CHAPTER 1

# Fundamentals of Nursing Research

## LEARNING OBJECTIVES

After the completion of the chapter, the readers will be able to:

- Define research.
- Describe scientific methods of acquiring knowledge.
- Describe the need and purposes of nursing research.
- Enlist the importance of nursing research.
- Describe the historical development of nursing research.
- Enlist the characteristics of a good research.
- Enlist the qualities of a good researcher.
- Elaborate on types of research.
- Explain the scope and areas of nursing researcher.
- Identify the gaps and challenges in nursing research.
- Explain the concept of evidence-based practice.

## CHAPTER OUTLINE

- Introduction
- Meaning of Research and Nursing Research
- Methods of Acquiring Knowledge in Nursing
- Problem-Solving
- Scientific Methods
- Needs and Purposes for Nursing Research
- Importance and Significance of Nursing Research
- Historical Developments of Nursing Research
- Characteristics of Good Research
- Qualities of a Good Researcher
- Types of Research
- Scope and Areas of Nursing Research
- Gaps and Challenges in Nursing Research
- Concept of Evidence-Based Practice

## KEY TERMS

**Empiricism:** It is based on observable and measurable data that is gathered through systematic observation, experimentation, and testing.

**Evidence-based practice:** The integration of the best available research evidence, clinical expertise, and patient preferences to inform health care decision-making and deliver high-quality care.

**Nursing research:** Nursing research is a systematic and scientific investigative process, with the objective of advancing knowledge and enhancing nursing practice, nursing education, and nursing administration and management.

**Problem-solving process:** A systematic approach to identify, analyze, and resolve issues or challenges by gathering relevant information and generating effective solutions.

**Research:** Research is a systematic inquiry and examination of materials and sources, conducted with the aim of confirming established facts and deriving fresh insights or conclusions.

**Research utilization:** The application of research findings and evidence in practical settings to improve outcomes, decision-making, or practice in various fields.

**Scientific methods:** The scientific method is a systematic and structured approach to acquiring and evaluating knowledge.

**Variables:** Factors or characteristics that can vary and are measured, observed, or manipulated in research or experiments to study their impact on outcomes or phenomena.

# INTRODUCTION

Nursing is an emerging profession that focuses on improving people's health. Nurses play a major role in providing quality health care to patients. Nursing is a profession that has a long history, but it is constantly changing and developing. To keep improving, it needs new information and knowledge acquired through research. Nurses need to have a strong understanding of their subject and stay updated on new information and knowledge gained from research. Using the latest evidence from research helps nurses ensure better quality of care for patients.

Nursing research is a systematic and scientific process of investigating questions and problems related to nursing practice, education, administration and management. The goal of nursing research is to generate new knowledge and evidence to inform and improve nursing practice, education, and health care outcomes. Nursing research involves the use of various methodologies, such as quantitative research, qualitative research, mixed methods research, to gather data and test theories. By conducting nursing research, nurses can stay current with best practices, understand patient needs, and provide quality care to those in their care.

The current chapter introduces the concepts of nursing research to the budding nursing researchers. It discusses the historical development, purposes, significance and characteristics of a good research. It enumerates the qualities of a good researcher. It also highlights the gaps and challenges in nursing research.

# MEANING OF RESEARCH AND NURSING RESEARCH

## Research

The term "research" is derived from the Middle French "recherche," which means "to investigate thoroughly". The word "recherche" is a verb form of "rechercher", which means "to seek".

The word "research" is made up of two parts: the prefix "re-" and the root word "search". The prefix "re-" often signifies "again" or "back", implying that research involves going back over existing information and

knowledge to gain a deeper understanding. The root word "search" refers to the process of looking for or seeking information or knowledge. When combined, the term "research" suggests a systematic and organized process of seeking knowledge through investigation and examination.

*Research is an orderly and systematic investigation into a subject in order to discover or revise facts, solve new or existing problems, or establish principles.* **—Campbell and Stanley**

*Research is a systematic inquiry that uses disciplined methods to answer questions or solve problems.* **—John W Creswell**

*Research is a systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions.* **—Martyn Shuttleworth**

*Research is a systematic and objective process of gathering, analyzing, and interpreting data for the purpose of discovering, refining, or verifying knowledge.* **—Neil J Salkind**

*Research is a systematic and systematic investigation of a phenomenon in order to describe it, explain it, or predict future occurrences.* **—William M Trochim**

## Nursing Research

Nursing research is a systematic and scientific process of investigating questions and issues related to nursing practice, health care, and the promotion of health. The goal of nursing research is to generate new knowledge, validate existing knowledge, and provide evidence-based solutions to nursing problems that can improve the quality of patient care. Nursing research involves the collection and analysis of data using various research methods and tools to test hypotheses, answer questions, and draw conclusions. The findings of nursing research can be used to improve nursing practice, guide health care decision-making, and to inform policy and legislation makers related to health care. Ultimately, nursing research aims to advance the nursing profession and improve the health and well-being of individuals and communities.

*Nursing research is a systematic and scientific process of investigation aimed at expanding knowledge and improving nursing practice.* **—International Council of Nurses**

*Nursing research is a systematic inquiry designed to develop knowledge about issues of concern to nurses and the nursing profession.* **—Polit and Hungler**

*Nursing research a scientific process that validates and refines existing knowledge and generates new knowledge that directly and indirectly influences the clinical nursing practice.* **—Burns and Grove**

*Nursing research is a systematic inquiry designed to develop knowledge relevant to nursing practice.* **—Nola J Pender**

*Nursing research a systematic and rigorous process of inquiry aimed at expanding the understanding of human experiences and phenomena in the field of nursing.* **—Marilynn J Wood**

## METHODS OF ACQUIRING KNOWLEDGE IN NURSING

One of the fundamental principles of categorizing nursing as a profession is that it has its own "Body of Knowledge". Nursing is a profession that involves the development of body of knowledge related to nursing practice. It is a constantly evolving field and nurses acquire knowledge from both formal and informal methods. Nurses learn from experience, other health care professionals, and continuing education.

Nurses use different sources of information to make decisions about patient care and support their actions with evidence.

The methods of acquiring knowledge can be divided into two categories: Unstructured and structured methods. Unstructured methods are more informal and based on personal experiences, while structured methods are systematic and based on a structured process or method.

## Unstructured Methods (Informal)

Unstructured methods of acquiring knowledge are informal ways of gaining information, such as traditions, personal experiences, authority, intuition, and trial and error. These methods may not follow a set of process or structure and can be based on individual understanding or perception.

- **Tradition:** This method of acquiring knowledge refers to the passing down of knowledge and practices from one generation to another, based on cultural and historical beliefs and values. Knowledge and the practices are passed down to the nurses from their seniors and become the basis of traditional understanding for them. These traditional practices can be communicated or passed on to others through *observed practices, role modelling, and written documents such as notes and books.* Tradition may involve using established practices or techniques that have been proven to be effective over time. However, it is important to critically evaluate traditional practices and consider new evidence-based research when making decisions in patient care. The use of tradition in nursing should be balanced with the use of evidence-based practices to ensure the best possible outcomes for patients.
- **Intuition:** Intuition is an unconscious and automatic mental process that guides a person's judgment and decision-making. It is often characterized by empathy and a gut feeling, without a clear rationale or explanation. Intuition can be a valuable source of knowledge building in nursing as it allows the nurse to draw on their personal experiences and understandings of situations, emotions and body language to inform their decisions and approach to care. However, it is important to note that intuition should not be relied on as the sole source of knowledge, as it may not always be based on evidence or rational thinking, and may also be influenced by personal biases or emotions.
- **Authority:** Authority refers to the person or group that is considered knowledgeable and trustworthy in a particular subject matter or field. In nursing, information and knowledge from authoritative sources such as expert nurses, physicians, and health care organizations can be used to inform clinical decision making and patient care. However, it is important to critically evaluate information from authority sources and consider all relevant evidence before making decisions in patient care, as information and recommendations may change over time and not always be the best course of action.
- **Personal experiences:** It involves acquiring knowledge, skills and insights through direct observation and participation in a situation or activity. Personal experience can play an important role in shaping attitudes, beliefs and values, and can also be a valuable source of information and learning. Nurses can gain knowledge and insights through their own hands-on experiences while working with patients and other health care professionals. Personal experience can provide practical and real-life perspectives that complement formal education and training. However, personal experience should not be relied upon as the sole source of knowledge, as it may not be scientifically sound and validated.
- **Trial and error:** It is a method of acquiring knowledge in which individuals experiment and make repeated attempts to solve a problem or find the solution to a question. The process involves trying different options, observing the results, and making adjustments until the desired outcome is achieved. An example of using trial and error as a method of acquiring knowledge in nursing could be trying

different strategies for managing a patient's pain, observing their response and making adjustments until the most effective approach is found. This method can be useful for understanding a problem, but it can be slow and has potential risks, so it should be used carefully, especially in nursing care as it involves potential risk to the patients.

## Structured Methods (Formal/Scientific)

Structured methods of acquiring knowledge are systematic and organized processes used to gain information and understanding. These methods typically involve the use of research studies and evidence-based practices for building body of knowledge. The structured methods of acquiring knowledge include Logical Reasoning, Assembled Information, Problem-solving, and Scientific Methods.

- **Logical reasoning:** It is a structured method of acquiring knowledge in which arguments or conclusions are reached by applying systematic and rational thinking. It involves analyzing and evaluating information and evidence, making connections and deductions, and coming to well-supported conclusions. This method can be applied in nursing to make informed decisions and solve problems based on reason and evidence. Inductive reasoning and deductive reasoning are two forms of reasoning.
  1. **Inductive reasoning:** It is the logical thought process of drawing conclusion from a specific observation. It starts with specific observations and draws a conclusion based on general principles.
  2. **Deductive reasoning:** It is a logical thought process of reasoning from general to specific conclusion. It starts with a general principle and applies it to specific cases to arrive at a conclusion. This approach entails that there is a theory or knowledge in existence which will be tested through the research process.

**Example for inductive versus deductive reasoning**

**Inductive Reasoning**
**Observation:** Every time Ravi eats peanuts, he develops a rash on his skin.
**Conclusion:** Ravi has developed an allergy to peanuts.
In this example, the specific observation that Ravi develops a rash after eating peanuts leads to the general conclusion that he has developed an allergy to peanuts.

**Deductive Reasoning**
**Premise 1:** All mammals have lungs.
**Premise 2:** A horse is a mammal.
**Conclusion:** Therefore, a horse has lungs.
In this example, the general principle that all mammals have lungs (Premise 1) is applied to the specific case of a horse being a mammal (Premise 2) to reach the conclusion that a horse has lungs.

- **Problem-solving:** Problem-solving method of acquiring knowledge involves using critical thinking, creativity, and logical reasoning to identify and solve a problem. This method of acquiring knowledge is often used in situations where a person needs to find a solution to a complex or challenging issue. In nursing, problem-solving is an essential skill that is used on a daily basis to ensure that patients receive the best possible care. Some examples of problem-solving in nursing include formulating nursing diagnosis, responding to medical emergencies, and addressing patient safety concerns.
- **Assembled information:** It refers to a method of acquiring knowledge by gathering, organizing, and analyzing information from various sources. This method of acquiring knowledge involves collecting information from a range of sources, such as books, journals, online resources, and personal experiences,

and then organizing and synthesizing that information to form a comprehensive understanding of a particular topic.

- **Scientific methods/research:** Research is a systematic and structured process of investigating a specific topic or problem to gain new knowledge and insights. Knowledge acquired through research are most reliable, valid, and accurate. Research is an important method of acquiring knowledge because it allows us to test our assumptions, verify facts, and make informed decisions based on evidence.

## PROBLEM-SOLVING

Problem-solving is the process of identifying, analyzing, and resolving a problem in a logical and systematic manner (Fig. 1.1). The research process and the problem-solving process have different purposes, processes and goals. Problem-solving is a simple process and targets a single problem of an individual or organization. The purpose is to find an immediate solution to a practical problem in an actual setting. However, the basic purpose of research goes far beyond solving the immediate problem. Research provides new knowledge that is systematically derived and is often capable of being generalized to a broader setting.

### Steps of Problem-Solving Process

The steps of problem-solving process (Fig. 1.1) are described in Table 1.1 with a practical problem example, i.e., the nursing staff is facing a shortage of personal protective equipment (PPE).

## SCIENTIFIC METHODS

The scientific method is a systematic and structured approach to acquiring and evaluating knowledge. It is widely used in the natural and social sciences, including nursing, to guide the development and testing of theories, evaluate interventions, and make decisions based on empirical evidence.

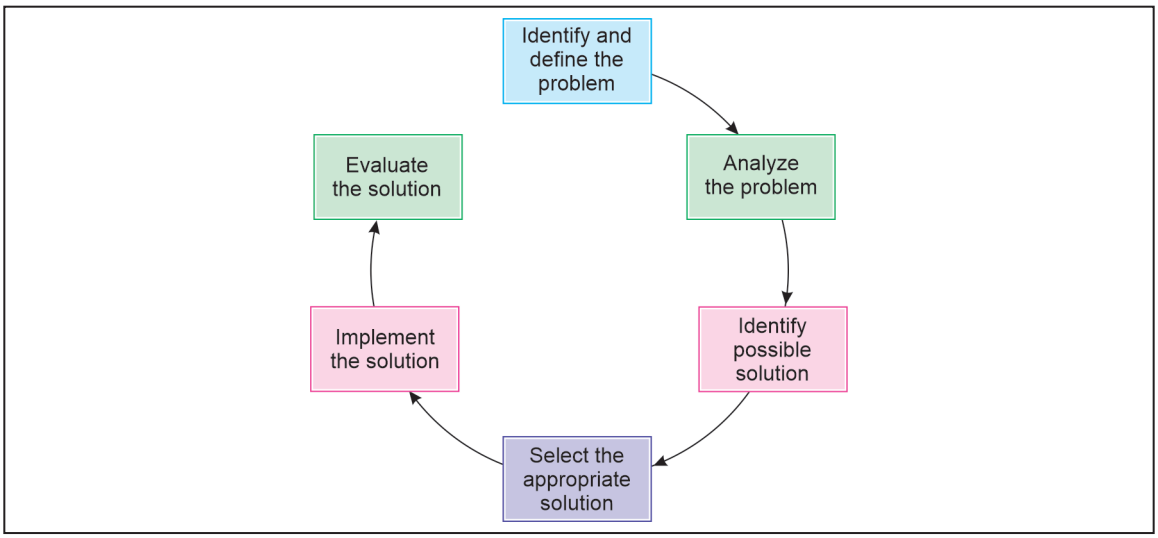


Figure 1.1: **Steps of problem-solving process**

**Table 1.1** **Steps of problem-solving process for nursing staff is facing a shortage of personal protective equipment**

| Step of problem-solving process | Description | Example |
|---|---|---|
| 1. Identify and define the problem | The first step is to identify, define and clearly understand the problem that needs to be solved. | The nursing staff is facing a shortage of PPE. The identified problem is 'shortage of PPE that needs to be solved'. |
| 2. Analyze the problem | Analyze the problem appropriately. It involves breaking down the problem into smaller, more manageable parts and examining each part in detail. | The nursing administrator conducts an inventory of the current PPE supply and reviews the hospital's budget and purchasing history. They also speak with other department heads to gather information about their PPE usage. |
| 3. Identify possible solution | Brainstorm to generate the probable solutions to solve the problem. Creative and analytical thinking is required for the same. Write down all the solutions in the order of priority. | The nursing administrator considers various options, such as ordering additional PPE, reallocating PPE from other departments, or implementing a rationing system |
| 4. Select the appropriate solution | Prioritize the ideas/solutions generated to solve the problem and select the most appropriate one to solve it. Before making a final decision, think about the objective of problem-solving. | The nursing administrator decides to order additional PPE and implement a rationing system until the new supplies arrive. |
| 5. Implement the solution | Implement the most appropriate solution and monitor its effectiveness. | The nursing administrator places the PPE order and communicates the rationing system to the nursing staff. |
| 6. Evaluate the solution | The last step is to evaluate the implemented solution. Reassess the problem to ensure the effectiveness of the selected solution. Whenever possible, brief the group and follow this up with written communication to ensure that everyone knows what is expected of them. | The nursing administrator assesses the effectiveness of the solution by monitoring the PPE supply and surveying the nursing staff for their feedback. If the shortage persists, repeat the problem-solving process with an alternate solution. |

## Characteristics of Scientific Methods

The characteristics of scientific methods are as follows:

- **Empiricism:** It is based on observable and measurable data that is gathered through systematic observation, experimentation, and testing.
- **Objectivity:** Scientific methods aim to be impartial, unbiased, and free from personal interpretations or opinions.
- **Hypothesis-driven:** Scientific methods start with a hypothesis or prediction of a phenomenon, which is then tested and revised as new evidence is gathered.

**Table 1.2** Comparison of research process and problem-solving process

| Characteristics | Research process | Problem-solving |
|---|---|---|
| Purpose | To acquire new knowledge and insights | To find a solution to a specific problem |
| Methodological approach | structured and systematic approach | Flexible and creative approach |
| Timeframe | Long-term process: Months to years | Short-term process: Days to weeks |
| Process | Begins with identifying the research problem and ends with analyzing the data to answer the research problem | The process begins with defining the problem and ends with implementing the identified strategies or solution |
| Data collection | Involves collection of data/information | Relies on personal experience, expert's opinions, and available data. |
| Analysis | Involves analysis of gathered data | Involves analysis of the problem itself |
| Steps | • Defining the research problem<br>• Determining objectives<br>• Formulating hypothesis<br>• Reviewing the literature<br>• Developing research methodology<br>• Collecting data<br>• Analyzing and interpreting data<br>• Communicating the findings | • Identifying the problem<br>• Analyzing the problem<br>• Developing alternative solutions<br>• Selecting the best solution<br>• Implementing the solution<br>• Following up the action taken |
| Scope | A research problem is more rigorous and broader in scope | A problem to be solved is less rigorous and less broad |
| Output | Development of theory, model, or answer to research questions | Remedial action plan that can often be generalized |

- **Evidence-based:** Scientific methods use data and evidence to support hypotheses and theories.
- **Replicability:** Scientific methods are repeatable and testable, which allows other researchers to verify the results and build upon them.
- **Skepticism:** Scientific methods maintain a critical attitude toward claims and theories, subjecting them to rigorous testing and evaluation. It involves the systematic evaluation of evidence and arguments, with the aim of discovering and verifying the truth.
- **Progressive:** Scientific methods are self-correcting, allowing for the refinement and improvement of theories over time.

Refer to Table 1.2 to know about the comparative overview of research process and problem-solving process.

## Steps of Scientific Methods

The steps of scientific methods typically include:

1. Observing a phenomenon or problem
2. Defining the objectives of the study
3. Reviewing the literature to gain insight about the problem
4. Define variables to be studied
5. Formulating a hypothesis to explain the phenomenon or problem.
6. Designing and conducting experiments to test the hypothesis.

7. Review for ethical considerations
8. Collecting the data
9. Analyzing and interpreting the data
10. Drawing conclusions based on the data and revising the hypothesis as needed.
11. Communicating the results and conclusions to others for peer review and further testing.

## Limitations of Scientific Methods

Although scientific methods are considered a highly effective means of acquiring knowledge, there are certain limitations in using these approaches to address problems in the field of nursing, which include:

- **Ethics:** Nursing problems often involve ethical considerations, such as informed consent and patient confidentiality, that can limit the types of research that can be conducted.
- **Human factors:** Nursing problems often involve human factors, such as emotions and relationships, that can influence outcomes and make it challenging to control for variables in scientific research.
- **Subjectivity:** Nursing problems often involve subjective experiences, such as pain or emotional distress, that cannot be easily quantified or measured.
- **Complexity:** Nursing problems often involve multiple, interrelated factors that can make it challenging to determine cause and effect relationships.
- **Lack of standardization:** Nursing interventions and assessment tools can vary widely across different settings, making it difficult to compare and replicate research findings.
- **Time constraints:** Nursing practice often requires quick decisions and actions, which can limit the ability to gather and analyze data using scientific methods.

# NEEDS AND PURPOSES FOR NURSING RESEARCH

Nursing practice based on solid evidence is essential to meet its mandate to society for effective and efficient patient care. The need for nursing research arises from the ever-changing and complex health care environment. Nursing research provides evidence-based information that helps improve the quality of patient care. The need for nursing research is essential for the continued growth and development of the nursing profession and for improving the quality of patient care. Evidence-based nursing research helps to ensure that patients receive the best possible care and improves patient outcomes.

Some key reasons for the need of nursing research include:

- **Gaining new knowledge:** This is acquired by an organized and logical process of inquiry during which data are methodically collected, analyzed and interpreted.
- **Improving patient outcomes:** Nursing research provides information about effective interventions and treatments that can improve patient outcomes.
- **Addressing health care challenges:** Nursing research helps to address complex and challenging health care issues, such as patient safety, quality of care, and patient satisfaction.
- **Evidence-based practice:** Nursing research provides evidence-based information that can be used to inform and improve clinical practice.
- **Advancing the nursing profession:** Nursing research helps to advance the nursing profession by providing new knowledge and insight into the practice of nursing. Nursing research contributes to the development and refinement of nursing theories.
- **Promoting interdisciplinary collaboration:** Nursing research promotes interdisciplinary collaboration and helps to bridge the gap between different health care professions.

## IMPORTANCE AND SIGNIFICANCE OF NURSING RESEARCH

Nursing personnel provide services to the society in various health care organizations and settings. These services should be based on accurate knowledge and empirical evidences acquired through research. Significance of nursing research can be highlighted from the following facts:

- Knowledge acquisition is critical for the progress of any profession, and nursing research is a reliable, objective, and systematic means of obtaining knowledge.
- Nursing research is an important constituent of health care field. Research in nursing helps to recognize the recent advancement and trends in nursing practices.
- Nursing research gives credibility to the nursing profession by establishing a distinct body of knowledge.
- Nursing research aids in the implementation of new changes in patient care.
- It focuses on developing new interventions for the prevention as well as for the treatment of disease.
- It helps in developing standards and protocols, in order to provide quality care to the patients.
- Nursing research provides the best possible care based on the best available evidences.
- Researchers can develop skills in advanced data analysis techniques in nursing research.
- Nursing research provides accountability to nursing practice. The general public is becoming more knowledgeable of their health related interventions.
- Nursing research enhances accountability in nursing practice as the public becomes more informed about their health interventions and has increased expectations of care from nurses.
- Effective nursing care based on research results can lead to shorter hospital stays, reducing health care costs.

## HISTORICAL DEVELOPMENTS OF NURSING RESEARCH

Florence Nightingale's contribution to nursing research is significant and foundational. She was the first to apply a systematic and scientific approach to nursing, using data and statistics to improve patient outcomes. During the Crimean War in 1854, she collected and analyzed data on the mortality and morbidity rates of soldiers, leading to her conclusion that a clean and hygienic environment, proper diet, and good sanitation were crucial for patient recovery. Nightingale's innovative approach to nursing transformed the way care was provided and helped establish nursing as a distinct profession. She was also a strong advocate for education and professional development for nurses, emphasizing the importance of evidence-based practices and continuous learning. Her work laid the foundation for the development of nursing research and helped establish the field as an important contributor to the advancement of health care.

Initially, nurses were not ready to conduct research. Hence, many of the research studies were conducted by members of other disciplines. The evolution of nursing research went from Florence Nightingale's investigations in the 19th century to studies on nursing education in the 1930s and 1940s, and then to studies on nurses and their role in the 1950s and 1960s.

### Development of Nursing Research in Western Countries

Certain historical events influencing research at international level have been enumerated in Table 1.3.

**Table 1.3** **Historical events influencing research in nursing (International)**

| Years | Events |
|---|---|
| **1850** | Nightingale, first nurse researcher and the statistician |
| **1859** | The first ever published nursing research "Notes on Nursing" by Florence Nightingale |
| **1900** | First American Journal of Nursing published |
| **1920** | First case study published in American Journal of Nursing |
| **1923** | Teachers College at Columbia University offered the first educational doctoral program for nurses |
| **1929** | First Master's in nursing Degree offered at Yale University |
| **1936** | Sigma Theta Tau, National Honour Society for Nursing, started funding nursing research |
| **1950** | American Nurses Association (ANA) study of nursing functions and came into being |
| **1952** | The first issue of 'Nursing Research' journal was published |
| **1953** | Institute of Research and Service in Nursing Education was established |
| **1955** | American Nurses Foundation established to fund nursing research |
| **1963** | First issue of International Journal of Nursing Studies published |
| **1965** | ANA sponsored first nursing research conference |
| **1967** | First issue of Image (Sigma Theta Tau Journal) was published, now entitled as 'The Journal of Nursing Scholarship' |
| **1970** | The National Commission for the study of nursing and nursing education, funded by ANA published its findings |
| **1972** | ANA Council of Nurse Researchers established |
| **1976** | The Commission on Nursing Research of the ANA recommended that research preparation be included in undergraduate, graduate, and continuing education program |
| **1978** | The first issue of Research in Nursing and Health and Advances in Nursing Science was published |
| **1979** | The first issue of Western Journal of Nursing Research was published |
| **1982–83** | Conduct and Utilization of Research in Nursing (CURN) Project was published |
| **1983** | First issue of Annual review of Nursing Research was published |
| **1986** | National Center for Nursing Research (NCNR) was established within the National Institute of Health (NIH) |
| **1987** | First Scholarly Inquiry for Nursing Practice was published |
| **1988** | First issue of Applied Nursing Research was published First issue of Nursing Science Quarterly was published |
| **1989** | Agency for Health care Policy and Research (AHCPR) was established Clinical practice guidelines were first published by the AHCPR |
| **1992** | Healthy People by 2000 was published by US Department of Health and Human Services<br>The first issue of Clinical Nursing Research was published |
| **1993** | NCNR was renamed as the National Institute of Nursing Research (NINR)<br>First Journal of Nursing Measurement was published |
| **1994** | The first issue of Qualitative Research Journal was published |
| **1999** | The first issue of 'Biological Research for Nursing' was published<br>AHCPR was renamed as Agency for Health care Research and Quality (AHRQ) |
| **2000** | Healthy People 2010 was published by US Department of Health and Human Services<br>First Biological Research for Nursing was published |
| **2004** | The first issue of worldviews on Evidence-Based Nursing journal was published |

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| Years | Events |
|---|---|
| 2005 | NINR identified mission and funding priorities for 2000 to 2005 |
| 2005 | AHRQ identified mission and funding priorities |
| 2008 | Courtney Lyder becomes the first male minority dean of a nursing school in the United States |
| 2009 | Carnegie Foundation releases the results of its study of nursing education, "Educating Nurses: A Call for Radical Transformation" |
| 2010 | Institute for the Future of Nursing (IFN) releases evidence-based recommendations to lead change for improved health care |
| 2010 | A national registration for all nurses and midwives came into force in Australia in July |
| 2011 | National Institute of Nursing Research (NINR) released its new strategic plan (Bringing Science to Life) which detailed NINR's strategic priorities for the next five years and beyond |
| 2014 | NINR launched Palliative Care: Conversations matter, an evidence-based communications campaign to increase awareness of and improve communications around pediatric palliative care |
| 2016 | Three schools of nursing in the West were ranked in the top ten for NIH funding |
| 2017 | NINR released 'Milestones in NINR history which included significant accomplishments, discoveries, and initiatives over NINR's 30-year history |
| 2019 | NINR added a women's health page to its website that highlights research, both conducted at and funded by NINR. It explains how nursing research informs women's health and demonstrates how NINR helps to advance the careers of women scientists |

## Development of Nursing Research in India

As already stated about nursing research, in India also, it has its roots in the philosophy of Florence Nightingale. Many Indian eminent nursing leaders had made tremendous contributions in the development and to uplift nursing research to greater heights. Major milestones in the history of nursing research in India are enumerated in Table 1.4.

**Table 1.4** Historical events influencing research in nursing in India

| Years | Events |
|---|---|
| 1910 | The Trained Nurses' Association of India (TNAI) published the Nursing Journal of India for the first time. |
| 1946 | • Bhore Committee in its report recommended for the improvement of various aspects of nursing profession including nursing education, nursing research, working conditions, nursing services both in hospitals and the community settings and also sending the nurses for higher education<br>• Following this, nurses from India were sent to Columbia University to attain qualification in research |
| 1953 | In 1953, Ms Edith Buchanan, Vice Principal, Raj Kumari Amrit Kaur (RAK) College of Nursing, New Delhi, was sent to Columbia University for Doctorate in Education under World Health Organization (WHO) fellowship program |
| 1955 | Ms Margaretta Craig, Principal, College of Nursing, New Delhi (Now RAK college) attended International Council of Nurses (ICN) meet in France to present a paper on the need for nursing research in India |
| 1959 | TNAI established a Standing Committee for Nursing Research with Miss M Craig as a Chairperson |

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| Years | Events |
|---|---|
| **1960** | • Two years master degree program in nursing was started by RAK College of Nursing, New Delhi and at College of Nursing, Christian Medical College, Vellore.<br>• The master degree program included nursing research as a full subject with a thesis work on some nursing topics |
| **1963** | • Indian Nursing Council (INC) conducted a study on health services in India to revise syllabus of General Nursing and Midwifery (GNM) program<br>• The study provided valuable insights into the trends in the health services and implications for nursing |
| **1964** | • Dr Marie Ferguson, a Public Health Nurse, joined RAK College of Nursing, New Delhi<br>• Dr Ferguson along with her team conducted a study to define nursing and non-nursing functions of nurses in selected health institutions of India<br>• Understanding and value of research in nursing for nursing practices, administration, and education was generated |
| **1966** | • Trained Nurses' Association of India (TNAI) conducted a 'Time Utilization Study' with the help of Ms Anna Gupta, principal, RAK, CON, New Delhi, under the able guidance of Dr Sulochana Krishnan<br>• TNAI also established a research section under the guidance of Ms Margaretta Craig |
| **1971** | TNAI conducted a study on the socioeconomic status of nurses in India |
| **1976** | A seminar on nursing research for educationists was conducted at Delhi, Mussoorie (Uttarakhand) and Yercaud (Tamil Nadu) by Dr Marie Farrell and Dr Aparna Bhaduri of RAK College of Nursing, New Delhi to strengthen the nursing research in India |
| **1978–80** | A series of articles on nursing research were published by Dr Aparna Bhaduri and Dr Marie Farrel in Nursing Journal of India |
| **1981** | Dr Farrell and Dr Bhaduri authored a book on 'Health Research: A Community Based Approach'. It was published by the WHO |
| **1982** | First national conference titled 'Nursing Research in India: Prospect and Retrospect' was organized at College of Nursing, Bengaluru. It was recommended that:<br>• Each college of nursing should have a research cell<br>• The nursing students should be encouraged and provided time for conducting research<br>• Central and state governments and private organizations should include nursing research in their budget<br>• Opportunities should be provided for faculty to visit foreign countries on short-term basis to learn about research<br>• Efforts should be taken to establish collaborative activities in the area of research and scholastic interactions with the nursing colleges in other countries |
| **1984** | University Grants Commission sponsored a nursing research workshop on 'Teaching Nursing Research to Nursing College Teachers' for all the teachers of India at Bengaluru |
| **1986** | • The Nursing Research Society of India (NRSI) was established to promote research related to nursing. The society is very regular in organizing research conferences every year till date<br>• MPhil program for nurses was started at RAK.<br>• PhD in nursing was started in College of Nursing, PGIMER, under Punjab University, Chandigarh. It was later discontinued because of certain unavoidable circumstances<br>• Manipal College of Nursing, Manipal and Shri Ramchandran College of Nursing, Chennai, also started PhD Nursing programs |
| **2002** | Indian Nursing Council included nursing research as a full subject in the revised syllabus of General Nursing and Midwifery Course (revised, 2002) and Post-Basic BSc Nursing (revised, 2005) |

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| Years | Events |
|---|---|
| **2005** | National Institute of Nursing Education, PGIMER, Chandigarh published an exclusive research-based journal titled Nursing and Midwifery Research Journal and is being published quarterly till date |
| **2005** | Indian Nursing Council in collaboration with Rajiv Gandhi University of Health Sciences, Bengaluru initiated PhD degree program in nursing. Six centers were designated as study centers, i.e., College of Nursing, NIMHANS, Bangalore; RAK College of Nursing, New Delhi; CMC College of Nursing, Vellore; CMC College of Nursing, Ludhiana; Government College of Nursing, Thiruvananthapuram; and Government College of Nursing, Hyderabad. These centers are connected by video-conferencing facilities to impart the education |
| **2009** | Central Institute of Nursing and Research (CIN) came into existence under the supervision of Trained Nurses Association of India, New Delhi |
| **2009** | Indira Gandhi National Open University (IGNOU) also started PhD in Nursing |
| **2010** | Faculty of Nursing Sciences, Baba Farid University of Health Sciences, Faridkot, Punjab, started PhD in Nursing |
| **2010** | First research project sponsored by Department of Science and Technology (DST) and Indian Council of Medical Research (ICMR) was started at National Institute of Nursing Education, PGIMER, Chandigarh |
| **2012** | First research project sponsored by Department of Biotechnology (DBT) was started at National Institute of Nursing Education, PGIMER, Chandigarh |
| **2014** | Started PhD at National Institute of Nursing Education, PGIMER, Chandigarh |
| **2015** | Nursing Research Society of India (NRSI) started Post-Doctoral Fellowship to promote research in the field of Nursing |
| **2020** | Nurses played a significant role in caring for patients during the COVID-19 pandemic, highlighting the importance of nursing research in improving health care outcomes. |
| **2021** | The use of Artificial Intelligence (AI) in nursing research gained prominence, including the use of machine learning algorithms to predict patient outcomes, identifying potential health risks, and improving nursing practices. |
| **2023** | Clinical Nursing Research Society of India (CNRS)-North Zone initiated Annual All India Nursing Research Award Program for Nursing students to encourage nursing researches by PhD, PG and UG Nursing students in India. |

Rapid development of nursing research has been seen in India over the last decade. Focus is placed on the development of evidence-based practices with a strong emphasis on systematic reviews. Conferences and workshops on nursing research are regularly held. Indian nurses have started and contributed as editors of popular national and international journals, providing a platform for nursing researchers to publish their work.

## CHARACTERISTICS OF GOOD RESEARCH

Certain characteristics have been attributed to nursing research. These are discussed as follows:

- **Empirical:** Research is a systematic and critical investigation of phenomenon of interest. Empirical research is based on measurements that can be accurately and precisely obtained. Quantitative research is based on numerical data and is easier to scientifically prove. Qualitative research, on the other hand, is based on people's opinions and experiences, making it more susceptible to bias.
- **Credible:** Credibility in research requires a believable and trustworthy source of information and the use of best practices. Secondary data may save time, but its reliability is questionable as it may have been

manipulated and is therefore less credible for use in research. Using only secondary data when primary data can be collected is not considered credible.

- **Analytical:** Research is conduced to find out answers to the pertinent questions and to solve the problems. Regardless of the type of study (historical, descriptive, experimental or case study), a systematic and analytical approach is used to gather data. The data is collected using the five human senses (sight, sound, smell, taste, and touch) either directly or indirectly.
- **Critical:** A critical approach in research means being able to evaluate information objectively, using logical and systematic reasoning to assess its validity, reliability, and significance. This requires accurate observations, objective analysis and interpretation, and description of the collected data.
- **Methodical:** Research is conducted methodically without any bias using logical method and procedures. It includes identification of a problem to be investigated; carefully designing the measurements and procedures; collection and logical analysis of the data; and formulation of conclusions regarding the problem being investigated. Methodical approach is essential for research. Each step should follow a logical sequence. Research requires patience and unhurried activity.
- **Generalizable:** Generalizability refers to the ability of the results from a research study to be applied to a larger group or population. This means that the findings from a smaller sample should accurately reflect the characteristics of the larger population. By generalizing the results, researchers can make conclusions that go beyond just the sample they studied and apply the results to a broader group or population.
- **Reliable:** Reliability refers to the consistency of results from a research study, instrument, tool, or procedure. If the same study is repeated multiple times with the same population and methods, and it produces similar results, then it is considered to be reliable. For example, if a study finds that parental separation negatively affects a child's academic performance, the reliability of the study would be high if the same result is found in another sample taken from a similar population. Reliability is also used to describe the accuracy of research instruments, such as surveys or tests. Using valid and reliable measures help to ensure the quality of patient care.
- **Expertise:** The researcher must be adequately prepared and trained to undertake the activity of research.

## QUALITIES OF A GOOD RESEARCHER

Research has become an integral part of various disciplines. In Nursing education, even at the diploma level, students are introduced to the basics of research through classroom teaching. However, to carry out a reliable and meaningful study, a person must meet certain minimum requirements.

- **Research-oriented:** Researchers should have an open mind and critical thinking approach to identify and solve research problems.
- **Competent:** Researchers should be dedicated, hard-working, and knowledgeable in the nursing research process.
- **Focused:** Researchers should have a clear vision, stable thinking, and integrity in their work.
- **Resourceful:** Researchers must be resourceful, inventive and creative. They should have an ability to transform their research question into a reliable protocol.
- **Honest:** They must be accurate and honest at all levels of research process. Misinterpretation or falsification of data may have very serious consequences. These may deprive patients of the correct diagnosis and the appropriate treatment. The researcher must take care of plagiarism while writing.
- **Knowledgeable:** Researchers should have a thorough understanding of their field of investigation and basic statistical principles.

- **Team spirit:** Research usually requires the contribution of more than one person. Research often requires collaboration, so researchers should have strong teamwork skills.
- **Verbal and written communication competency:** An important step of conducting research is dissemination of findings. Effective communication of research findings, through writing and presentations, is crucial and requires strong verbal and written communication skills.

## TYPES OF RESEARCH

Research can be classified either based on its approach (quantitative or qualitative) or based on the purpose of conducting research (basic or applied research). The detailed classification and explanation of the types and designs are discussed in the Chapter 8.

### Based on Approach

- **Quantitative research:** This type of research involves collecting numerical data and using statistical methods to analyze it. The focus is on testing hypotheses and generating generalizable findings.

**Example**

A study to determine the effectiveness of a new pain management protocol on postoperative pain in surgical patients. The researcher would collect numerical data on the pain scores of patients before and after the intervention, and analyze the data using statistical methods to determine the effectiveness of the new protocol.

- **Qualitative research:** This type of research focuses on understanding the experiences, perspectives, and views of individuals. It involves collecting non-numerical data, such as interviews, observations, and focus groups, and using interpretive and inductive methods to analyze it.

**Example**

A study to explore the experiences and perceptions of cancer patients regarding their pain management. The researcher would collect non-numerical data through in-depth interviews, observations or focus groups, and use interpretive methods to analyze the data to gain an understanding of the patients' experiences and perceptions.

- **Mixed methods research:** This type of research combines both quantitative and qualitative methods, using both numerical and non-numerical data. The aim is to combine the strengths of both approaches to provide a more comprehensive understanding of the research problem.

**Example**

A study to examine the effectiveness of a new nursing intervention on reducing anxiety in patients undergoing surgery. The researcher would collect both numerical data, such as anxiety scores on a standardized scale, and non-numerical data, such as patient interviews or focus groups, to provide a more comprehensive understanding of the intervention's effectiveness and to gain a deeper understanding of patients' experiences and perceptions.

### Based on Purpose

- **Basic research:** Basic research, also known as pure or fundamental research, is a type of research that aims to increase understanding of a phenomenon, without immediate practical applications. In the field of nursing, basic research may be conducted to gain a better understanding of a particular health condition or disease process, or to explore the underlying mechanisms of a nursing intervention.

**Example**

A basic research study in nursing could involve investigating the physiological and psychological changes that occur in patients with depression. The study could collect data on patients' brain activity, hormone levels, and symptoms of depression, and then use statistical methods to analyze the data. The goal of the study would be to increase our understanding of the underlying causes of depression, and to identify potential targets for future interventions.

- **Applied research:** It is a type of research that is focused on solving practical problems and improving the quality of life. In nursing, applied research is conducted to improve the health outcomes of patients, enhance the quality of care, and improve the overall functioning of the health care system.

**Example**

A nursing researcher may conduct a study to investigate the effectiveness of a a new pain management protocol for postoperative patients. This type of research aims to address a specific, practical problem and determine the best solution to improve patient outcomes. In this study, the researcher would collect numerical data (such as patient pain scores) and use statistical methods to analyze the data, with the goal of informing the implementation of the new pain management protocol in clinical practice.

- **Translational research:** It refers to the process of converting basic scientific findings into practical applications for health care and clinical settings.

**Example**

A study to investigate the effectiveness and safety of the negative pressure wound therapy (NPWT) device for treating wounds in patients with diabetes. The NPWT device is developed through basic research. The goal of the applied research would be to determine the best practices for using the negative pressure wound therapy device in a clinical setting and to provide evidence to support its use in wound care for patients with diabetes. The findings from this study could then be used to guide clinical practice and improve patient outcomes.

## SCOPE AND AREAS OF NURSING RESEARCH

The scope of nursing research is extensive and encompasses various aspects of the nursing field. It seeks to answer questions and address problems related to nursing practice, including prevention, treatment, and rehabilitation. Additionally, nursing research also covers the preparation of nursing personnel and practitioners. Furthermore, it covers the challenges faced by nurses in their day-to-day practice, education, and administration. Overall, nursing research aims to contribute to the advancement of the nursing profession and improve patient care. The scope of nursing research in different areas of nursing are described below.

### Nursing Practice

The scope of research in clinical nursing practice is broad and includes a wide range of topics and issues related to patient care and outcomes. The goal of clinical nursing research is to improve patient care and outcomes, enhance the body of knowledge, and inform health care policies and practices. It includes studies on patient diagnosis, treatment and management, assessment of health outcomes, patient education and satisfaction, nursing interventions, and the development and evaluation of new treatments and technologies. Clinical nursing research also explores the effectiveness of different nursing interventions and strategies for improving patient outcomes, as well as the impact of various health care systems, policies, and procedures on patient care. Additionally, it includes studies on the experiences of patients and families, as well as the

experiences of nursing staff, and their role in the health care delivery system. The goal of clinical nursing research is to improve patient care and outcomes, enhance the nursing profession, and inform health care policies and practices.

Here are some common areas of research in the field of nursing practice which are as follows:

- Patient safety and quality care delivery
- Promotion, prevention, and restoration of health
- Developing and testing new nursing interventions
- Development and implementation of clinical practices
- Patient education and self-management
- Palliative and end-of-life care
- Mental health and wellness
- Chronic illness management
- Use of advanced technologies in nursing practice

## Nursing Education

Nursing research in education aims to improve teaching and learning processes through evaluating the effectiveness of various teaching methods and technologies. The advancements in technology over the period of time have led to the emergence of new and innovative teaching methods, the effectiveness of which can be compared to traditional methods.

In order to produce a well-educated and efficient team of nursing educators and researchers, it is crucial to develop and implement innovative models of nursing education. This will ensure that the nursing profession continues to evolve and meet the changing demands of society. In the Indian context, these efforts are necessary to meet the growing needs of the public and produce a highly skilled team of nursing professionals. The development of new models of nursing education should be given top priority along with the assessment of clinical competence to ensure the continued advancement of nursing research in India.

## Nursing Administration and Management

Nursing administration is an important area in the field of nursing and there are many challenges, issues and problems that require solution through research. Some common areas of research in nursing administration include:

- **Quality improvement:** Research focuses on improving the quality of care and patient outcomes through the implementation of evidence-based practices, continuous quality improvement initiatives, and data-driven decision-making.
- **Staff management/workforce management:** This area of research focuses on issues related to staffing, scheduling, and productivity, including the recruitment and retention of nurses and other health care professionals.
- **Financial management:** Research focuses on financial management and cost containment, including issues related to budgeting, billing and reimbursement, and the effective use of resources.
- **Patient satisfaction:** Research focuses on evaluating patient satisfaction with care and the health care experience.
- **Health information technology:** Research focuses on the use of technology in nursing administration, including the implementation and use of electronic health records, telehealth, and other digital health tools.

- **Organizational culture:** Research focuses on the culture of health care organizations, including issues related to leadership, teamwork, and workplace culture, and the impact of these factors on patient outcomes and quality of care.
- **Regulatory compliance:** Research focuses on the compliance of health care organizations with regulatory requirements, including issues related to patient privacy and confidentiality, as well as state and federal regulations.

## GAPS AND CHALLENGES IN NURSING RESEARCH

Nursing research plays a crucial role in improving patient care and advancing the nursing profession. By conducting research studies, nurses can gather valuable information and make discoveries that can have a positive impact on health care and the lives of patients. Although there has been a growing focus on nursing research in recent years, India still lags behind the developed countries in terms of the level of research conducted and its impact. However, the increasing emphasis on research in nursing programs and clinical settings is a positive step forward and suggests that the quality and quantity of nursing research will continue to improve in the future.

Nurses are the backbone of the health care system, as they are often the first line of care for patients. In addition to performing routine tasks such as monitoring vital signs and administering medication, they have the potential to make significant contributions to improving health care and reducing health disparities. Nurses are well-positioned to drive change in the nursing profession and improve nursing practices. Despite this, there has been a persistent challenge in connecting nursing research with clinical practice.

### Barriers in Conducting Nursing Research

A number of barriers have been identified that prevent them from conducting, participating or implementing the research. Some of these barriers are as follows:

- **Deficient knowledge and training regarding research:** Nurses who lack training and knowledge in research methods may be less likely to participate in research and may be intimidated by the process. They may not be familiar with research designs, statistical analysis, and ethical considerations in research.
- **Misconceptions regarding research:** Some nurses may view research as a complex, time-consuming process that is not relevant to their practice. They may believe that research is only for academicians and not for practicing nurses.
- **Negative attitudes toward research:** Some nurses may hold a negative view of research because of prior negative experiences or misconceptions about the purpose of research. They may believe that research is not relevant to their practice or is a waste of time.
- **More patient workloads:** Nurses often have a heavy workload and are expected to provide care for multiple patients at the same time. They may find it difficult to take time out for conducting research or to prioritize research amidst their other responsibilities.
- **Lack of administrative/organizational support:** Nursing research may not be a priority for health care organizations and hospitals. They may not allocate resources or provide support for nurses to conduct research, leading to barriers in conducting research.
- **Lack of ability to change traditional practices:** Traditional nursing practices may be resistant to change. Nurses may find it difficult to challenge established beliefs and practices, even if the research supports a different approach.

- **Considering research not a priority:** Nurses may view research as a low priority in comparison to the more immediate needs of patient care.
- **No incentive for the researcher:** In some cases, there may not be any financial or professional incentives for nurses who participate in research. This may discourage nurses from participating in research.

## CONCEPT OF EVIDENCE-BASED PRACTICE

Evidence-based practice (EBP) is an approach to health care that uses the best available evidence to inform decision-making about patient care. This approach involves integrating clinical expertise, patient values, and the best available research evidence to make decisions about patient care. EBP is a systematic approach to clinical decision-making that involves critically appraising and synthesizing the best available research evidence with clinical expertise and patient preferences. The goal of EBP is to provide patients with the most effective and efficient treatments and care, based on the best available evidence.

Nursing research is essential to generate scientific knowledge for use in clinical practice. One of the major goals of nursing research is to provide evidence-based nursing care. The nursing care based on sound scientific research and best available evidence is the most favorable approach for ensuring quality care for the patients. EBP is rapidly evolving in all health care disciplines in the developed countries.

### Definitions and Meaning of Evidence-Based Practice

Evidence-based practice is "the conduct of health care according to the principle that all interventions should be based on the best currently available scientific evidence" (Shorten A, 1997). **Evidence-based nursing (EBN)** is a type of evidence-based health care. It involves identifying solid research findings and implementing them in nursing practices. Evidence-based nursing is an integration of the best evidence available, nursing expertise, and the values and preferences of the individuals, families and communities who are served.

*Evidence-based nursing is the "conscientious, explicit and judicious use of theory-derived, research-based information in making decisions about care delivery to individuals or groups of patients and in consideration of individual needs and preferences."* **—Ingersoll G, 2000**

*Evidence-based nursing is "an ongoing process by which evidence, nursing theory and the practitioners' clinical expertise are critically evaluated and considered, in conjunction with patient involvement, to provide delivery of optimum nursing care for the individual."* **—Scott K, 2009**

### Evidence-Based Practice versus Research Utilization

Health care providers can often confuse EBP with research utilization, even though they are related but distinct concepts in nursing. EBP refers to the process of using the best available evidence, along with clinical expertise and patient preferences, to guide clinical decision-making and improve patient outcomes. Research utilization, on the other hand, refers specifically to the process of using research findings in clinical practice. Figure 1.2 and Table 1.5 illustrate the difference between EBP pathway and research utilization pathway.

### Needs and Purposes of Evidence-Based Practice in Nursing

Evidence-based practice in nursing is aimed at improving patient outcomes, enhancing the quality of care, increasing patient satisfaction, reducing health care costs, and advancing the nursing profession.

- **Improve patient outcomes:** EBP is designed to help nurses provide the most effective and appropriate care to their patients, based on the best available evidence. By using evidence-based interventions, nurses

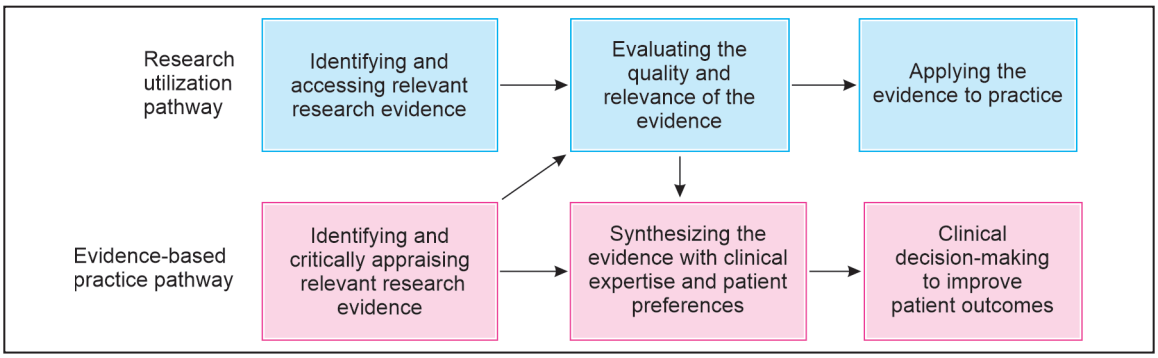


Figure 1.2: **The differences of evidence-based practice pathway and research utilization pathway**

**Table 1.5** **Differences between evidence-based practice and research utilization pathway**

| Criteria | Evidence-based practice (EBP) | Research utilization |
|---|---|---|
| Definition | A process of using the best available evidence, along with clinical expertise and patient preferences, to guide clinical decision-making and improve patient outcomes. | A process of using research findings in clinical practice. |
| Focus | Broad decision-making process that integrates research evidence with clinical expertise and patient preferences. | Specific process of applying research evidence in practice. |
| Components | Best available evidence, clinical expertise, and patient preferences. | Research evidence only. |
| Purpose | Improve patient outcomes by providing the most effective and appropriate care. | Incorporate research findings into practice. |
| Outcome | Improved patient outcomes and quality of care. | Integration of research evidence into practice. |
| Applicability | Applicable to all areas of nursing practice. | Applicable to research findings only. |

can improve patient outcomes, such as reducing complications, improving quality of life, and enhancing overall health and well-being.

- **Enhance quality of care:** EBP helps to ensure that nurses are providing the highest quality care possible by using the most up-to-date and accurate evidence to inform their clinical decisions. This can lead to improved safety, effectiveness, and efficiency in health care delivery.
- **Increase patient satisfaction:** EBP emphasizes the importance of patient-centered care, taking into account patient preferences, values, and beliefs. By involving patients in their own care decisions, nurses can improve patient satisfaction and overall health care experience.
- **Reduce health care costs:** By using evidence-based interventions, nurses can optimize health care resources, reduce waste, and minimize unnecessary treatments and procedures. This can lead to cost savings for patients, health care organizations, and the health care system as a whole.
- **Advance the nursing profession:** EBP promotes the use of scientific evidence to guide nursing practice, which can enhance the credibility and legitimacy of the nursing profession. By continually updating their knowledge and skills, nurses can contribute to the ongoing development and refinement of evidence-based nursing practice.

By using the best available evidence to inform their clinical decisions, nurses can provide the most effective and appropriate care to their patients, improved patient safety, effectiveness, and efficiency, and optimize health care resources.

The eventual aim of EBP is to provide the patient with the highest quality and most cost-effective nursing care to patients. EBP is increasingly being recognized as an essential component of health care, and health care organizations are increasingly implementing EBP frameworks and processes to ensure that their clinical decisions are evidence-based. Hence, it is essential for health care providers to have the skill to provide evidence-based care to their patients.

## Steps of Process of Evidence-Based Practice

The process of evidence-based practice (EBP) starts with cultivating a spirit of inquiry, which is essential for nurses to question and seek out the best evidence to inform their clinical decision-making. Evidence-based practice (EBP) involves a series of distinct steps as describe below:

**Step 1—Asking a clinical question:** Asking a clinical question is the first step in the evidence-based practice process. It involves identifying a clinical problem or issue and formulating a focused and answerable question. Clinical questions can arise from various sources such as patient care issues, health care provider's experience, current guidelines and protocols or gaps in the existing literature.

The question should be structured using a well-defined framework, such as the Patient/Problem, Intervention, Comparison, and Outcome (PICO) format, to ensure that it is clear and concise. PICO is a framework used for developing a clinical question in evidence-based practice.

**For example:**
**Problem question:** Does the use of hand hygiene education for patients and health care workers decrease hospital-acquired infections (HAIs) in adult intensive care units (ICUs)?
**P:** Adult patients and health care workers in ICU
**I:** Hand hygiene education
**C:** Hand hygiene education vs No education or other types of education
**O:** Decrease in HAIs
The question should also be relevant to the clinical context and the available evidence. Asking a well-formulated question is essential for conducting a thorough and effective literature search, which is the next step in the evidence-based practice process.

**Step 2—Review of the literature for relevant evidences:** After formulating the clinical question, the next crucial step is to search, review and gather research evidence. It is essential to search for high quality and high-level evidence, such as randomized controlled trials (RCTs), systematic reviews, and meta-analyzes. These types of evidence are considered the most reliable in providing conclusive answers to clinical questions.

During the review process, it is necessary to rigorously analyze and synthesize the results from independent quantitative and qualitative studies. This integrative review helps in determining the current knowledge for the chosen research question and locating the most relevant facts to answer it.

It is important to search for reliable sources of evidence, such as Cochrane reviews, MEDLINE, CINAHL, PsycINFO, ERIC, etc. These sources provide access to a vast pool of literature, and using the PICO format to identify keywords or phrases can aid in finding relevant articles in various research databases.

When conducting a literature review for EBP, it is important to consider the correctness of the evidence. In rapidly changing health care field, newer studies may provide more relevant and accurate information. It is recommended to limit the search to studies published within the last 5 years unless a specific older study is of particular relevance.

**Hierarchy of Evidence**

Levels of evidence in descending order from the highest level of evidence to the lowest (Fig. 1.3).
**Level I:** Evidence from systematic reviews or meta-analyzes of randomized controlled trials (RCTs) or evidence-based clinical practice guidelines based on systematic reviews of RCTs
**Level II:** Evidence from single randomized controlled trials (RCTs) or randomized clinical trials.
**Level III:** Evidence from nonrandomized controlled trials/Quasi experimental research
**Level IV:** Evidence from case-control studies and cohort studies
**Level V:** Evidence from systematic reviews of descriptive and qualitative studies
**Level VI:** Evidence from a single descriptive or qualitative study.
**Level VII:** Expert opinion, reports of expert committees or consensus statements

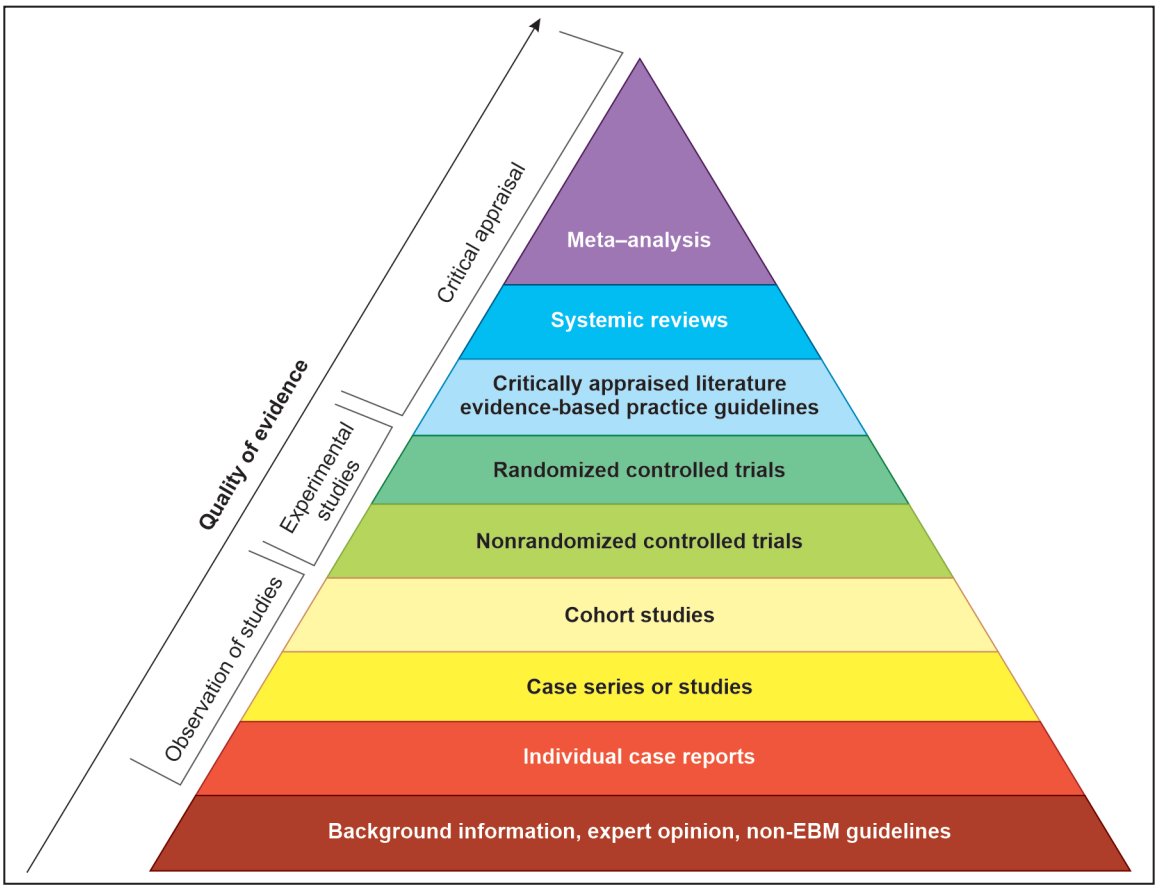


Figure 1.3: **Hierarchy of evidence pyramid**

*Source:* The above image is based on the EBM Page Generator (2006) from Dartmouth College and Yale University and the Coursera MOOC "Understanding Clinical Research: Behind the Statistics" (2016).

**Step 3—Critical appraisal of the evidence:** The next step is to critically evaluate the evidence found in the literature search to determine their validity, reliability, and applicability to the clinical question. It involves evaluating the worthiness of the research by assessing its authenticity, results, and applicability.
***Authenticity*** includes whether the research methodology was accurate, appropriate, and adequate.

***Results of the study*** assess whether the intervention worked and its impact on outcome variables.
***Applicability*** assesses the feasibility, cost-effectiveness, and patient values and preferences.

After evaluating all the studies, the results are combined to make a decision if they have identical or related conclusions. Conducting a thorough critical appraisal of studies ensures that the best evidence is used in making clinical decisions.

**Step 4—Combining the evidence with clinical expertise, patient preferences and values:** Once the evidence has been appraised and synthesized, the next step in EBP is to combine it with clinical expertise, patient preferences, and values. This step involves integrating the available evidence with the nurses' own knowledge and skills to make informed clinical decisions that are tailored to the individual patient's unique circumstances, values, and preferences. Patient preferences and values are particularly important in EBP, as they provide insight into the patient's goals and expectations for their care, which can guide treatment decisions. For example, a study may suggest a particular treatment approach, but a nurse may need to consider the patient's cultural background, lifestyle, and personal values to determine whether the treatment is appropriate for that individual.

**Step 5—Evaluating the outcome of the practice decision:** The final step is to evaluate the outcomes of the recommended treatment or practice to determine its effectiveness and make adjustments as needed. After implementing EBP, it is important to monitor and evaluate any changes in outcomes, both in terms of process and outcomes. Evaluation data should be gathered over a period of 6–12 months to assess the effect of the intervention properly. The positive effects can be incorporated into practice, while negative outcomes can be reviewed to determine how to address them.

Steps of the process of EBP have been explained with an example clinical question in Table 1.6.

**Table 1.6** **Steps of process of evidence-based practice with an example**

| Steps | Example for "In patients with type 2 diabetes, does regular exercise improve glycemic control?" |
|---|---|
| Step 1: Asking a clinical question | What is the impact of regular exercise on glycemic control in patients with type II diabetes? |
| Step 2: Review of the literature for relevant evidences | • A search was conducted on PubMed, Cochrane Library, and CINAHL using keywords "type 2 diabetes", "exercise", and "glycemic control".<br>• Several relevant studies were identified, including a randomized controlled trial, a meta-analysis, and a systematic review. |
| Step 3: Critical appraisal of the evidence | The identified studies were critically appraised for their quality, relevance, and applicability. The randomized controlled trial was found to be of high quality and directly relevant to the clinical question. The meta-analysis and systematic review were also of high quality and provided additional support for the effectiveness of exercise in improving glycemic control in patients with type II diabetes. |
| Step 4: Combining the evidence with clinical expertize, patient preferences and values | The evidence was combined with the clinical expertise of the health care team and the preferences and values of the patients to develop a plan for implementing regular exercise as a part of the treatment for type 2 diabetes. The plan was tailored to the individual patient's needs and goals. |
| Step 5: Evaluating the outcome of the practice decision | • The outcomes of the practice decision were monitored and evaluated over a period of 6 months. Patients who adhered to the exercise plan showed a significant improvement in glycemic control compared to those who did not exercise regularly.<br>• The positive outcomes were incorporated into the practice and the exercise plan was modified for ongoing use. |