm. However, a qualitative study need not have a predetermined research goal. With qualitative research, a broad study focus is not only conceivable but also encouraged. The challenges faced by Cambodian migrants are just one example of how comprehensive they may be.
3. **Instrumentation**: When conducting quantitative research, the researcher must employ a measurement scale that has undergone psychometric verification. The foundation of qualitative research, on the other hand, is the idea that the investigator lacks the necessary knowledge to develop such instruments. Instead, it is assumed that the study participants will be specialists who can inform the researcher about what is required. Once the study participants are on board as co-investigators, the research interview is converted into a collaborative dialogue where both sides examine the research participant's experience. As a result, in addition to the licence to not know, there is also permission to inquire.
4. **Selection:** In quantitative research, a carefully chosen sample of relevant subjects is used to allow for generalisation. The generalizability of qualitative research is not problematic. Instead, a theory is established using a sample, and any residual ambiguities are subsequently addressed with additional sampling. Exploration is thus possible with qualitative research.
5. **Sample Size:** In quantitative research, a power analysis procedure that takes into account the degree of effect as well as the ideal types of one and type 2 errors determines the sample size. In qualitative research, the group's size is not specified. Instead, theory is created throughout the process of sampling, and sampling is stopped when theoretical saturation occurs or when the study has a sufficient number of participants for no further knowledge to be gained from their experiences. Qualitative research therefore permits the development of theories while accumulating data.
6. **Quantitative Research:** Quantitative research is the methodical gathering and assessment information from a broad spectrum of subjects that is based on numerical values. A variety of computational, statistical in nature and mathematical methods are then used to analyze the data in order to provide findings. The researcher can identify averages and trends when using the quantitative study method.

**Types of Quantitative Research:**

Quantitative methods are used to undertake descriptive, correlational, causal-comparative, and experimental research. Let's take a closer look at each type.

* **Descriptive research:** This type of quantitative analysis explains the current state of a variable or issue. Why cannot be addressed (qualitative research handles this issue), only that, when, where, and how. The researcher has no influence or control over the variables. They only observe and evaluate them.
	+ Large amounts of data are regularly gathered through surveys so that they can be analyzed for patterns, frequencies, and averages. Survey can be utilized, for example, to analyze the demographics of a particular area, ascertain public opinion on political matters, and gauge consumer satisfaction with a business's products and services.
	+ Observations are widely used in data collection techniques that don't rely on the sincerity or accuracy of questionnaire responses. Descriptive research is used to understand how individuals behave in real-world situations.
	+ Investigations may also serve to gather comprehensive data and identify characteristics of a narrowly focused subject. They are frequently used in the creation of theories and hypotheses..
	+ This method examines the relationships between various topics and variables without the investigator having any control or ability to manipulate any of the variables. It focuses on the relationships between the fixed variables. The scientific method and theories serve as the foundation for correlational research.
* **Quasi-experimental research:** The causal-comparative study method is used to identify the causes and effects of two variables when one depends on the other yet they are independent from one another. It can't be regarded as an actual experiment while having some similarities to experimentation. There are three main types of quasi-research designs, and they are as follows:
	+ **Nonequivalent groups**: Similar groups, but only one receive therapy or are variable
	+ **Regression discontinuity**: Researchers select a participant cutoff at random. Who receives treatment or a variable while others do not depend on the cutoff. The persons who are barely below the threshold are used as the control group since they are so near to it..
	+ **Natural experiments:** Randomly assigning subjects to the variables receive group is the result of an outside event or situation (nature). These analyses are observational studies rather than true experiments.
* **Experimental research:** The term "experimental research" refers to study that is impacted by a specific hypothesis or collection of hypotheses. Making decisions is much facilitated by it. All investigations that adhere to the scientific method involve experimental research methods. There are three main experimental research layouts available:
	+ **Pre-experimental:** A researcher observes one or more groups while introducing a variable or using an intervention that is thought to result in changes in the groups. To ascertain whether additional research is necessary for the categories that was observed
	+ **True experimental:** Based on statistical analysis, assesses if the hypothesis is correct. The participants must be chosen through random sampling.
	+ **Quasi-experimental:** The selection of participants is not random.
1. MIXED METHOD RESEARCH

A research approach known as mixed methodologies research, which includes numerical (quantitative) and qualitative (descriptive) research components, is used to arrive at a study's result. A mixed-methods investigation is likely to use a range of procedures for data collecting and evaluation that include qualitative and quantitative methods. The characteristics listed below make it simple to identify mixed methods research:

* Data gathering and analysis, both quantitative and qualitative
* Data integration during data gathering
* Theoretical model(s) acting as a study framework

The most common usage of a combination of study methodologies is when a researcher wants to learn more about an event or process while also testing ideas or adding a certain theoretical perspective. If the study issue cannot be resolved by independently analysing quantitative and qualitative data, it is advised to use a combination of methodologies. These domains make the most use of this kind of research because behavioural and health contexts both frequently ask for comprehensive situational studies with a sizable sample size.

1. THE POPULATION, SAMPLE AND SAMPLING TECHNIQUE

It also provides rules for the researcher to follow when choosing the demographics, sample size, and sampling method to be used for the study. In order to do population research, data must first be collected and then analyzed. This is referred to as the sampling methodology or sample procedure. Although there are many sample techniques available, they can be divided into two groups. All of those sampling strategies might involve focusing in particular on hard-to-reach groups. Numerous sampling techniques can be used in statistics to gather relevant data from the population. As shown in fig. no. 1, the two alternate sampling procedures are as follows:



**Figure 01**

1. **Probability Sampling:** The probability sampling approach makes use of a random selection in some way. In this method, there is an equal chance that each eligible participant will select a sample from the whole sample space. Simple random sampling, systematic sampling, stratified sampling, and cluster sampling are some of the different types of probability sampling procedures. Let's look at the different types of probability sampling approaches.

* **Simple Random Sampling:** When employing a straightforward random sampling technique, everything in the entire population has an equal likely possibility of being selected for the sample. The selection of an object is purely based on luck, hence the name "The Method of Chance Selection" for this technique. Because the sample size is sizable and the item was chosen at random, it is known as "Representative Sampling".
* **Systematic Sampling**: In the systematic sampling strategy, the items are randomly selected from the target population at a certain sample interval, and then the remaining ways are chosen. Divide the required number of people by the overall population size to calculate it.
* **Stratified Sampling:** A stratified sampling strategy splits the entire population into portions to complete the sampling process. People who live in the small community have some characteristics in common with other members of society. After splitting the population up into smaller groups, the statisticians randomly select the sample.
* **Clustered Sampling:** In the cluster sampling procedure, a group of people are created from the sample set. The group has important characteristics in common. Additionally, they have an equal chance of getting picked for the sample. The population cluster is sampled using a simple random sampling procedure.
1. **Non-Probability Sampling:** In contrast with random selection, the non-probability sampling strategy involves the researcher selecting the sample based on their own discretion. Not every member of the population will be able to participate in the research using this methodology. Non-probability convenience sampling, sequential sampling, quota sampling, judgemental sampling, and snowball sampling are some of the several kinds of sampling strategies. Now let's examine each one of these non-probability sample types in greater detail:
* **Convenience Sampling:** Since the investigator can easily access them, the samples in this case are taken directly from the population. The samples are easy to choose, but the researcher didn't choose the one that most accurately reflects the community as a whole.
* **Consecutive Sampling:** Consecutive sampling is similar to convenience sampling with a minor distinction. The researcher selects a single person or a whole group of people for sampling. The researcher then performs additional research for a while, evaluates the results, and moves to another group if necessary.
* **Quota Sampling:** In the sampling quota strategy, the researcher uses individuals to represent the overall population by selecting a sample based on specific traits or qualities. The researcher chooses sample subsets that yield useful data that can be generalized to the entire population.
* **Purposive or Judgmental Sampling:** In purposive sampling, the samples are only chosen based on the researcher's knowledge. Because the examples were made using their knowledge, they have a chance to receive answers that are exceptionally accurate and have only a slight margin of error. It is also known as judgmental sampling or authoritative sampling.
* **Snowball Sampling:** Snowball sampling is a frequent name for a chain-referral sampling strategy. Hard to find qualities can be found in the samples utilized in this technique. Therefore, locating the other sample units is a requirement of each recognized member of a population. The same target audience also includes these sampling units.
1. **The Time, Place and Sources of Data collection:** The Time, Place, and Source of the Requisite Data are the other essential components necessary to ensure adequate planning to conduct research study. The techniques and procedures used to collect data for study are known as data gathering methods. These techniques may employ either quantitative or qualitative methods to data collection and might range from straightforward reported questionnaires to more involved investigations. The following are the two primary sources used to gather data:
* **Primary Data Collection Method:** It was never used before and was gleaned from first-hand experience. The data gathered through primary data collection methods is extremely accurate and tailored to the study's objective.
* **Secondary Data Collection Methods:** Secondary data refers to data that is currently being used. Both the internal and external to an organization sources include the information the researcher requires.
* Internal sources of secondary data:
* Organization’s health and safety records
* Mission and vision statements
* Financial Statements
* Magazines
* Sales Report
* CRM Software
* Executive summaries
* External sources of secondary data:
* Government reports
* Press releases
* Business journals
* Libraries
* Internet

Secondary data collecting may also employ quantitative and qualitative approaches. Secondary data can be obtained more quickly and cheaply than primary data because it is openly available. The procedures used to acquire secondary data, however, make it impossible to verify the accuracy of the data that was collected.

1. **Tools and Methods of Data Collection:** This research design component also describes several instruments and data collection methods. Data collecting methods refer to the various steps taken to gather and examine information for a research study. Data collecting methods refer to the various steps taken to gather and examine information for a research study. the method of getting data utilizing specific instruments or tools that are used in a specific approach. A tool is a device that a researcher employs to collect data that quantifies a notion that is crucial to their research project. There are many techniques, such as the following:
* **Interview:** An interview is a discussion between two or more people during which the interviewer asks questions to elicit information. You could think of it as a two-way, structured conversation between an investigator and an informant which is started to gather information for a certain study.
* **Characteristics**
* All of the participants, the interviewer, and the responses are strangers.
* Using this method, you can elicit voice answers to verbal questions.
* The investigator records the information supplied by respondents.
* The discussion's goal is quite apparent.
* In addition to in-person interactions, telephone calls can be made.
* It is a conversation between two persons, albeit it may on occasion only include one respondent.
* **Questionnaire:**  Researchers will ask participants to complete a questionnaire, which is a standardised tool used to gather data on people's knowledge, opinions, and feelings. A participant in the inquiry is required to fill out the questionnaire with paper and a pencil. It is a structured self-reporting technique.

**Types:**

* Open Ended Questions
* Closed Ended Questions:
* Dichotomous Questions
* Multiple Choice Questions
* Cafeteria Questions
* Rank Order Questions
* Contingency Question
* **Attitude scales:** In order to assign individuals a numerical score and set them up on a continuum in regard to the attributes being assessed, scales were developed**.**

**Types:**

* + Likert scale
	+ Semantic differential scale
	+ Visual analogue scale
	+ Observations
	+ Rating scale
* **Observations**: It is a method for learning knowledge by witnessing actions, occurrences, or physical characteristics in their natural settings. There are two kinds of observations: overt, in which everyone is aware that they are being watched, and covert, in which no one is aware that they are.

**Types:**

* + Structured Observation
	+ Unstructured Observation
	+ Participant Observation
	+ Non Participant Observation
* **Rating Scales:** They make reference to a scale that has a range of viewpoints that, to varying degrees, define the many aspects of an apparent attitude. A rating scale is a technique for limiting judgement or organising a view about a trait.

**Types:**

* + Graphic Rating Scale
	+ Descriptive Rating Scale
	+ Numerical Rating Scale
	+ Comparative Rating Scale
* **Checklist:** A checklist is a straightforward tool made up of a prepared list of anticipated behaviours or qualities.
* **Bio Physiological Methods:** The method comprises collecting bio physiological data from subjects with the aid of specialized equipment in order to determine their physical as well as biological status.

**Types:**

* + In vivo Bio Physiological Methods: Measurements are made directly over the organism or topic of the investigation using specialized tools or equipment
	+ In vitro Bio Physiological Methods: Measurements made using specialized tools or equipment outside of the organism or study subject are referred to as in vitro bio physiological methods
* **Projective Technique:** These methods entail delivering unstructured stimuli to respondents, to which they must respond, in order to assess respondents' psychological traits.

**Types:**

* + Association Technique
	+ Completion Technique
	+ Construction Technique
	+ Expressive Technique
1. METHODS OF DATA ANALYSIS

The study design must also include a description of the data analysis processes, whether qualitative or quantitative, that help the researcher collect relevant data that can subsequently be examined in line with the research strategy plan.

a. Steps in Quantitative Data Analysis:

1. **Data management:** Test the application, then purge the data.
* Identify the scales of measurement that are used for your variables that are dependent or independent.
* Compile descriptive statistics using measures of central tendency, dispersion, and distribution, lists the main characteristics of your data collection.
* Use the right inferential statistics – This helps researchers to assess their ability to draw conclusions that go beyond the available data. Variations between two or more groups, changes over time, or a link between two or more factors
* Select the best statistical examination - This is based on your knowledge of the variables' characteristics, measurement units, distribution patterns, and the kinds of inquiries you want to make.
* Verify statistical importance. The common method for doing this is to calculate your "p-value," which assesses the likelihood that your results are not merely coincidental. The p-value decreases as the degree of confidence in the validity of the results increases.
1. **Steps in Qualitative Data Analysis**
* Write down all that was said, in detail.
* Adverse reactions to discomfort, disability, and surgery
* Create arguments or related thoughts: dread
* Develop themes that convey your general perception of your data in relation to them.
* Insufficient control of emotions
* Provide examples in support of categories and themes to keep the analysis grounded in reality.
1. **FACTORS TO CONSIDER WHEN CHOOSING A RESEARCH METHODOLOGY**
2. **Research objective:** Consider the purpose of the investigation. Once they're clear on the data you will need to collect in order to accomplish their goals at the project's conclusion, researchers can choose the most advantageous strategy and research methodology.
3. **Type of research:** If the goals and objectives are exploratory, qualitative data collection methods will likely be used. However, if the study's goals are to assess or test something, quantitative data collection methods will be required.
4. **Sample size:** What size group is required to answer the research's inquiries and achieve its objectives? Depending on the number of respondents, your data collection methods could alter, such as whether you employ in-person interviews with fewer participants or online surveys with more.
5. **Statistical significance:** You should also think about if you need quick, data-driven conclusions and statistical solutions. Instead, think about whether understanding causes, views, mindsets, and motivations is necessary to provide meaningful answers to the study's questions.
6. **Time availability:** If there is a time constraint, consider convenience sampling, random sampling, and tools that allow for quick data gathering. Face-to-face interactions and observations are feasible if sufficient time can be set up for data collection.
7. SUMMARY
8. Evidence-based research is used to promote nursing practices in the field of nursing. Since Florence Nightingale's time, nurses have evolved into an evidence-based profession, and many nurses today work in both the healthcare sector and as researchers at universities.
9. Quantitative and qualitative research designs are the two main categories.
10. When conducting a study, a quantitative research design aims to provide answers to the following questions: who, what, when, how, and when. Additionally, it is easy to demonstrate the outcomes of the quantitative evaluation utilizing statistics, pictures, graphs, and numbers.
11. The goals of a qualitative research design are the why and how. It makes use of open-ended inquiries and supports the participants in effectively expressing their ideas.There are five types of study designs: Experimental designs may employ correlational, descriptive, explanatory, or diagnostic design strategies.
12. Data collection obtains the information needed to do precise evaluations of a patient's present condition.
13. The client now serves as the principal information source. Family members or other trusted confidants, other healthcare professionals, reports and documentation, lab or diagnostics analyses, and applicable literature are examples of secondary sources.
14. Popular methods for gathering data include interviews, surveys, observations, focus groups, experiments, & secondary data analysis. These methods can be used to collect data, which can then be examined to verify or refute research hypotheses and provide conclusions about the study's subject.

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