**Chapter- Research Methodology in Nursing**

Introduction:

Research is the methodical, scientific consideration of studies pertaining to a particular topic or research problem. A method of rigorous study that is either tested or studied to add to a body of knowledge is called research. To support a purpose, research is done in many different domains. New knowledge is necessary to arrive at successful solutions. The creation of those solutions can be significantly aided by nursing research that is focused on clinical problems. In order to create clinical interventions to aid people who need nursing care, nurses conduct a variety of studies. The complexity and range of nursing research frequently calls for interdisciplinary scientific support. Nursing research's intricacy and breadth frequently necessitate scientific support from multiple fields. Research in nursing advances our understanding of health, the promotion of health across the lifespan, the care of people with disabilities and health issues, and nursing interventions to improve people's capacities to respond to current or upcoming health issues.

Definition:

An explanation of a researcher's intended approach of investigation is known as research methodology. To address a research issue, it is a rational, methodical plan. An explanation of a researcher's technique helps to ensure that the research will produce accurate, valid results that meet the goals and objectives of the researcher.

Importance of Research Methodology:

* A research approach gives investigation credibility and yields reliable scientific findings. It also has a well-defined plan that helps researchers stay on course, making the process easy, efficient, and manageable.
* A researcher's methodology enables the reader to understand the approach and steps taken to come to their conclusions.
* When researchers receive negative feedback, they may use the methodology to defend their strategy.
* It can help researchers create a detailed plan to adhere to throughout their investigation.
* The methodology design process helps researchers choose the best strategies for their objectives.
* It enables researchers to outline their objectives for the study right away.

Research methodology in Nursing

When creating a study approach, a researcher must weigh several possibilities. In order to get precise and reliable data for problem analysis, a process known as research methodology must be followed. The following are examples of research methodology:

1. Research Design
2. Research Approach
3. The Population, Sample and Sampling Technique
4. The Time, Place and Sources of Data collection.
5. Tools and methods of data collection
6. Methods of data analysis

**1. Research Design:** A study's planning, execution, and analysis are governed by its research design, which serves as a framework or manual. It is a methodical plan that outlines what must be completed, how it must be done, and the way the data must be analysed. The term "research design" is frequently used synonymously with the word "methodology." Research design is sometimes referred to as an outline that researchers choose to implement their research study.

**2. Research Approach**: It offers an outline of how the phenomenon under investigation will be investigated using a structured, unstructured, or a combination of two approaches. As a result, the method helps in determining whether variables are there or not, as well as altering and controlling them. Selecting a data methodology—qualitative, quantitative, or a combination of the two—is one of the most important. Whatever the research type, the data collected will be in the form of numbers or descriptions, and researchers can decide whether to gather words, numbers, or both. Below is an explanation of the many research methodologies:

**A. Qualitative Research:** Gathering and analyzing words that are spoken or written along with textual data are both parts of qualitative research. In order to create an accurate description of a researcher's observations, it may additionally focus on body language or visual cues. Compared to employing quantitative data, this study approach is more subjective & time-consuming. Researchers usually use a qualitative methodology when their goals and objectives are exploratory..

**Types of Qualitative Research:**

Selecting a study design technique that is appropriate for your issue is a requirement for conducting qualitative research. Over the course of an investigation, researchers frequently use multiple strategies. The following five standard design methods:

**i. Historical Study:**

A detailed analysis of the past, including people, events, and records, is best handled by a historical study. A historical study's goal is to make predictions regarding the present and the future using data from earlier research. This model relies on relevant historical records and interview sources. Finding primary sources and verifying the data's accuracy are crucial. This kind of research could lead to a biography, depending on the researcher's objectives, which is why the terms "historical study" and "biographical study" are sometimes used interchangeably.

**ii. Phenomenology:**

Phenomenology is an extremely diverse field of study. In this research methodology, the researcher seeks out data that explains how people encounter phenomena and their reactions to them. This approach acknowledges that there is no one objective reality; rather, every person has a unique perspective on the world. The conclusion is explained from the participants' perspective. Even so, the researcher might still come up with a set of conclusions that can be utilized to pinpoint common themes in the phenomena under investigation.

**iii. Grounded Theory:**

Grounded theory is a method for creating a theory about a social issue. In addition to identifying issues in social settings, this theory also aims to characterize how people resolve those issues. Because it only uses the information gathered during the research process, grounded theory is distinct from other qualitative design techniques. Frequently, when more data is acquired on the subject, the original research question is gradually reformed and modified. In this way, the study is shaped by the participants**.**

**iv. Ethnography:**

The study of a particular subgroup within a culture is known as ethnography. Researchers that use this methodology will fully ingratiate themselves with the subject culture. The qualitative information is collected through closely observing and interacting with members of that culture. Then the material is given from their point of view. The ultimate goal of this research is to comprehend group culture.

**v. Case Study:**

One of the most popular qualitative research methods is the case study, which is used to investigate an individual, group, community, or institution. Bounded theory approaches, which limit the particular research in terms of time or place, are frequently used by researchers. The researcher may use a variety of data sources for the case study, including interviews, records, and observation. The study question or topic being examined must have a commonality across all the participants, which means they must all be related to it either directly or indirectly. After gathering the information, the researcher will examine it to find recurring or important themes.

**Qualitative Research Methods**

There are many ways to acquire qualitative data, and throughout the data collecting stage of a single qualitative study, many methodologies could be used.

* **Interview:** Participants can be interviewed in-depth and face-to-face by researchers. This enables them to better comprehend the participants' experiences by gaining insights from them.
* **Focus groups:** It is similar to interviews in that they bring together a number of people at once. They provide an additional method for getting feedback and conducting observational interviews.
* **Observation:** Less direct than interview or focus groups, this technique collects information by paying close attention to participants' actions and behaviours.
* **Document analysis:** Both print and electronic records can provide researchers with relevant information. To derive inferences from the body of associated documents, careful analysis is required.

**Designing of Qualitative Research:**

Five steps, each of which is mirrored in the design of a quantitative research study, can be used to organize the design of a qualitative research project. The qualitative researcher is required to perform each of these stages in a way that quantitative researchers would deem "unscientific," "imperfect," and "insufficiently rigorous."

**a. Literature Review**: A literature review is the first step in the design of both qualitative and quantitative research. The purpose of a literature review in the quantitative framework is to ascertain what already exists and advance this knowledge. The purpose of a literature review in the qualitative approach is to ascertain what is unknown. Consequently, the qualitative paradigm allows you to be uncertain. For instance, little was understood about the demographics of refugees from Cambodia.

**b. Formulation:** In the quantitative paradigm, the study hypothesis must explain how one or more independent variables influence one or more dependent variables. A qualitative study, however, need not have a rigid research aim. A broad study emphasis is possible with qualitative research—it is even encouraged. Understanding the difficulties of Cambodian refugees is just one illustration of how extensive it may be.

**c. Instrumentation**: A psychometrically verified measurement scale must be used by the researcher when doing quantitative research. Contrarily, qualitative research is predicated on the notion that the researcher lacks sufficient expertise to create such instruments. Instead, the assumption is that the study subjects are subject matter experts who can impart knowledge to the researcher as to what is necessary. The research interview is transformed into a collaborative discussion wherein both parties explore the research participant's experience once the study participants are brought on board as co-investigators. As a result, there is also a permission to inquire along with the license to not know.

**d. Selection:** A selected group of people of interest is employed in quantitative research to enable generalization. Generalizability does not pose a problem in qualitative research. Instead, the sample is chosen to establish a theory, and then more sampling is used to address any remaining uncertainties in the theory. Qualitative research thus permits exploration.

**e. Sample Size:** In quantitative research, the sample size is chosen by a power analysis process that considers the effect size as well as ideal types one and type 2 errors. The sample size is not predetermined in qualitative research. Instead, theory is developed throughout the sampling process, and sampling stops when theoretical saturation sets in, or when the researcher has enough participants in their study that no more knowledge can be gleaned from their experiences. The ability to theories during data gathering is thus permitted by qualitative research. For the Cambodian refugees, for instance, theoretical saturation set in after six individuals had been questioned.

**B. Quantitative Research:** The systematic collection and evaluation of data from a wide range of participants that depends on numerical values is known as quantitative research. The data is then examined to produce findings using a range of computational, statistical, and mathematical tools. The quantitative study method allows the researcher to spot averages and trends.

**Types of quantitative research:**

Experimental, causal-comparative, correlational, and descriptive research are all conducted using quantitative approaches. Let's examine each kind in more detail.

**a. Descriptive research:**

A variable's or topics current status is explained using this kind of quantitative study. Which, when, where, and how can be addressed, but not why (qualitative research addresses this topic). The variables are not under the researcher's control or influence. They merely watch and gauge them.

i. Surveys are frequently used to collect vast amounts of data that may be examined for trends, frequencies, and averages. Surveys can be used, for instance, to Analyze the population makeup of a specific area, determine how the general public feels about political issues, and assess how satisfied customers are with a company's offerings.

ii. Data collection methods that don't rely on questionnaire respondents' sincerity or accuracy frequently involve observations. To comprehend how people behave in actual settings, descriptive study is used.

iii. Research projects can also be used to compile in-depth data and uncover traits of a specifically defined subject. They are widely employed to produce theories and hypotheses.

iv. Correlational research: Without the researcher having any control over or manipulation of any of the variables, correlational research explores the correlations between various subjects and factors. It concentrates on the connections between constant variables. Correlational research is based on theories and the scientific process.

**b. Quasi-experimental research:**

When one variable depends on and another is independent, the causal-comparative research approach is utilized to determine the cause and effect between the two variables. Although it shares some characteristics with experimentation, it cannot be regarded as a true experiment. Three primary categories of a kind of quasi research designs are as follows:

**i. Nonequivalent groups**: Similar groups, but only one receive therapy or are variable

**ii. Regression discontinuity**: Researchers choose a random cutoff in the participant list. The cutoff determines who gets therapy or a variable and who doesn't. Because they are so close to the threshold, the people who are just below it are employed as a control group.

**iii. Natural experiments:** The assignment of subjects at random to the variable receiving group is the outcome of an external occurrence or circumstance (nature). These studies are observational in nature and are not real experiments.

**c. Experimental research:**

Research that is influenced by a particular hypothesis or set of hypotheses is known as experimental research. It is excellent for assisting in decision-making. Experimental research techniques are used in all studies that follow the scientific method. Three different experimental study designs are available:

i. Pre-experimental: After introducing a factor or applying a therapy that is thought to cause changes in the groups, a researcher monitors a group or many groups. The purpose of this is to determine whether further study is required for the groups that were observed.

ii. True experimental: Determines whether or not the hypothesis is true based on statistical analysis. Random sampling must be used to select the participants.

iii. Quasi-experimental: The selection of participants is not random.

**3. Mixed Method Research:**

A study's conclusion is reached using a design known as mixed methods research, which combines quantitative (numerical) and qualitatively (descriptive) research components. A mixed methods study is likely to employ a variety of methodologies for both qualitative and quantitative approaches to evaluation and data collection. The following traits make it easiest to recognise mixed methods research:

* Collection and analysis of both quantitative and qualitative data
* Integration of the data during the collection process
* Theoretical model(s) serving as a research framework

When a researcher has an interest in both testing theories or incorporating a particular theoretical perspective and developing a deeper knowledge of an event or process, a combination of research methods is most frequently used. It is recommended to utilize a combination of methods if the research topic cannot be resolved by analyzing either quantitative or qualitative information separately. Since both behavioral and health contexts typically involve finished situational study from a large sample size, these fields see the most use of this sort of study.

**3. The Population, Sample and Sampling Technique:** Additionally, it offers guidelines to the researcher regarding the demographic, sample, and sampling technique that will be employed for the research study. The process of researching a population involves acquiring data and then analyzing it. This is known as the sample method or sampling technique. There are numerous sampling methods that can be used, but they can be split into two categories. All of these sampling techniques may entail particularly aiming for difficult-to-reach groups. Different Sampling TechniquesTo obtain pertinent data from the population, many sampling approaches are available in statistics. The two alternative sample techniques are as follows, as indicated in fig. no. 1:



**Fig No: 1**

**A. Probability Sampling:** Some type of random selection is used in the probability sampling method. All eligible participants in this approach have an equal probability of choosing a sample from the entire sample space. The various forms of probability sampling techniques include simple random sampling, systematic sampling, stratified sampling, and clustered sampling. Let's examine the various forms of probability sampling techniques**.**

**i. Simple Random Sampling:** Each item in the population will have an equal and likely probability of being chosen for the sample when using a simple random sampling procedure. This method is referred to as "Method of Chance Selection" since the decision to select an item is solely based on luck. It is referred to as "Representative Sampling" because the sample size is substantial and the item was selected at random.

**ii.** **Systematic Sampling**: In the systematic sampling approach, after a predetermined sample interval, the items are chosen at random among the target population and then the other ways are chosen. In order to compute it, divide the required population size by the total population size.

**iii. Stratified Sampling:** To finish the sample process, a stratified sampling approach divides the entire population into smaller groups. The small community is made up of people who share a few traits with the general population. The statisticians choose the sample at random after dividing the population into smaller groups**.**

**iv.** **Clustered Sampling:** A cluster of individuals is produced from the sample set in the cluster sampling approach. The group shares similar significant traits. They also have an equal likelihood of being included in the sample. For the population cluster, this method employs straightforward random sampling.

**B. Non-probability Sampling:**

In contrast to random selection, the researcher chooses the sample in the non-probability sampling approach based on their personal judgement. With this methodology, not every person of the population has the opportunity to take part in the research. Non-probability The various types of sampling techniques include convenience sampling, sequential sampling, quota sampling, judgmental sampling, and snowball sampling. Let's go into more detail about each of these non-probability sampling types now:

**i. Convenience Sampling:** In this, the samples are chosen directly from the population since the researcher can easily access them. The samples are simple to choose, and the researcher avoided selecting the sample that best represents the population as a whole**.**

**ii. Consecutive Sampling:** With a small difference, consecutive sampling is comparable to convenience sampling. One individual or an entire group of people are chosen by the researcher for sampling. The researcher then conducts more research for some time, analyses the findings, and, if necessary, switches to a different group.

**iii. Quota Sampling:** The researcher creates a sample using people to reflect the general population based on particular characteristics or attributes in the sampling quota approach. The researcher selects sample subsets that produce a valuable data set that can be used to generalise about the complete population.

iv. **Purposive or Judgmental Sampling**: Only the researcher's expertise is used to select the samples in purposive sampling. There is a chance to get extremely accurate replies with a small margin of error because their knowledge was used to create the samples. Additionally, it is referred to as judgemental sampling or authoritative sampling.

v. **Snowball Sampling:** A chain-referral sampling approach is commonly referred to as snowball sampling. The samples used in this procedure have characteristics that are hard to find. Therefore, it is required of each recognized member of a population to locate the other sample units. These sampling units are also a part of the same intended audience.

**4. The Time, Place and Sources of Data collection:** The other crucial elements required to assure proper planning to perform research study are the Time, Place, and Source of the Requisite Data. Data gathering methods are the methods and processes used to gather data for research. These methods can range from simple self-reported surveys to more complex studies and might use qualitative or quantitative approaches to data collection. The two main sources of data collecting are as follows:

**a. Primary Data Collection Method**: It is gathered from firsthand experience and hasn't been applied before. The information acquired via primary data gathering techniques is highly precise and specific to the goal of the research.

**b. Secondary Data Collection Methods:**

The information that has already been used is referred to as secondary data. The data that the researcher needs can be found in sources that are both inside and external to the organization.

* 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

Quantitative and qualitative methodologies may also be used in secondary data collection. Since secondary data is freely accessible, it is also less time- and money-consuming to get than main data. The validity of the data collected, however, cannot be confirmed using the secondary data gathering methods.

**5. Tools and methods of data collection:** The description of various tools and data collection techniques is included in this study design component. The numerous procedures taken to acquire and analyze data for a research study are referred to as data collection methods. The numerous procedures taken to acquire and analyze data for a research study are referred to as data collection methods. The process of acquiring data using particular tools that are employed in a particular technique instruments/tools for gathering data. An instrument is a tool that an investigator uses to gather data that measures the idea that is important in a research endeavor. There are various methods, including the following:

**i. Interview:** A conversation among two or more persons that includes questions posed by the interviewer in order to gather information is referred to as an interview. It might be described as a two-way systematic discussion between a researcher and an informant that is started to gather data for a particular study.

Characteristics:

* The interviewer, the responses, and the participants are strangers.
* This is a technique for getting vocal responses to queries asked verbally.
* The investigator keeps a record of the data provided by respondents.
* The discourse has a clear objective.
* It can be done over the phone in addition to face-to-face
* It is a dialogue between two people and can occasionally be limited to a particular respondent.

**ii. Questionnaire**: **Types:**

In order to collect information from people about their knowledge, attitudes, and feelings, researchers will ask research subjects to complete a standardised instrument called a questionnaire. The questionnaire is a systematic self-reporting tool that an investigation participant is requested to complete with paper and pencil.

• Open Ended Questions

• Closed Ended Questions:

* Dichotomous Questions
* Multiple Choice Questions
* Cafeteria Questions
* Rank Order Questions
* Contingency Question

**iii. Attitude scales:** A scale is a tool created to give people a numerical score and place them on a continuum in relation to the traits being measured**.**

**Types:**

• Likert scale

• Semantic differential scale

• Visual analogue scale

• Observations

• Rating scale

**iv. Observations**: It is a technique for acquiring information through observing behaviour, events, or physical traits in their natural environments. There are two types of observations: overt (everyone is aware they are being watched) and covert (no one is aware they are.

**Types:**

• Structured Observation

• Unstructured Observation

• Participant Observation

• Non Participant Observation

**v. Rating Scales:** They refer to a scale containing a collection of opinions that describe the various dimensions of an observable attitude in differing degrees. A tool for qualifying judgement or systematizing an opinion about a trait is a rating scale.

**Types:**

• Graphic Rating Scale

• Descriptive Rating Scale

• Numerical Rating Scale

• Comparative Rating Scale

**vi. Checklist:** A checklist is a straightforward tool made up of a prepared list of anticipated behaviours or qualities.

**vii. Bio Physiological Methods**: The technique entails gathering bio physiological information from subjects using specialized equipment to ascertain their physical and biological status.

**Types:**

a. In vivo Bio Physiological Methods: Measurements are made directly over the organism or topic of the investigation using specialised tools or equipment (a. in vivo bio physiological methods). BP, ECG, etc.

b. In vitro Bio Physiological Methods: Measurements made using specialised tools or equipment outside of the organism or study subject are referred to as in vitro bio physiological methods (b). Examples: Radiological Measure

**viii. Projective Technique**: These techniques involve presenting respondents with unstructured stimuli, to which they must reply, in order to gauge respondents' psychological characteristics.

**Types:**

• Association Technique

• Completion Technique

• Construction Technique

• Expressive Technique

**6. Methods of data analysis:** The description of data analysis procedures, whether quantitative or qualitative, that aid the researcher in gathering pertinent data that can then be analysed in accordance with the research design plan, must also be included in the study design.

**a. Steps in Quantitative Data Analysis:**

1. Data management - Test your software, then clean up the data.

2. Recognise your dependent and independent variables, as well as the scales for measurement that they use.

3. Compile descriptive statistics - Using indicators of central tendency , dispersion and distribution  summarize the basic features of your data collection.

4. Use the proper inferential statistics - This enables researchers to gauge their capacity for making inferences that go beyond the facts at hand. A relationship among two or more variables, changes through time, or variances among two or more groups

5. Choose the appropriate statistical test - This depends on understanding the nature of your variables, their scale of measurement, their distribution shape, and the types of questions you wish to ask.

6. Check for statistical significance. This is typically done by calculating your "p-value," which determines the likelihood that your findings are not just a coincidence. The greater the confidence that the results are real, the lower the p-value.

**b. Steps in Qualitative Data Analysis:**

1. Clearly record every conversation in writing.

2. Keywords: aversion to pain, aversion to incapacity, and aversion to surgery

Form related thoughts or arguments: dread

4. Create themes that describe how you see your data as it relates to them overall: inadequate emotional regulation

5. Cite examples to support categories and themes to keep the analysis rooted in the facts.

6. Reach judgements.

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

* **Research objective:** Take into account the aim of the study. Researchers can select the most effective strategy and research approach after they are clear on the data they will require to achieve their objectives at the project's conclusion.
* **Nature of the research:** Qualitative data collection techniques will probably be used if the purposes and objectives are exploratory. However, quantitative data gathering techniques will be needed if objectives of the study are to measure or test something.
* **Sample size:** • What size sample is necessary to respond to the study's questions and meet its goals? Your data gathering techniques may change depending on the sample size, such as if you conduct interviews in person with fewer participants or use online surveys with larger ones.
* **Significance of statistics:** You should also consider whether or not you require brief, data-driven findings and statistical solutions. Consider instead whether comprehension of causes, viewpoints, attitudes, and motivations is required to answer the study's questions.
* **Availability of time:** If you have a time limit, take into account techniques like convenience or random sampling and tools that enable data collection in a couple of days. If more time can be spared for data gathering, face-to-face conversations and observations are possible.

Summary

* Research in nursing is evidence-based and utilised to support nursing practises. Since Florence Nightingale's time, nursing has evolved into an evidence-based field of practise, and now, many nurses work both as researchers located in universities and in the healthcare industry.
* In general, there are two types of research design: quantitative and qualitative.
* The goal of quantitative research design is to answer the questions of whom, what, when, how, and when during the course of the study. Additionally, using statistics, diagrams, graphs, and numbers to show the results of the quantitative analysis is simple.
* The goal of qualitative research design is to determine the why and how. It makes use of open-ended inquiries and aids the individuals in clearly expressing their opinions.
* Five categories of study design types: Design approaches used in experiments include correlational, descriptive, explanatory, and diagnostic.
* Data gathering gathers the knowledge required to make reliable assessments of a patient's current state.
* The client becomes the main source of information. Secondary sources include family members or other confidants, other healthcare providers, records and reports, lab and diagnostics analyses, and pertinent literature.
* Surveys, interviews, observations, focus groups, experiments, and secondary data analysis are a few examples of popular data collection techniques. These techniques can be used to gather data, which can then be analysed with the goal to support or disprove research hypotheses and reach conclusions regarding the topic of the study.

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