

Part A: Nursing Research

Section

I

Introduction

Section Outline

1. Introduction to Nursing Research
2. Nursing Research Process: An Overview
3. Harnessing the Potentials of Artificial Intelligence, Cloud Computing and Machine Learning in Nursing Research

Sukhpal Kaur

Sukhpal Kaur

*Meghna Sharma, Siddharth Angrish,
Sukhpal Kaur, Amarjeet Singh*

Chapter 1



Introduction to Nursing Research

—Sukhpal Kaur

“Research is creating new knowledge.”

—Neil Armstrong



Learning Objectives

At the completion of the chapter, the readers should be able to:

- » Define nursing research.
- » Enumerate the sources of nursing knowledge.
- » Discuss knowledge building in nursing and role of research.
- » Understand the historical evolution of nursing research worldwide.
- » Discuss the gaps and challenges in nursing research.
- » Discuss the historical development of nursing research.
- » State the purposes of nursing research.
- » Discuss the significance of nursing research.
- » Recognize the scope and areas of nursing research.
- » Enumerate the characteristics of a good research.
- » Appreciate the qualities of a good researcher.
- » Appreciate the suggested research approaches for nursing faculty, serving nurses and nursing students.



Chapter Outline

- ☐ Introduction
- ☐ Meaning of Research
- ☐ Research: Definitions
- ☐ Research Process and Problem Solving Process
- ☐ Knowledge Building in Nursing
- ☐ Development of Nursing Research: Historical Aspects
- ☐ Purposes of Nursing Research
- ☐ Significance of Nursing Research
- ☐ Scope of Nursing Research
- ☐ Characteristics of Nursing Research
- ☐ Qualities of a Good Researcher
- ☐ Gaps and Challenges in Nursing Research
- ☐ Suggested Research Approaches for Nursing Faculty, Serving Nurses and Nursing Students
- ☐ Summary
- ☐ Assess Yourself



Key Terms

- Authority
- Clinical experiences
- Crimean war
- Deductive approach
- Inductive approach
- Intuition
- Nursing research
- Personal experiences
- Problem solving process
- Research
- Research process
- Tacit knowledge
- Traditional
- Trial and error

INTRODUCTION

Nursing is an emerging profession. It deals with the development, maintenance and improvement of the health of all the individuals. Nursing professionals, constituting the major healthcare force, have an important role to play

in providing quality care to the patients. Excellence in patient care depends both on research and development to a great extent. With the passage of time the general public is becoming much more aware of the issues related to their health. They are becoming more health literate which increases their expectations of care from the healthcare providers. Nurses need to have a sound knowledge of their profession which could be enhanced by being in touch with various sources of information to acquire knowledge through scientific research. It has been documented that the decisions regarding patient care are based on scientific research and best available evidences ensure better quality of care for the patients.

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. The suggested research approaches for nursing faculty, serving nurses and nursing students are also elaborated at the end of this chapter.

MEANING OF RESEARCH

Many people associate research with the experiments being conducted in the laboratory, the discovery of new drugs or treatments in medical science, or scientific experiments that have been conducted in space.¹ However, research has many different meanings.

The word “research” is composed of ‘re’ which means once again, a new, or afresh and ‘search’ which means to look for some information/to examine closely and carefully/to test and try/or to prove something. Therefore, research is the close and careful examination of the facts to discover new knowledge.

Specifically, research is carried out to validate and to refine the existing knowledge and thereby developing new knowledge. Research can be conducted by a single individual or by a group of research scholars on a specific issue for generating new knowledge. The studies carried out for the partial fulfillment of an educational program, in majority of the cases, is conducted by a single individual only, though for few it is conducted in groups also; however, the funded research projects are generally carried out by a group of experts.

RESEARCH: DEFINITIONS

Research has been defined by various authors in different ways.²⁻⁵

- As per **Creswell**, research consists of three steps: Posing a question, collecting data to answer the question, and presenting an answer to the question.



- Another definition of research as given by **Martyn Shuttleworth** is “In the broadest sense of the word, the definition of research includes any gathering of data, information and facts for the advancement of knowledge.”
- The **Merriam-Webster Online Dictionary** defines research in more detail as “A studious inquiry or examination; especially investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts, or practical application of such new or revised theories or laws”.
- **Barnes** has said that research is a way of dealing with ideas. It is nothing more than this and it is nothing less. Most research deals with ideas.
- As per **Polit and Beck** nursing research is a “Systematic inquiry designed to develop knowledge about issues of importance to the nursing profession, including nursing practice, education, administration, and informatics”.
- In view of **Burns and Grove** nursing research is “a scientific process that validates and refines existing knowledge and generates new knowledge that directly and indirectly influences the clinical nursing practice”.
- Further **Hek, et al.** have added that “research is a systematic approach to gather information for the purposes of answering questions and solving problems in the pursuit of creating new knowledge about nursing practice, education and policy”.

In all the above said definitions, we see the following core elements regarding nursing research:

- A systematic process
- A search for new knowledge or in depth understanding regarding a phenomenon
- An activity that is planned and logical
- A search for an answer to a question

RESEARCH PROCESS AND PROBLEM SOLVING PROCESS

The research process and the problem solving process have different purposes, processes and goals. Problem solving is a simple process. It targets a single problem of an individual or organization. Its purpose is to find an immediate solution to a practical problem in an actual setting. This solution as such cannot be replicated as it is on other problems as the reason may be different.

The process of problem solving involves, identifying a problem, collecting information about the problem, considering options, and deciding the best possible option to solve the immediate problem. Then, look back to the problem to see the effectiveness of the solution.

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. The steps of research process are discussed separately in Chapter 2. The differences between research process and the problem solving process has been depicted in Table 1.

Table 1: Differences between research process and problem solving process

Characteristics	Research process	Problem solving
Scientific	Always scientific	May not always be scientific
Purpose	Developing new knowledge or validating the existing one	Removing/reducing differences between current and desired situation
Knowledge base	Research expertise	Situation expertise
Starting point	Inconsistencies in the current knowledge	Undesirable/uncomfortable situation requiring change
Time period	Months to years	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 implementing the identified strategies or solution
Steps	<ul style="list-style-type: none"> ■ Defining the research problem ■ Determining objectives ■ Formulating hypothesis ■ Reviewing the literature ■ Developing research methodology ■ Collecting data ■ Analyzing and interpreting data ■ Communicating the findings 	<ul style="list-style-type: none"> ■ Identifying the problem ■ Analyzing the problem ■ Developing alternative solutions ■ Selecting the best solution ■ Implementing the solution ■ 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
End product	Development of theory, model, or answer to research questions	Remedial action plan that can often be generalized

Steps of Problem Solving Process

The steps of problem solving process are as follows (Fig. 1).

1. **Identify and define the problem:** The first step is to identify and define the problem. Time should not be

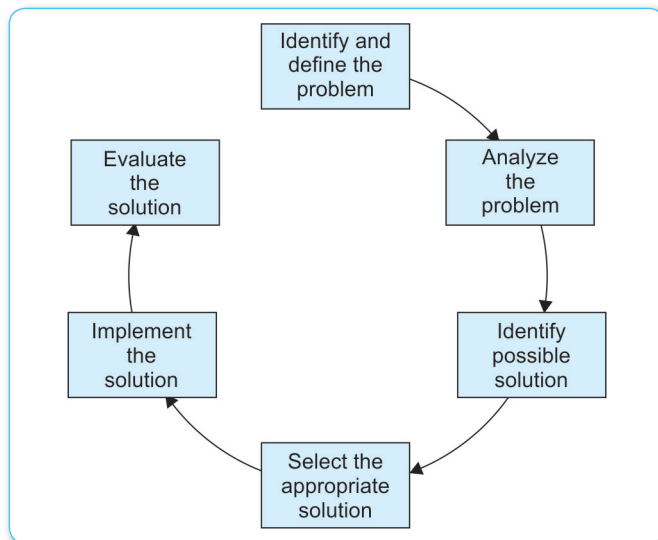


Fig. 1: Steps of problem solving

wasted in identifying the problem because sooner a problem is identified and solutions are devised, the better it will be for all who are involved. Therefore, try to anticipate or identify problems at the earliest.

2. **Analyze the problem:** Analyze the problem appropriately. It will facilitate in prioritizing its importance in relation to other problems.
3. **Identify possible solutions:** Try to generate the probable solutions to solve the problem. Creative and analytical thinking is required for the same. In fact, the solutions should come from those who are connected with the problem. Write down all the solutions in the order of priority.
4. **Select the appropriate solution:** Prioritize the ideas/solutions generated to solve the problem and select the most appropriate one to solve it. One should not be in hurry in making the final decision. First, make sure that all the required informations to solve the problem are present. Before making a final decision, think about the objective of problem solving. Then reassess the priorities, consider the options and weigh up the strengths, weaknesses, opportunities and threats of each solution.
5. **Implement the solution:** Implement the most appropriate solution.
6. **Evaluate the solution:** The last step is to evaluate the implemented solution. Reassess the problem in order to ensure the effectiveness of the selected solution. Also we need to make sure that all the people involved are aware about the decision that has been made. Whenever possible, brief the group and follow this up with written communication to ensure that everyone knows what is expected of them.

KNOWLEDGE BUILDING IN NURSING

Nursing involves “Assisting the individual (sick or well) in the performance of those activities contributing to health, or its recovery (or to a peaceful death) that he would perform unaided if he had the necessary strength, will or knowledge”.³ Abdellah et al.⁶ has further elaborated by saying that “Nursing is a service to the individual and to the families and therefore to the society. It is based upon an art and science which mould the attitudes, intellectual competencies, and technical skill of an individual nurse into desire and ability to help people, sick or well, cope with their health needs, and may be carried out under general or medical direction”.

Nursing is described as a “Practice Discipline”. It is concerned with the development of professional knowledge and skills of nurses. It is people-oriented work of health related nature which is nurtured by practice of knowledge. Nursing is a dynamic and ever evolving profession. After attaining nursing education from their teachers, the practicing nurses while working with the patients, learn from each other, from their seniors and other healthcare professionals. Theoretical and practical knowledge is central in order to provide appropriate quality care to the patients. One of the fundamental principles of categorizing nursing as a profession is that it has its own “Body of Knowledge.”

In order to make decisions regarding delivery of care and using evidences supporting their practice, various sources of knowledge may be explored by the nurses. These sources of nursing knowledge may include the evidence from research; experience (tradition, intuition and tacit understanding) and personally derived understanding.^{7,8} All the sources is mutually inclusive. Nurses may use the scientific and own experience driven knowledge while making the decisions.⁹ has given the four fundamental patterns of knowing. These include “Empirics (know what), Aesthetic (know how), Personal knowledge (do I know myself and others?) and Ethics (know why I should)”.

Sources of Knowledge

There are different means and sources of acquiring the knowledge in nursing. These can be broadly categorized as less structured and structured methods (Fig. 2).

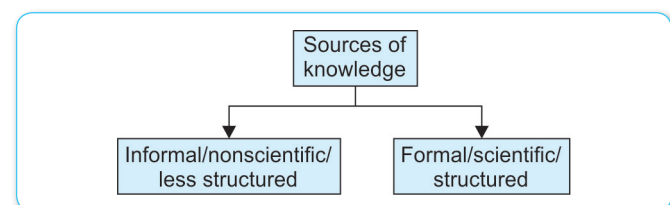


Fig. 2: Sources of knowledge

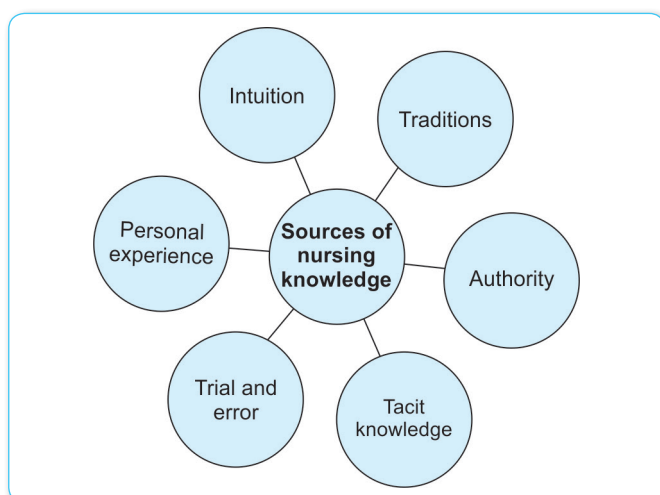


Fig. 3: Less structured/informal sources of nursing knowledge

Informal/Nonscientific/Less Structured Sources (Fig. 3)

The less structured sources may sometimes lack rationalization of the information obtained from them. These sources include traditions; authority; trial and error; personal experience; intuition and tacit knowledge, etc. Although these sources may not be much scientific, but cannot be ignored because a vast majority of our practices are based on these sources. All of these are discussed as follows:

Tradition

Tradition is basically passing down ideas, actions, conduct, knowledge, practice, etc. within a group or society. It has its origin in the past. 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 modeling, written documents, books, journal articles, and often from “experienced” personnel*. These practices can be imposed by saying that “This is the way it should be done because this is the way it has always been done”.

Traditions may influence the current nursing practices, because they are based on effective past experiences. Most of the policies and procedure manuals in the hospitals or in the market may contain traditional ideas. Some of the traditional practices can have a useful place in today’s nursing practices. The traditional practices can facilitate learning for student nurses and newly joined nursing personnel. It offers an opportunity for socialization. But as new evidences come into sight, there is often a need to challenge and change the traditional and ritualistic practices. However, the right traditional practices need to be continued. For example, bedside handing over the patients at the time of changing the shift of nurses

was better. This practice is vanishing these days in most of the areas in the hospitals, especially in the general wards although it is still practiced in the critical care areas. The problem with the traditional methods could be that many traditional practices/interventions may never have been tested and validated. So, these should be tested and evaluated to make them scientifically proven practices/interventions.

Authority

This involves the use of specialized sources of information. An authority is the power or right to give orders and make decisions and an individual who is specialized and knows how a particular thing can be done. He/she can give command regarding this. He/she should be able to influence the opinions and behavior of others. An individual is given power and authority because it is thought that he/she knows better than others in a given area. The nurses who publish articles and books or develop theories are frequently considered as authorities in nursing education. Similarly, a person who is more knowledgeable and competent in nursing practice may be considered as an authority in nursing practice. Most of what we do in nursing is based on authority. Usually it is said by the experts that “This is the way to do it”. Although, the knowledge gained may be useful, but it should be verified through research because the expertise may be based on the personal experience only.

Trial and Error

As the name implies, in this method, various alternatives are tried one after another until a solution to a problem is found. Although this method may be commonly used in solving day to day life problems, but there are some disadvantages of using trial and error method in nursing, especially while providing care to the patients. When a nurse uses the trial and error practice there may be a risk of harming the patients. A nurse may have been taught a procedure incorrectly. If she practices that procedure in trial and error way, he/she could potentially harm the patient. The nurse could then pass down his or her knowledge to other nurses. Thus the incorrectly-taught procedure will spread throughout the hospital and more patients would be cared/treated in an incorrect manner. Moreover, generalizability is also an issue in this method, because whatever might work for one patient may not work for the other patients. Overall, trial and error in nursing practice is a good way to discover new cures and treatments but it can be a risky method. So, one needs to be very careful.

Personal Experience/Clinical Experience

This implies to an individual’s own knowledge that is acquired by being personally involved in various situations



and events. Liaschenko and Fisher¹⁰ refer “Personal Knowledge” as “Knowing a person as an individual, understanding personal experience of illness and care delivery”. Personal expertise could be developed through a range of experiences and they may be based on a numerous sources of knowledge. It could be developed through traditional and tacit knowledge or observing role models in practice. Trial and error can also play an important part in the development of knowledge as it increases personal experience different approaches with unknown outcomes are tried. Its status, as a form of evidence, on which the practice will be based could be subject of question. Closs¹¹ has suggested that we should question expert knowledge, if it is based on limited experience and personal bias without reliable foundation. The limitation of this method lies in the fact that the knowledge gained through this method may be very narrow and personal, and often without formal documentation.

Intuition and Tacit Knowledge

Intuition is an insight into or understanding of a situation or event that usually cannot be explained logically.¹¹ It is different from all other sources of knowledge, which generally involve conceptualization of the object of knowledge, by means of rational/analytical thought processes. As per Burnard⁸ intuition is an acute sensitivity or “Sixth Sense” which is drawn on experience and knowledge to make a judgment for care. Tacit knowledge is also developed through experience gained by practice. Gunilla et al.¹² proposed that tacit practice can be role modeled and delivered to future nurses. Benner¹³ has suggested that nurses become expert practitioners by experience and develop aesthetic knowledge (know-how). Expert nurses use this knowledge to identify patients’ needs and delivery of holistic care as intuitive doers. It helps in the development of personal knowledge which may ultimately become knowledge for professional practice.

Lack of objectivity and ability to identify a rationale behind decisions taken while using intuitive and tacit knowledge, prevents it from being viewed as a phenomenon for scientific study. Thus it may adversely affect its recognition and position as a knowledge base for practice. Rew and Sparrow¹⁴ suggested the use of intuition and tacit knowledge in circumstances with limited information, to understand a behavioral response or where ethical dilemmas are present.

Formal/Scientific/Structured Sources

The knowledge gained through scientific method is positioned at the top of various sources of acquiring knowledge. This method is an ordered, systematized, and controlled approach to obtain empirical information.

This type of knowledge is gained through research, carried out by following a rigorous and scientific approach.

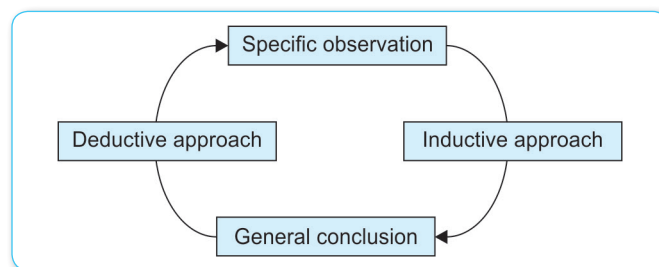


Fig. 4: Inductive and deductive approaches

These findings are then utilized to improve the nursing practices.

For developing the knowledge, to carry out the research activity and to understand a problem, the investigators use both the **inductive** and **deductive** reasoning/approaches (Fig. 4). The reasoning process in quantitative research is primarily the deductive approach, however, in qualitative research, the inductive approach is used.

Inductive approach is the logical thought process of drawing conclusion from a specific observation. In simple words, it is moving from specific to general. The researcher tries to develop a theory. The **deductive approach** is a logical thought process of reasoning from general to specific conclusion. It moves from general to specific. This approach entails that there is a theory or knowledge in existence which will be tested through the research process.

Clinical skills and knowledge are essential for nurses to provide high-quality care to the patients. Nursing knowledge is constantly evolving. The clinical decisions should be based on certain evidences rather than just opinions or beliefs. The knowledge generated through a research activity is the scientific knowledge.

Research provides evidences to care the patients. Nursing practices are undergoing tremendous changes and facing challenges with the passage of time. Nursing practice must be based on research to provide a strong foundation to provide care to patients. Research provides evidence-based data to practice new directions to assess, evaluate, and deliver nursing care. Research is needed to evaluate the effectiveness of nursing interventions, to determine the impact of nursing care on the health of the patients, to test the theories. Retaining the research findings by not integrating them into practice will not only deny the advancement and the quality of nursing care, but will also be an injustice to the nursing profession. Lack of knowledge regarding the subject can leave nurses powerless to provide safe and effective care.

It has been said that nurses should be the researchers of nursing. This is because they know nursing best and therefore they are worthy to generate important nursing research questions and areas of interest. Furthermore, they can most effectively access and work with other nurses,



health workers and clients in various healthcare settings. Further, they are skilled to analyze and interpret effectively what they observe, gather and compile because they have in depth knowledge of the culture of nursing. That is the reason, bedside practicing nurses are very important to nursing research. They are the ones who know the patients the most, because they remain with the patients for most of the time. They are also aware of what works or what does not work for the patients.

Although the knowledge gained through all above sources is important, however, these ways of acquiring knowledge (except research) may not be adequate in providing a scientific knowledge base for nursing practice. None of these ways have the characteristics of research which involves the purposeful and systematic collection, analysis, and interpretation of data.

Thus, research as a method of acquiring knowledge is considered at the top of all the sources. Without evidence based knowledge, it may be impossible to incorporate the latest nursing interventions to provide quality nursing care to the patients. Research provides a solid foundation on which nurses can develop and refine their professional knowledge and practices. Nursing is still an evolving profession. It needs a continuously growing and expanding body of knowledge, which can be developed only through research.

However, none of the sources of knowledge exist exclusively. Nurses make use of the scientific, personal driven and experience driven knowledge in making their decisions regarding patient care. Both sources of knowledge that is scientific and personal knowledge are required to provide effective patient care.

DEVELOPMENT OF NURSING RESEARCH: HISTORICAL ASPECTS^{1,15-18}

Worldwide nursing research has its roots in the philosophy of Florence Nightingale, the pioneer of nursing profession. The main focus of Nightingale was on the importance of a healthy environment and the physical and mental well-being of the patients. During the Crimean War in 1954, Nightingale collected and analyzed the morbidity and mortality data of the soldiers. She observed that the soldiers were poorly cared for. There was short supply of medicines and other essential things. Hygiene was completely neglected. Infections were out of control. Nightingale found that there was no clean linen; the clothes of the soldiers were swarming with bugs, lice, and fleas; the floors, walls, and ceilings were filthy; and rats were hiding under the beds. Nightingale believed that the main problems were poor diet, dirt, and drains. She brought food from England, cleaned up the kitchens, and asked her nurses to maintain cleanliness in the hospital wards. With untiring efforts of Nightingale, the mortality

rate reduced drastically. It changed the approach of the military and society toward caring the sick. They realized that the sick had a right to adequate food, shelter and medical treatment.

Further, Nightingale made major changes in many areas of society. These included testing public water, improving sanitation, starvation prevention, and decreasing morbidity and mortality.

Initially, nurses were not ready to conduct research. Hence, many of the research studies were conducted by members of other disciplines. Sociologists were particularly interested in the 'learning, living and working' experienced by nurses. Thus the research conducted by sociologist and behavioral scientists etc. added to their 'body of knowledge'. But it didn't as such expanded 'nurses' body of knowledge'. As nurses received advanced education, they became competent in conducting research. However, in the beginning, many of the studies they carried out were in the field of nursing education. This is because most of the nurses before 1950 received their advanced degrees in education.

Afterwards, many developments took place all over the world, including the emergence of various nursing associations, growth of educational institutions, and efforts of prominent educators and administrators for the growth of the profession. Currently, research has become a part of the curriculum in nursing. Even it has been incorporated at diploma level. In no other discipline research is incorporated at the undergraduate level. At the undergraduate level, the nursing students work in groups on various research projects. However, at the post graduate level, the subject is taught more extensively. Each student works individually on the research project he/she plans. Now both the number and the quality of nursing studies have increased extensively.

Research in nursing helps to recognize the current development and trends in nursing practices; establishes guidelines for writing scientific papers, develops skills to be applied in sophisticated data analysis in the field of nursing research, and most importantly promotes qualitative studies in nursing practice. The nurses who have completed master and doctorate are able to conduct independent nursing research. They can contribute to the policy development of the country by identifying and improving health indicators.

Now, in the current era, a nurse/nursing teacher can assume many roles in research. He/she can work as:

- Principal investigator
- Member of a research team
- Identifier of research problem
- Evaluator of research findings
- User of research findings
- Patient/client advocate during studies
- Subject/participant in studies.



Development of Nursing Research in Western Countries^{4,5,8,15}

Certain historical events influencing research at International level have been enumerated in Table 2.

Table 2: Historical events influencing research in nursing (International)

Years	Events
1850	Nightingale, first nurse researcher and the statistician
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 masters in Nursing Degree offered at Yale University
1932	The Association of Collegiate School of Nursing was organized
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

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Years	Events
1988	First issue of Applied Nursing Research was published First issue of Nursing Science Quarterly was published
1989	Agency for Healthcare 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 The first issue of Clinical Nursing Research was published
1993	NCNR was renamed as the National Institute of Nursing Research (NINR) 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 AHCPR was renamed as Agency for Healthcare Research and Quality (AHRQ)
2000	Healthy People 2010 was published by US Department of Health and Human Services First Biological Research for Nursing was published
2004	The first issue of worldviews on Evidence-Based Nursing journal was published
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 healthcare
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^{4,5,8,15}

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 3.

Table 3: Historical events influencing research in nursing in India

Years	Events
1946	<ul style="list-style-type: none"> 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 Following this, nurses from India were sent to Columbia University to attain qualification in research In 1953, Ms Edith Buchanan, Vice Principal, Raj Kumari Amrit Kaur (RAK) College of Nursing, New Delhi, was the first nurse from India who was sent to Columbia University for Doctorate in Education under World Health Organization (WHO) fellowship program In 1955, Ms Margareta Craig, Principal, College of Nursing, New Delhi, attended International Council of Nurses (ICN) meet in France to present a paper on the need for nursing research in India
1960	<ul style="list-style-type: none"> 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. The master degree program included nursing research as a full subject with a thesis work on some nursing topics
1963	<ul style="list-style-type: none"> Indian Nursing Council (INC) conducted a study on health services in India to revise syllabus of General Nursing and Midwifery (GNM) program The study provided valuable insights into the trends in the health services and implications for nursing
1964	<ul style="list-style-type: none"> Dr Marie Ferguson, a Public Health Nurse, joined RAK College of Nursing, New Delhi Dr Ferguson along with her team conducted a study to define nursing and non-nursing functions of nurses in selected health institutions of India Understanding and value of research in nursing for nursing practices, administration, and education was generated
1966	<ul style="list-style-type: none"> 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 TNAI also established a research section under the guidance of Ms Margareta Craig

Contd...

Years	Events
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	<p>First national conference titled 'Nursing Research in India: Prospect and Retrospect' was organized at College of Nursing, Bengaluru. It was recommended that:</p> <ul style="list-style-type: none"> Each college of nursing should have a research cell The nursing students should be encouraged and provided time for conducting research Central and state governments and private organizations should include nursing research in their budget Opportunities should be provided for faculty to visit foreign countries on short-term basis to learn about research 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	<ul style="list-style-type: none"> 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 MPhil program for nurses was started at RAK. PhD in nursing was started in College of Nursing, PGIMER, under Punjab University, Chandigarh. It was later discontinued because of certain unavoidable circumstances 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)
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

Contd...



Years	Events
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

Tables 2 and 3 depict just the “tip of an iceberg” regarding development of research in the field of nursing. Plenty of things are happening at individual institutional level. Majority of the nursing professionals especially on the educational side are becoming more and more aware about research. The intra as well as extra mural research grants are being allocated to them.

Regarding the books on research, initially, we had the books written only by foreign authors. Now, many Indian authors have taken up this task. A number of open access online national and international journals have come up. These have provided a platform to the nursing researchers to publish their research work. Now both the number and the quality of nursing studies have been increased extensively.

The professionals in nursing education have become more aware regarding research. Number of conferences and workshops are being conducted by them on a regular basis. Nursing research is regularly developing at a rapid pace. It will definitely grow in the 21st century. There is

regular focus on development of evidence based practice. Great emphasis is on the systematic review.

PURPOSES OF NURSING RESEARCH

Nursing practice based on solid evidences is essential to meet its mandate to society for effective and efficient patient care. The ultimate goal of nursing research is to bring out evidences in order to provide standard and quality care to the patients. Nursing research is methodical and systematic process. It is carried out with the purposes of¹⁵⁻¹⁷

- Gaining new knowledge: This is acquired by an organized and logical process of inquiry during which data are methodically collected, analyzed and interpreted.
- Finding answers to the questions or solutions to the problems which are only partially solved by existing methods and information.
- Discovering and interpreting new facts.
- Testing the already developed theories.
- Formulating new theories.
- Refining and improving existing techniques.
- Developing new instruments or interventions.

SIGNIFICANCE OF NURSING RESEARCH

Nursing personnel provide services to the society in various healthcare organizations and settings. These services should be based on accurate knowledge. Significance of nursing research can be highlighted from the following facts:¹⁵⁻¹⁷

- Knowledge is paramount requisite for the advancement of any profession. Nursing research is one of the most reliable, objective and systematic way of obtaining knowledge although there are various means of acquiring knowledge, such as traditional practices, authority, and trial and error, etc.
- Nursing research is an important constituent of healthcare field. Research in nursing helps to recognize the recent advancement and trends in nursing practices.
- It ensures credibility of the nursing profession. Nursing research establishes a unique body of knowledge that allows nursing to be clearly identified as a distinct profession.
- It helps to implement new changes in the care of patients.
- It focuses on developing new interventions for the prevention as well as treatment of diseases.
- It helps in developing standards, in order to provide quality care to the patients.
- Nursing research provides the best possible care based on the best available research.
- The researchers can develop skill in applying sophisticated data analysis in nursing research.



- Nursing research provides accountability to nursing practice. The general public is becoming more knowledgeable of their health related interventions. Their expectations from nurses as providers of care have also increased. So, to be accountable for their practices, nurses must have a sound rationale for their actions, based on knowledge that is gained through scientific research.
- When effective nursing care based on the results of certain interventions is provided to the patients, leads to lesser stay in the hospital and thereby decreasing the cost of healthcare. Many studies in the literature demonstrate the cost effectiveness of nursing care.^{19,20}

SCOPE OF NURSING RESEARCH¹⁵⁻¹⁷

The scope of nursing research is quite wide. Nursing research is carried out to answer questions or to find solutions to problems that fall within the explicit province of nursing. It includes the rehabilitative, therapeutic, and preventive aspects of nursing. It also involves preparation of practitioners and personnel involved in nursing. It also includes the issues being faced by nurses themselves in nursing practice, nursing education, and nursing administration (Fig. 5).

Nursing Practice

The scope of nursing practice is quite wide. It may range from acute to chronic care experiences across the entire life span and from the health promotion and preventive care till the end-of-life care. It also includes the care of individuals, families, and communities in diverse settings. It is very important for nursing research to take an intuitive approach for having a great impact in the future.

The expanded role of nursing in healthcare lay emphasis on health promotion, restoration, and rehabilitation. It also includes the commitment of caring and comfort. The researchers study how to assist the sufferers in their illnesses, e.g., decreasing the side effects of various treatment strategies and addressing the social and behavioral aspects of illness and quality of life.

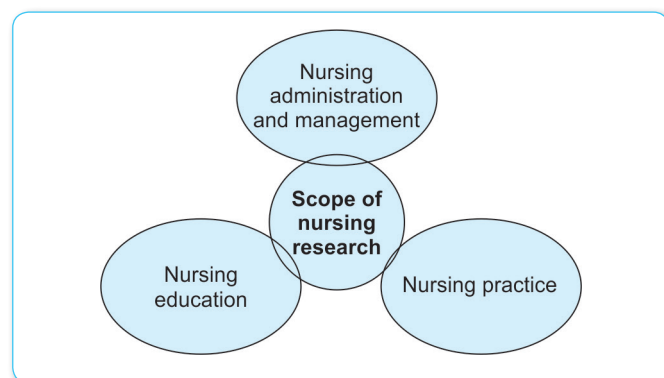


Fig. 5: Scope of nursing research

Nurses work independently as well as a part of inter-professional teams. They often work in different healthcare settings. Nursing research may focus upon effectiveness of nursing care interventions. The researchers may take up the work on development and appraisal of new types of delivery of care. New interventions are researched for better and safe provision of nursing care. Nursing research is an essential part of generating scientific knowledge, to be applied in practice. One of the major goals of nursing research is to provide evidence based nursing care. The healthcare professionals need to be knowledgeable regarding the recent advances in healthcare in order to satisfy the queries of the patients and to base their care/ interventions on the sound scientific knowledge. Research has always been known as the most reliable, objective and methodical way of obtaining knowledge.

Further development of various theories in nursing and the impacts of policy on practices are the other areas of research in nursing.

Nursing Education

Nursing research in education involves developing and testing more efficient teaching and learning processes. For example, recognizing the effectiveness of technology on learning, and finding out the effective methods to promote lifelong learning, etc. Over the period of time, there has been substantial advancement in the technology. New techniques and methods of teaching have come up. Their effectiveness and efficacy can be evaluated over the traditional methods. For instance, a study was carried out to evaluate the effect of web based vs class room teaching, on newborn care amongst the nursing students. Both of the teaching methods were effective in enhancing the knowledge scores of the students. There was no significant difference in between the teaching methods on the knowledge scores of the subjects.

Moreover, because of the demographic transition and to meet the needs of the public, we need to have well-educated nurses. For this, new strategies for recruiting and retaining the nurses must be developed and tested. In addition, new models of nursing education are needed to prepare the nurses for faculty and research positions. These efforts must be at top priority if nursing research has to evolve continuously. However, currently there is lack of research in this particular field.

Assessing the clinical competence of graduates and postgraduates, outgoing nursing students is another area which has drawn attention of the researchers recently.

Nursing Administration and Management

Review of the organization and administration of nursing services, for example, the usefulness of innovative roles of nurses, etc. are other researchable areas. The nursing profession is constantly determined to build up its own



'body of knowledge' in order to contribute to the health services and the social sciences.

Nursing research in nursing administration and management attempts to discover the ways that how the organization and delivery of healthcare services affect the quality, cost, and the experiences of patients and their families. Such issues are not exclusively for nursing discipline. However, nursing research is to be integrated with other healthcare services regarding issues of organization, delivery, financing, quality, patient and behavior provider, informatics, effectiveness, cost, and outcomes.

CHARACTERISTICS OF NURSING RESEARCH

Certain characteristics have been attributed to nursing research.^{15,17} These are discussed as follows:

- **Empirical:** Research is a systematic and critical investigation of phenomenon of interest. The empirical nature of research is based on something that can be accurately and precisely measured. The quantitative research is comparatively easier to prove scientifically as compared to the qualitative research. In qualitative research because of its nature, the biases and prejudices can take place more easily.
- **Credible:** Credibility in research is to have a believable and trustworthy resource of information and to employ the best procedures in carrying out the research. If we are making use of secondary data in research, the work may be completed in less time, but its trustworthiness or the reliability will be questionable. Secondary data might have been manipulated by others. So, it may not be very valid to be used in research. Thus, supporting a research entirely on secondary data when primary data can be collected, is least creditable.
- **Analytical:** Research is conducted to find out answers to the pertinent questions and to solve the problems. For that matter irrespective of the type of study, i.e., historical, descriptive, experimental or a case study; a methodical and analytical procedure is adopted to gather the data. The data should be carefully gathered, directly or indirectly through five human senses namely sight, sound, smell, taste, and touch.
- **Critical:** Research is not only a compilation but a purposive investigation. It aims at describing, interpreting and explaining a phenomenon. Research exhibits careful and precise judgment. It requires accurate observations, recording, 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. It cannot be carried out unsystematically. Each step should follow a logical sequence. Research requires patience and unhurried activity.

- **Generalizable:** Generalizability involves the extent to which the findings of a research study can be applied to the target population. The findings from a sample should be representative of the entire population from which it has been drawn. Generalization enables an investigator to go beyond the results of the sample studied and apply the results to a broader group or population.
- **Reliable:** As such reliability is a subjective term. It cannot be measured specifically. It is the repeatability of any research, research instrument, tool or procedure. If we get comparable results, every instance the research is undertaken with similar population and by adopting the similar procedures, it is said to be a reliable research. "Suppose a research is conducted on the effects of separation between parents on the academic performance of the children. The study results conclude that separation of the parents leads to low grades in the class. These results must be reliable for another sample taken from similar population. More similar the results are; more is the reliability of the research". The word reliability is also used as a feature of a research instrument. The use of valid and reliable measures will permit monitoring the quality of the care provided to patients.
- **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 diploma level, the subject of research has been introduced. The classroom teaching of the students usually will dictate the basic knowledge of research. However, there are some minimal requirements that a person should fulfill in order to conduct a reliable and meaningful study.^{15,17,21}

- **Research-oriented:** Good researchers must be open-minded and must also adopt a critical way of thinking. They should adopt an accurate method to identify a research problem, work on it and find a solution for that problem.
- **Competent:** He/she should be hard working, diligent, focused and devoted to his/her specific field of interest. He/she needs to have an outstanding knowledge regarding the steps of nursing research process.



- **Focused:** Researchers must have a vision of their own. They should be stable having a consistent thinking. They should be honest, sincere, brave and ambitious.
- **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:** The researcher should have complete knowledge and information of the field of investigation. They should be aware of basic statistical principles in order to be able to appreciate and interpret critically the findings of others' work.
- **Team spirit:** Research usually requires the contribution of more than one person. So, a researcher should be able to develop a team spirit for conducting research.
- **Verbal and written communication competency:** An important step of conducting research is dissemination of findings. This is accomplished by writing and publishing the report or presenting the findings at certain scientific platform. Thus a certain level of written and verbal communication skills in the researcher are required.



Mnemonics

The qualities of a good researcher may also be discussed under the acronym '**RESEARCHER**'.

R Research oriented
E Efficient
S Scientific
E Effective
A Active
R Resourceful
C Creative
H Honest
E Economical
R Reliable

GAPS AND CHALLENGES IN NURSING RESEARCH

Research strives to garner knowledge and make discoveries that aid our daily lives. Nurses extensively engaged in research, conducting research studies that benefit the nursing profession and the patients as well. Any research carried out in clinical settings or academic settings always help in understanding various aspects of nursing care and the nursing profession. These ultimately help to improve

patient care. Until a few decades ago there was not much emphasis and concentration on the research aspect of nursing, especially in India. But over the period of time, there is a greater thrust on research in all the nursing programs and even in the clinical settings. Still we are far behind when compared with the developed world.

Nurses are back bone of the healthcare system and are usually on the front lines of caring for patients. Along with their routine duties of monitoring vital signs and administering medications, they can play an important role in improving healthcare and eliminating health disparities. They are at the prime position to generate changes in nursing practice. They have a significant potential for improving nursing practices.

However, the relationship between nursing research and practice invariably has been a challenge for the nurses. A number of barriers have been identified that prevent them from conducting, participating or implementing the research. Some of these barriers are as follows. The details are discussed in Chapter 37.

- Deficient knowledge and training regarding research
- Misconceptions regarding research
- Negative attitudes regarding research
- More patient workloads
- Lack of administrative/organizational support
- Lack of ability to change the traditional practices
- Considering research not a priority
- No incentive to the researcher

Moreover, nursing is a female dominating profession, though currently males have also started joining the profession. Being female nurses, they are obliged to look after the family chores also, after getting free from their routine hospital duties. That could be another barrier for not actively participating in research.

Many nurses think that research is undertaken in the academic settings only. It is not the activity of clinical practice. They think research as frightening. They perceive researchers as scary and keep them away from the clinical settings. These discernments can be conquered once there are opportunities to share opinions by researchers and collaborate with the nurses in the clinical settings.

The bedside nurses can help in conducting research and advancing the nursing practice. While working on patient's bedside, they can contribute to the quantity and quality of data collection. They can also facilitate the immediate translation of findings into practice. Their participation can also help to highlight the need for changes in nursing practices. Apart from this, involvement of the nurses in the direct care roles often allows changes to be implemented quite early and with greater ease as they themselves were involved in all the steps of research process. So, these nurses may be quite beneficial for the application of research findings. However, to involve the



bedside nurses in whole of the research process, support both from the central and local level is required, which may not be possible at all the times.

The details regarding barriers and utilization of evidence based nursing practice is discussed in Chapter 37 on Evidence-based Nursing Practice.

SUGGESTED RESEARCH APPROACHES FOR NURSING FACULTY, SERVING NURSES AND NURSING STUDENTS

The ultimate aim of nursing research is to provide patient care of highest standards based on current knowledge. Irrespective of the level, i.e., a nursing student or the practicing nurse or the nursing faculty, everyone has a responsibility in some or the other way to contribute in the development of the nursing profession through research. So, all of them need to become 'research literate'. They need to be aware of the steps of research process starting from identifying the research question till the utilization of the evidence. The difference could be the level or the type of research undertaken by them.

Nursing students studying at diploma level and undergraduate degree program usually work in groups for their research activity. The main purpose here is to acquaint them with the steps of nursing process. The time period to complete the research project is quite limited. They may take a research study which is descriptive in nature. Although they work in group, but each one should have a thorough knowledge of each and every aspect of the research project. Everyone should be able to find and critically appraise research literature.

Nurses undergoing the master program are supposed to take the individual research project. They should be taking more of high quality experimental or quasi experimental research studies. At doctorate level, the focus of research should be on policy development in field of nursing. Several nurses are currently educated to

doctorate level both at national and international level. This is a major change which has taken place in India in 21st century.

The nursing faculty should develop high quality independent research projects, capable of securing the external funding from various organizations such as Department of Science and Technology (DST), Department of Biotechnology (DBT), Indian Council of Medical Research (ICMR), World Health Organization (WHO), University Grant Commission (UGC), Council of Scientific and Industrial Research (CSIR) etc.

The practicing nurses are involved in direct patient care. They should be doing more of action research. They can take either independent research projects or can be involved in research projects undertaken by other medical or nursing faculty.

SUMMARY

Nursing research is essential to generate scientific knowledge to be used in practice. The ultimate goal of research is developing an organized body of scientific knowledge. It is an orderly process of answering to a research inquiry. It involves methodical collection, analysis, and interpretation of data to gain new knowledge or verify already existing knowledge. Nursing is still an upcoming profession especially in India. The nursing researcher often had to depend on other disciplines in carrying out research. Currently many nursing researchers carry out their research activities independently, although a large number of research studies are also being carried out in collaboration with others disciplines. Certain minimum qualities are required in a person to be a good researcher.

The bedside nurses in the field of research can be very useful to improve the nursing practice. There may be many barriers to do research studies but support and motivation from all levels can help in achieving this endeavor.



ASSESS YOURSELF

Long and Short Answer Type Questions

1. What do you mean by nursing research? Discuss it.
2. "Research is much concerned with proper fact finding, analysis and evaluation." Do you agree with this statement? Give reasons in support of your answer.
3. Explain the purposes of conducting nursing research with examples from nursing education, nursing service, and nursing administration.
4. Discuss the significance of nursing research.
5. Discuss the historical aspects of research in India.
6. Discuss the qualities of a good researcher.
7. How will you differentiate research process from problem solving process? Discuss with an example.
8. Write a short note on scope of nursing research.
9. What are the characteristics of a good research?

Multiple Choice Questions

1. The most important contribution to research in health by Florence Nightingale was:
 - a. Development of nursing theory in 'Notes on Nursing'.
 - b. Compilation of data on soldiers' morbidity and mortality.
 - c. Study of the best way to acquire provisions.
 - d. Experimenting with the wound care techniques.
2. Determine which of the following statements conveys the empirical nature of research:
 - a. The research is conducted in controlled situations.
 - b. Research has been carried out following meticulous steps.
 - c. The results of the research yielded favorable results.
 - d. The researcher was able to generalize the findings to a large group of population.
3. As a professional, a nurse can do research for varied reason except:
 - a. Professional advancement
 - b. To validate the results of new nursing modalities.
 - c. For financial gains
 - d. To improve nursing care
4. Who is the first nurse researcher?
 - a. Martha Rogers
 - b. Dorethea Orem
 - c. Florence Nightingale
 - d. Sr. Callista Roy
5. In which year Post Doctoral Fellowship was started by NRSI?
 - a. 2014
 - b. 2015
 - c. 2016
 - d. 2017
6. In which year of Crimean War, Nightingale collected and analyzed the morbidity and mortality data of the soldiers?
 - a. 1952
 - b. 1953
 - c. 1954
 - d. 1955
7. Which of the following agencies first started funding nursing research?
 - a. Association of Collegiate School of Nursing
 - b. Sigma Theta Tau, National Honor Society for Nursing
 - c. American Nurses Association
 - d. Teachers College at Columbia University
8. In which year, the first issue of International Journal of Nursing Studies was published?
 - a. 1960
 - b. 1961
 - c. 1962
 - d. 1963
9. Which of the following nurses first went to Columbia University for Doctorate in Education under World Health Organization (WHO) fellowship program.
 - a. Ms Edith Buchanan
 - b. Ms Margaretta Craig
 - c. Ms Marie Ferguson
 - d. Ms Sulochana Krishnan
10. Who authored the book 'Health Research: A Community Based Approach'
 - a. Dr Aparna Bhaduri
 - b. Dr Edith Buchanan
 - c. Dr Sulochana Krishnan
 - d. Dr Margaretta Craig

Ans.

1. b 2. b 3. c 4. c 5. b 6. c 7. b 8. d 9. a 10. a



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