



Section

Nursing Research



Section Outline

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Introduction to Nursing Research

Learning Objectives

This chapter is designed to enable the intellectual consumers to:

- Recognize the historical evolution of nursing research
- Understand the concept of research and nursing research
- Determine the sources of acquiring knowledge in nursing
- Appraise the scope and areas of conducting research in nursing
- Identify the characteristics of good research
- Orient the quantitative and qualitative research process
- Compare the basics of quantitative and qualitative research
- Familiarize with characteristics, types and steps of research process
- Explain the concept of evidence-based practice
- Identify the role of consent in research
- Appreciate the code of ethics and nurse researcher responsibilities in ethical aspects

Chapter Outline

- Introduction
- Sources of acquiring knowledge in nursing
- Scientific methods
- Nursing research
- Evidence-based practice
- Evidence-based nursing
- Basic terminology related to research process
- Steps of research process
- Ethics in nursing research
- Selection of special groups for research
- Safeguarding confidentiality
- Publication ethics
- ICMR ethical guidelines for biomedical and health research
- Code of ethics for nurses in India
- Nursing process versus research process
- Role of nurses in nursing research

INTRODUCTION

Research is a process of finding out the solution to a problem. It is a sequence of activities, which when followed enables the investigator to achieve the stated aim or purposes. Research follows the scientific method, which is why it can stand the test of time. A scientific practice base for nursing indicates that the nursing practice is guided by numerous nursing theories or empirical clinical research findings or evidences.

In nursing, the concept of research has been introduced by the Florence Nightingale; pioneer of modern nursing profession, where she had brought down the mortality of wounded soldiers during the Crimean War by applying basic research and statistics. Since then, research became integral part of nursing profession. It provides scientific evidence to support as well as to modify the nursing practice. Most importantly the subject of Research and Statistics is included in nursing curriculum of diploma to masters degree to inculcate the research knowledge and its methods among the nursing fraternity. The research scholars in nursing (M Phil, PhD and Postdoctoral fellow) especially focus on research activities in nursing to rationalize the nursing interventions, and develop nursing theories or models used for attaining professional status.

Though the research scholars in nursing are minimal, it is an emerging discipline and currently a considerable number in nursing fraternity are interested to take up the profession. Similarly, the students of all nursing courses need to conduct small-scale to large-scale research as a partial fulfillment of courses, which in turn leads to enormous number of research work in nursing. Though the utilization of these researches in practice is scanty due to various reasons; however, the novice students/nurses are oriented and sensitized to research process and the research methodologies. Conducting research in

practice areas is a win-win situation for all stakeholders of the organization/hospital especially the patients. The major goal of nursing research is to confirm and expand the present body of knowledge. Providing conducive and supportive environment enables the nurses to think out of box which ultimately leads to quality research and positive impact on patient care and satisfaction.

SOURCES OF ACQUIRING KNOWLEDGE IN NURSING

Nursing involves the care of sick and healthy with the help of using basic and advanced body of knowledge as well as use of scientific evidences in nursing practice at varieties of health care settings. To take appropriate clinical decisions, the nurses need adequate and appropriate knowledge and information. Majority of existing nursing practices are traditional and to validate and refine the traditional practices to evidence-based nursing practice, we need sources from where the knowledge can be shared and utilized in significant manner. The following are the various sources of knowledge in nursing professional practice:

- Tradition
- Expert knowledge
- Professional experience
- Trial and error
- Intuition
- Reasoning
- Research and literatures
- **Tradition:** It is a pool of knowledge, which is accumulated over a period of time (decades and centuries) and is passed from one generation to another generation through variety of means. Traditional nursing knowledge is acquired from textbooks, referral books, literature search and following the traditional practice as well as learning from the educational institutes related to nursing field. The traditional practice is usually developed from past experiences and plays an important role in influencing the current nursing practice. For example, it may be a traditional practice in nursing that handing over and taking over between nurses at various times and contexts. However, the practice has a significant contribution in assessment, continuity and follows-ups of care, to cater patient's safety issues like medication error, wrong identification of patient, wrong performance of procedure or intervention. Thus, the tradition has significant contribution in providing knowledge to the nursing fraternity.

- **Expert knowledge:** It involves the utilization of specialized sources of information, where the knowledge is acquired from the subject experts who have enormous knowledge through experience, decision making and practice. For example, the novice nurses and researcher may find it difficult to make decisions related to nursing care, wherein the experts help for decision making; which helps the nurses to practice in a systematic and scientific manner. It is in congruence with the famous quote that "experience counts and makes a man perfect" and nursing is no exception.
- **Professional experience:** An individual's personal educational qualification and experience in various fields of nursing enables him to acquire specific knowledge and comprehensive understanding of concepts, theories and scientific nursing practices. The personal and professional experience can be obtained through education, training, sensitization programs as well as through work experience (professional practice). The experience of practice makes the nurses to take appropriate decisions, critical thinking and utilize evidence-based nursing practice.
- **Trial and error:** It involves use of multiple alternatives or interventions, which help in identification of the best alternatives for the specific problem. This method is commonly used in day-to-day activities of nursing, however, it has a chance of failure of alternatives which leads to endangering the life and other vital function. Trial and error can be for routine care activities and help to discover new knowledge, and cues for management, however, it has limited scope of knowledge and utilization during emergencies.
- **Intuition:** It is an insight or understanding of an event or situation as a whole without logical reasoning. It is nothing but utilization of knowledge and experiences in appropriate manner for making proper judgments. In research it is a process of developing generalization from specific observations. In simple term, it is nothing but sixth sense without conscious logical thinking where the rationalization of information may not be obtained. Many a times intuition has proved to be false when it is tested scientifically.
- **Reasoning:** The inductive (development of generalization from specific observations) and deductive reasoning (development of specific prediction from general principles) are useful for comprehensive understanding and organization of phenomena, which have significant role in the research and knowledge and theory generation.
- **Research and literatures:** Research carried out in scientific and objective manner helps in gaining



and generation of knowledge, which is scientific and evidence-based. It is the most accurate and reliable source of knowledge and information for the medical and nursing fraternity. The number of research findings are available in the form of archives or in databases as literature; the literature search makes the researcher and the practitioners more wise and knowledgeable to carry out the medical and nursing practices.

SCIENTIFIC METHODS

It is defined as controlled and systematic investigations that are driven based on objectives to generate general knowledge of natural phenomena. A scientific method is a orderly and systematic process, and its findings are based on the empirical evidences. The findings are scientific work can be generalized and the course work is always carried out based on hypotheses to test the theories or develop the theories.

The fundamental purpose of scientific method is—description, exploration, explanation, prediction, control, identification and assessment of facts/phenomena.

Steps of Scientific Method

Scientific method is a cyclic process of identifying truth in systematic manner, which minimizes the errors. It is always pragmatic in nature, i.e. experimentation which helps to discover the truth or science behind the action or reaction. Scientific experiments are carried out to assess the relationship between cause and the effect variables and help to develop hypotheses, and evaluate the experiments. It reduces the bias and a prejudice in relation to experiments as scientific methods enhances generating new knowledge or observations. It possesses the significant attributes of empirical (experimentation) and generalization of findings with the universe.

The steps of scientific method are cyclic in nature, which are depicted as follows (Fig. 1):

- **Step 1: Define question:** Scientific method always starts with a specific question, i.e. what, why, how, where, when, who, which—that needs to be answered via experimentation and observation. It is required to see that whether the question is feasible for experiment.
- **Step 2: Perform background research and review of literature:** The question will be answered scientifically without bias, provided if we perform review and background research as a pilot testing to find the best method to conduct the experiments.

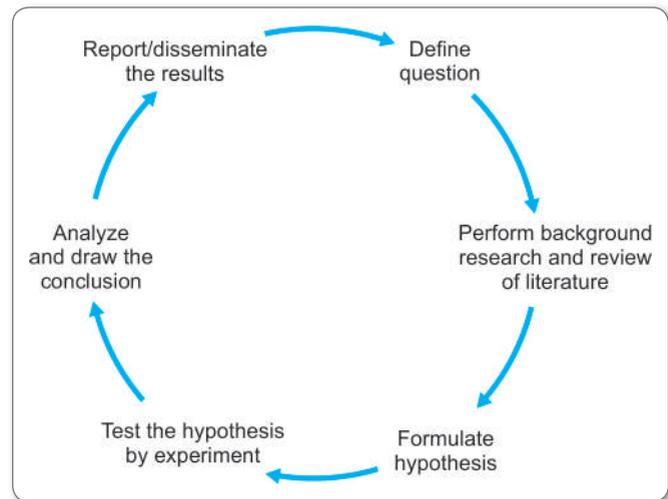


Fig. 1: Steps of scientific method

- **Step 3: Formulate hypothesis:** It is a statement which shows how things work and are related to each other. In simple term it shows “if I do this what will be the likelihood of event”. Further it should be formulated in congruence with the question.
- **Step 4: Test the hypothesis by experiment:** Test the hypothesis with experiment. Perform it in a controlled environment with standard guidelines.
- **Step 5: Analyze and draw the conclusion:** The observation measurements or data are analyzed by using appropriate statistical methods to test the hypothesis whether true/false or accepted/rejected. If the hypothesis is false it leads to further refining of question in a different way and proceeds further.
- **Step 6: Report/disseminate the results:** After the completion of experiment, communicate the results in the form of report/manuscript/abstract to others in an educative forum or scientific meetings, etc.

DEFINITION OF RESEARCH

The word research derived from French word “*recherchier*” where “re” means “once again”, “afresh” and “search” means to “look for something”, to “examine closely”, to “try or to prove” etc. In simple term, research is nothing but re searching the existing facts or information or knowledge. The dictionary meaning of research is “a careful enquiry/investigation of knowledge”. The following are some of the definitions of research that are:

- Research is a careful enquiry or examination in seeking facts or principles and a diligent investigation to ascertain something.
—Clifford Woody
- Research is a systematic search for answer to questions about facts and the relationship between and among the facts.
—Shirly Charter
- Research is systematized efforts to gain new knowledge.
—Redman and Mory



NURSING RESEARCH

Definition

As like research, the following are the definitions for nursing research:

- Nursing research is defined as a scientific process that validates and refines existing knowledge and generates new knowledge that directly influences nursing practice. —**Burns and Grove**
- 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. —**Polit and Beck**

Core Elements

- It is a systematic process
- It is a search for new knowledge or deepens understanding of specific phenomena
- It is an activity that is planned and logical
- It is a search for an answer to a focused and specific question.

Needs

Research is an integral part of any profession and nursing is no exception. Research is done in every profession, however it needs to be carried out in a systematic manner without deviation from standard protocol. It is always said that “nursing is an art and science” where “art” is nothing but performing nursing interventions/procedures in skillful and competent manner in the nursing practice; whereas “science” is body of knowledge which comes from research outcomes that enables to develop, refine nursing body of knowledge. Most importantly research in nursing is one among the criteria for attaining professional status of nursing. Nursing research and nursing care is a cyclic process, where the problem arises from care aspects and questioning the theories. For solving the problems and answering questions, research needs to be carried out. The following are the needs for nursing research:

- Nursing research helps to generate theories and scientific body of knowledge which is paramount important for any profession including nursing
- Nursing research helps to validate, improve, refine and modify existing nursing procedures/traditional practices to evidence or research based nursing practices
- Nursing research results/outcomes help enormously all the stakeholders of health care system especially patients

- Nursing research helps to have insights on the recent trends and advances in nursing, and guides the professionals in appropriate and wise clinical decision making.
 - Nursing research helps in effective patient care management and cost-effective nursing care (ultimately nursing fulfills the need for serving the human kind)
 - Nursing research inculcates scientific reasoning, inductive thinking and develop rational use of decisions/interventions in nursing practice
 - Nursing research enables the nurses to know and understand the phenomena which is least known to others
 - Nursing research helps to widen the new horizons of nursing, to test theories as well as assess the effectiveness of specific nursing interventions
 - Nursing research inculcates a research culture (conduct, utilize and critique) amongst all nursing fraternity in the universe
- Nursing research always implies two aspects they are:
- Use of research methods (i.e. conducting research work)
 - Techniques to evaluate and guide nursing practice (i.e. utilization of research findings).

Conduction as well as utilization of research is interrelated and interdependent, where both are essential for the modernization and advancement of nursing practice.

Historical Evolution

Initially, the research evolved slowly in nursing profession which was initiated by investigations of Florence Nightingale in 19th century to current century. In the initial period the nursing research was focused on “nursing education” followed by “nurses and nursing roles,” “clinical nursing practice,” “development of scientific nursing knowledge” and currently focuses on “scientific evidence” for evidence-based nursing practices. The nursing research is the driving force in developing a scientific knowledge base for evidence-based nursing practice.

- **19th century:** In the mid 19th century, nursing as a formal discipline began to take root with ideas and practices of Florence Nightingale. Her concepts have contributed to the present values and status image of nursing and nursing research. The core idea of her system was promotion of health, prevention of illness and care of sick. She believed that systematic collection, exploration of data and analysis was important for nursing to evolve as profession with scientific background. It was well documented from the fact on collection and analysis of data related to the health status of British soldiers during the Crimean war which leads to variety of reforms in health (medical and nursing) care.



- **20th century (nursing research in first half of 20th century):** The history of nursing research can be categorized as early, i.e. first half (before 1950) and late i.e. second half (after 1950) 20th century. The nursing research in first half was focused on nursing education research. It was carried out by number of eminent nurse leaders, such as Lavinia Dock (1900), Anne Goodrich (1932), Adelaide Nutting (1907, 1912, 1926), Isabel Hampton Robb (1906) and Lillian Wald (1915), etc.
 - **Nuttings (1907):** The education and professional position of nurses; Nutting and Dock (1907) - History of Nursing; was the earliest study in nursing and nursing education. This revolutionary works consisted of documentation gathered for the purpose of reforming nursing education and established it as viable and long-lasting profession.
 - **Goldmark report** of United States emphasized the continued need for reforms in nursing and nursing education.
 - **Wald and Dock (1902):** Experimental project leads to the employment of school nurses in New York school system followed by other cities. Linda Richards was the first American Trained Nurse at Bellevue Hospital. She was the first nurse to keep written documents of patient care, which was used by medical fraternity for their investigations.
 - In 1913, the committee on public health nursing of *National League of Nursing Education* studied on infant mortality, blindness and midwifery. The committee called for nursing to distinguish its role in prevention of disease and promotion of health through knowledge and use of scientific approach.
 - **Isabel M Stewart (1920):** Development and teaching of the earliest nursing research course titled “Comparative Nursing Practice” which was taught firstly by Smith followed by Henderson. It introduced a scientific method of investigation of the students. Similarly in this period, the case studies appeared in American Journal of Nursing (AJN).
 - **Clayton (1927):** Nursing studies were focused on improving nursing techniques, such as hand washing procedures and thermometer disinfection techniques.

Social change and World War II affected all aspects of nursing research, wherein investigations focused on hospital environment, nutrition, nursing status, nursing education and nursing shortages, etc. After the war, nursing fraternity began to reassess itself and its goals. In 1948 ‘*Nursing for Future*’ by Esther Lucille Brown was published, which emphasized the inconsistencies in educational preparation and the need to move in standard pattern (university) of education.
- **Nursing research in second half of 20th century:** The nursing research started to bloom in this period, where courses related to nursing research were included in graduate programs. There was inception of “Journal of Nursing Research” dedicated to the promotion of research in nursing.
 - **In late 1950s,** there was reordering of research priorities and targeting of practice-oriented research which was supported by the American Nurses Association. During this period nursing studies were conducted in collaboration with social sciences and medicine.
 - **In 1955,** American Nurses Foundation was chartered as center for research followed by national level of American Nurses Association a Standing Committee on Research and Studies was formed. The committee was charged with planning, promoting and guiding research and studies related to the functions of association.
 - **During 1960s and later,** there was development of number of nursing theories and concepts by theorists like Ida Jean Orlando (1960), Hildegard Peplau (1952) and Ernestine Widebach (1964) called for development of nursing practice based on theories. The theories enabled the nurses to think critically in implementation of nursing services.

Study of Nursing and Nursing Education Report (Lysaught Report: 1970)—recommended that there must be more practice-oriented and education-oriented research, which was necessary for improvement of educational organization and curriculum and practice.
 - **In 1970s,** there was a growth in the number of masters and doctoral programs for nursing, which supported nurses well in learning research, there by enhancing the quality of care. Journal of Advanced Nursing (JAN), a premier international journal for nursing research began to be published.
 - **In 1980s,** a variety of clinical journals were published in large numbers as well as increased funding for nursing research activities. In 1986, the National Center for Nursing Research (NCNR) at National Institutes of Health (NIH) came into existence in the United States of America (USA) which promoted nursing research through funding and training etc.



- **In 1990s**, research on health promotion and illness prevention were focused as people moved toward improving the quality and quantity of their lives.
- **21st century:** The commencement of 21st century witnessed a surge in nursing research globally including India. A number of scientific platforms came into existence where nursing professionals could communicate their research findings to the community with mutual exchange of information and facts etc. Online journals (electronic version), open access journals and peer reviewed system improved the quality and standard of scientific work published by journals. The index status of journals enabled the scholars to view articles globally and maintained standards or quality of research work. Organization of international and national conferences and conventions enabled the nurses to share their facts and findings with others which ultimately led to change in nursing practice.

Current Trends in Nursing Research

Following are the certain trends in the beginning of the 21st century, which were evident from literature. There was an increased focus on outcomes research, and biophysiological research. The current researchers are focusing on promotion of evidence-based practice and development of a stronger scientific knowledge base. It focuses on strengthening of multi- or interdisciplinary collaborative research and expanded dissemination of research findings and emphasizes for increasing the visibility of nursing research.

Box 1

Evolution of nursing research

1856	: Florence Nightingale offered research based nursing practice
1989	: Nightingale published Notes on Nursing – What it is and what it is not?
1900	: American Journal of Nursing was published
1910	: TNAI began to publish Nursing Journal of India
1924	: First doctoral degree in nursing was started
1936	: Sigma Theta Tau International was formed
1947	: Nuremberg code for research came into existence
1948	: Universal Declaration of Human Rights
1950	: Adaptation of Code of Ethics by American Nurses Association
1964	: Declaration of Helsinki adopted by World Medical Association
1966	: TNAI established Research Section
1970	: Standards for Clinical Practice developed
1973	: First nursing diagnosis conference conducted

Contd...

Box 1

1975	: Development of Nursing Research center at RAK Collage of Nursing
1977	: The Royal College of Nursing Code for Nurses in Research
1978	: Initiated focus on qualitative research
1980	: ICMR policy statement on ethical considerations
1982	: WHO International guidelines for biomedical research
1983	: ANA Center for Research for Nursing established
1985	: ANA guidelines for research, human rights guidelines for nurses in research
1986	: National Center for Nursing Research started
1987	: Nursing Research Society of India established
1994	: Publication of qualitative researches
2000	: Indian Council of Medical Research released ethical guidelines of research
2000	: Society of Midwives (SOMI) established
2005	: National Consortium for PhD in nursing established under INC
2009	: Central Institute of Nursing and Research established under TNAI

Areas of Conducting Research

The types of research activities can be carried out in different areas, must be in congruence with need of profession and society as well. The common areas of conducting research in nursing are:

- **Environment:** It has larger scope to carry out research, which was first focused by Florence Nightingale (pioneer of nursing). The focus areas of research in environment are condition of living, safe water and air, sanitation, disposal of waste, biology and epidemiology, where the researcher can conduct variety of scholarly studies.
- **Management:** Development of management policy, guidelines, strategic planning, health economics, management studies, performance appraisal and evaluation of training are the areas of conducting research.
- **Family and society:** Behavioral sciences, epidemiology, social structure, social process, community participation and community participation and development, etc are the areas of research under family and society.
- **Care or treatment:** Clinical trial, biomedical waste, behavioral science, epidemiology, effectiveness of care, operational research, affordability and accessibility of care, etc. are the common areas of conducting research.
- **Government policy and scheme:** Health needs, effectiveness of policy/scheme, equity of resources, awareness, coverage and optimum utilization, development of adequate monitoring and evaluation procedures, etc. are the scope for research work under this category.



Characteristics of Good Research

Research is needed to discover, verify, and refine the professional knowledge through systematic enquiry, and it is an ultimate way to develop the nursing knowledge. The nurse must have basic understanding on research, wherein following are the characteristics of research. These features are vital for the research process and need to be adhered strictly to carry out scientific research activities.

- **Goal/result oriented:** Research is always carried out to find results, which is helpful in modifying the existing nursing practice. However, to achieve concrete results the study needs to be carried out with focused aim and objectives as well as clear statement of problem.
- **Logical and systematic activity:** Research must be carried out in systematic manner by considering standard guidelines and protocols (without any deviation).
- **Cause and effect:** Research establishes the relationship between cause (independent variable) and effect (dependent variable). It enables to identify the precise impact of intervention or treatment on the study variables.
- **Careful record and reporting:** In research, the collected data are recorded carefully and the same are coded, tabulated and analyzed appropriately with statistical methods. After the analysis of results, it should be presented or reported in suitable forum, thereby the patients and society will be benefited at large.
- **Avoid subjectivity:** In research, subjectivity in selection of participants, settings, collection and presentation of data (fabrication, manipulation) must be avoided by the researcher. Thus the research shall be scientific, rationale and leads to empirical evidence. Here researcher must always avoid personal feelings and preferences.
- **Control:** Control is one of the significant components of experimental research, wherein researcher needs to control number of extraneous variables to get precise and accurate result from the participants without the influence of extraneous variables.
- **Ethical aspects:** Research activities resolve around the human beings, wherein study of participants needs to be valued by considering ethical principles like consent, confidentiality, anonymity, justice, beneficence and nonmaleficence.
- **Replicability and reproducibility:** The research shall be replicated at different settings or samples or using same interventions to get the reproducible results so that the results can be validated and draw conclusive results.

Criteria of Good Research

Research is a scientific endeavor, which involves a rationale approach in finding answers to the questions. The goal of

good research is to gain new knowledge thereby modifying the existing practice on scientific basis. The good scientific research must fulfill the following criteria:

- Good scientific research should have clear statement of problem and the purpose/objectives
- It should have adequately described research methodology and design (procedure)
- The data must be collected rationally with help of appropriate data collection tools and techniques
- The tools used in research must be standardized one (validity, reliability and pilot tested)
- It should be systematic, logical, reliable and bound to consider ethical principles
- Research must have randomized selection of sample, and controlling of extraneous factors
- Researcher must be committed to present the honest results without any distortion of findings, and avoids subjectivity in research work.

Types of Researches (Table 1)

Conducting research is quite laborious, which requires research knowledge, skills and experience. It is mandatory for the researcher before undertaking any kind of research that they firstly understand the different types of research and the availability of resources for conduction of research. The primary purpose of research is to generate new knowledge and information useful for the community.

There are different types of researches which can be classified based on its purposes, its processes and its outcomes. The common types of researches are as follows:

Based on Process

- **Quantitative research:** It is a formal, objective and deductive approach in problem solving. Quantitative research collects numerical data in order to explain, predict and control phenomena of interest, and the data analysis is statistical. The common quantitative researches are descriptive research, correlational research and experimental research, etc. where the goal is to generalize the findings. **Example:** What is the effect of hand washing in prevention of infection among hospitalized patients?

Table 1: Types of researches

Based on process	Based on purpose	Based on outcome
○ Quantitative research	○ Explorative research	○ Basic/Pure research
○ Qualitative research	○ Descriptive research	○ Applied research
	○ Analytical research	○ Clinical research
	○ Predictive research	○ Action research



- **Qualitative research:** It is a systematic, subjective approach used to describe life experiences and give them meaning. The common characteristics are—it is always carried out in natural settings, intuitive in nature where the human beings are considered as instruments. Data analysis includes the coding of data and production of verbal synthesis. The common qualitative researches are ethnography, phenomenology grounded theory, etc. where the findings are not generalizable. **Example:** What is the experience of hope in women suffering with advanced breast cancer?

Based on Purpose

- **Explorative research:** The explorative research focuses on investigation of full nature of the phenomena or variable under study including its manifestation and associated factors, etc. rather than just description of variable. The descriptive study on assessment of pain among postoperative patients, here the researcher interested in assessing the level of pain the patient actually experiences. However in explorative study, the researcher might be interested in assessing the factors influencing the level of pain, and associated biopsychological problems of pain. It helps to understand the variable in holistic manner. **Example:** Assess the experience of yoga therapy among institutionalized elderly.
- **Descriptive research:** Description of phenomena or variable is an imperative purpose of research. The research describes clearly, what the variable is as well as how the variable is influenced with other factors. The examples of variables in nursing are pain, stress, anxiety, depression, adaptation, awareness, practice, attitude, belief and behaviors, etc. In quantitative research, descriptive study focuses on prevalence, incidence, size and measurable attributes of phenomena, whereas in qualitative research, it describes the dimensions, variations and importance of phenomena. **Example for quantitative descriptive research:** A study to assess the incidence and prevalence of anemia among antenatal mothers in rural area. **Example for qualitative descriptive research:** A study to describe the pain experience and its associated factors among postoperative orthopedic patients. In simple words—Descriptive research focuses on what is going on? Whereas explanatory research focuses on why it is going on?
- **Analytical research:** Analytical studies identify and quantify the associations, and identify causes and find whether there was an association existed

between variables under study. It usually compares two or more groups or sets of data, and evaluates the facts and information relative to the research being conducted. Randomized control trial, case control study and cohort studies are the examples of analytical studies. **Example:** A study to assess the association of sociodemographic variables with reality shock among novice nurse educators

- **Predictive research:** The research focuses on prediction and control of phenomena based on research findings where the explanation of variable is difficult. It has the ability to predict the future occurrence/changes in the variable, which helps in making appropriate decision in clinical practice. For example studies have found that late pregnancy does have increased chance of congenital abnormalities. Based on previous data, the researcher can be able to predict the chance of occurrence of congenital abnormality by performing amniocentesis for the women aged above 35 years, which can be partially controlled by genetic counseling and proper antenatal education, etc. **Example:** A study to assess the effectiveness of education program on cessation of smoking among adults of rural area.

Based on Outcome

- **Basic research:** Basic is called fundamental or pure research, the basic researches are usually carried out to broaden the base of knowledge in a specific discipline as well as generate new theories and refine existing theories. Here researcher has pursued their own ideas for a long time before nursing application. **Example:** A study on assessment of grief and grieving process. Here the study is focused on assessing general principles of human behavior and biophysiological processes.
- **Applied research:** It is otherwise known as integrated research, it is always carried out to develop existing practice thereby the patients and community at large will get benefits. Here in applied research, there is an involvement of experts from the various fields (medicine, physiotherapy, social scientist, anthropologist, language expert and legal representatives) for the development of innovative procedure or treatment. It focuses on finding solutions for the existing problems, which helps in evidence-based practice. These types of studies are used for utilizing/application of principles of human behavior and how best can be done to solve the problems in nursing practice. **Example:** A comparative study to assess the effectiveness of heparinized saline versus



normal saline flush on prevention of venous occlusion of peripheral venous catheters.

- **Clinical research (trials):** It is a research done before using any clinically relevant treatment or drugs on healthy individuals or patients. It is very important for any researcher to conduct clinical research involving any kind of new treatment or modification of treatment or drugs, the study must be registered in Clinical Trial Registry of India (CTRI) for the transparent research process and results. **Example:** A study to assess the efficacy of magnetic therapy on acute pain among CABG patients.
- **Action research:** Action research (otherwise called reflective research) is usually concerned with generating knowledge about a social system, wherein at the same time, attempting to change it. It is an evaluative, investigative and analytical research with aim of diagnosing the problems and weakness in existing system or practice and improves the existing system. Action research is commonly used in social system, education and health care system practice. **Example:** A study to assess the effectiveness of instructional media in enhancement of knowledge and skill among nursing students.

Scope of Nursing Research (Fig. 2)

The nursing research mainly based on biological, behavioral and psychosocial, which provides scientific basis of the care of individuals according to their age, and other biological characteristics. It has wide scope in the following areas such as nursing practice, nursing education, nursing administration and health care system.

- **Research in clinical practice:** The scope of nursing research in clinical practice ranges from the basic assessment or examination of specific patient to testing the effect of nursing interventions, illness prevention, care of patient, family and community in diverse settings. The nursing research mainly focuses

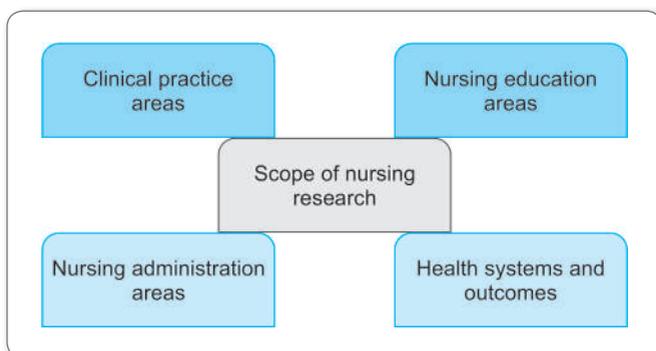


Fig. 2: Scope of nursing research

on health promotion, restoration of health and rehabilitation of patients. In nursing, researcher has expanded the scope for assessing the sociocultural and religious influence on health and illness as well as understanding the complex human beings through scientific enquiry. There is always a scope for interdisciplinary research activities along with physiotherapy, sociology, psychology, anthropology and faculty of medicine, dentistry and other allied health sciences. The following are the research areas

- Health promotion, illness prevention, and restoration of health care setup
- Standards and quality of nursing in health
- Coordination of care, delivery of care including the interdisciplinary approach of care
- Palliative care, hospice care and end of life care
- Action research and transactional research
- Home care and community health care practices
- Testing the effect of treatment and its compliance
- Role of physical, psychological, social, spiritual and environmental aspects in health and illness
- **Research in nursing education:** The primary purpose of nursing education is to impart quality education, training and skills in relation to patient care among the nursing professionals. The scope of research in education focuses on educational methods, teaching and learning activities, role of educational technologies and other newer techniques (computer-assisted learning, computer programmed instructions, e-learning). There is always a need for regular and specific research work on nursing education to refine the existing curriculum and teaching and learning methods as per the needs of hour. The following are the common areas for nursing research on nursing education:
 - Testing the effectiveness or efficacy of various teaching and learning methods used in nursing education
 - Test the methods for enhancing the acquisition of knowledge (cognitive), skill (psychomotor) and attitude (affective) domains of nursing education
 - Research on educational psychology and role of linguistics
 - Refining the existing evaluation (formative and summative) methods in nursing education
 - Measures to minimize the behavioral problems, psychological issues and motivational problems
 - Testing the effectiveness of various methods for educating the masses/large community



- **Research in nursing administration:** The administration and management is an integral part of nursing in educational and clinical practice. There is always a need for minimizing and overcoming the shortfalls in management areas. The research in management areas enhances the smooth functioning of organization of nursing services and proper personal management. The following are the areas where there is a need for scientific work:
 - Exploration of existing management activities including structure, functions, line of authority, span of control, personal management, grievance redressal and performance appraisal, etc.
 - Developing different administrative models, systems in enhancing the existing nursing management
 - Measures to improve the customer satisfaction, techniques to get comprehensive feedback from all stakeholders.
 - Formulation of policies and procedures for faculty recruitment, training and education methods, faculty welfare services, and measures to retain the employees, etc.
 - Testing of various operative models of implementation of nursing services and measures to maintain the quality and standards in nursing care delivery
 - Studies can be performed in relation to the issues related to nursing administration and managerial issues
- **Research in health systems and outcomes:** The delivery of health care services plays a vital role in achieving the government goals, schemes, programs and policies, etc. Always there is a need for research in health systems to test the effectiveness and utilization of schemes, programs and programs which enables the policy makers to modify and refine the existing system and program. Along with medical, social and epidemiological research, nursing research also plays a vital role in identifying the lacunas in existing policy, system and its utilization among various stakeholders. The common areas where the research activities are required in health systems and outcomes:
 - Testing the existing models of health care delivery and assessing the affordability and accessibility to diverse people at varied geographical locations
 - Developing the cost-effective models or systems of health care delivery for the tribal, rural and other under privileged population
 - Role of information and education and communication system and impact of information technology in patient care and education

- Role of quality control measures and related organizations, as well as to test the structure, process and outcome of health care delivery system

Problems in Nursing Research (Fig. 3)

The research is carried out in natural as well as in laboratory settings. Usually there is no such limitations or problems when the research is conducted in laboratories and controlled environment. However, when the research is conducted in natural settings on human beings there is always scope for problems and difficulties on various aspects. Following are the areas of problems in nursing research conducted in natural settings.

- **Practicability:** As the research is carried out on human beings, there is always an existence of problems in conduction of research. Though the research topic may be novel, interesting and innovative, it may have problems in feasibility or practicality of research in natural settings. The practicality of research is generally related to participation of human beings in the research, ethical implications, availability of resources, etc.
- **Use of many variables:** Research in nursing is usually conducted on the areas like health, illness and social sciences. When the researcher involves in many numbers of variables to be assessed or studied in a given single study, there is always a scope for problems and difficulties. However, it may be possible when we use adequate resources, manpower and other logistical arrangements, the multiple variables can be studied in a single study.

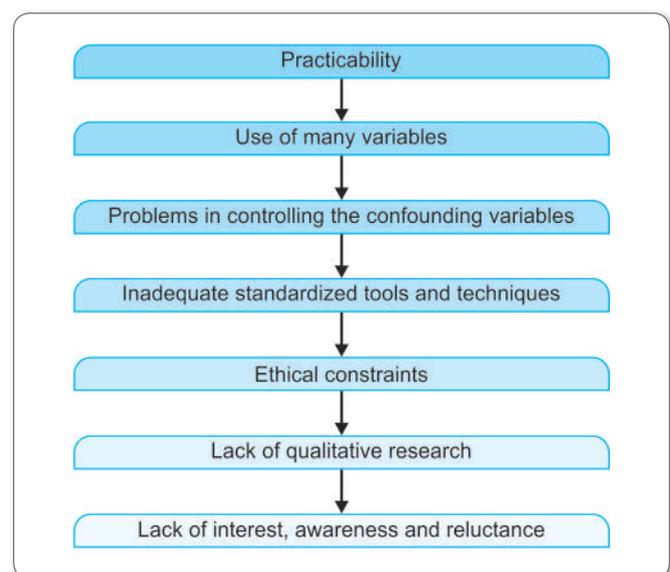


Fig. 3: Problems in nursing research



- **Problems in controlling the confounding variables:** Nursing research is usually conducted in natural settings where the study results are difficult due to control of external factors. The external factors or extraneous (confounding) has effect on dependent variables thereby the researcher may not be able to identify the precise effect of independent variable on the dependent variables.
- **Inadequate standardized tool and techniques:** Research in nursing and social sciences requires standardized tools and techniques for the assessing and testing the phenomena under study. Though, there are numerous standard tools (like WHO QOL scale, hospital anxiety and depression scale, numerical pain scale, etc) still there is inadequate standard tool in number of phenomena in nursing for the data collection.
- **Ethical constraints:** Research involving human beings is always bound with the ethical principles of research and the guidelines given by Indian Council of Medical Research. The consent, fairness and safeguarding privacy and confidentiality are important in research among human beings. The ethics committee approval for the study is essential before carrying out the scholarly work, wherein it is always not possible in nursing research where the majority of studies are descriptive and qualitative. The legal and ethical aspects of research lead to problems of nursing research.
- **Lack of qualitative research:** In nursing, qualitative research is considered to be the best if study is related to nursing, health and social sciences. However, we find majority of researches in nursing are quantitative and descriptive research, there is a need for qualitative research and mixed method research to understand the lived experiences, cultural aspects, etc.
- **Lack of interest, awareness and reluctance:** The other factors like lack of interest for conducting research, lack of awareness on research process and research methodology and reluctance to change from traditional nursing to modern and evidence-based nursing.
- Conceptual utilization refers to the use of findings to enhance one's understanding of a problem or issue in nursing
- Symbolic utilization is the use of evidence to change the mind of other people, usually decision makers to make changes in conditions, policies and practices relevant to nurses and patients.

Research consists of activities designed to test a hypothesis, permit conclusions to be drawn, and thereby to develop or contribute to general knowledge. Practice consists of interventions designed solely to enhance the wellbeing of an individual, and that has a reasonable expectation of success. Research utilization is vital to promote evidence-based practice in the critical care area, where nursing practice continues to grow in complexity and nurses have greater responsibility and accountability for patient care. Research evidence has assumed priority over other sources of evidence in the delivery of evidence-based health care. Although, practice and research often occur together and influence one another.

EVIDENCE-BASED PRACTICE

Evidence-based practice is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of the individual patient. It means integrating individual clinical expertise with the best available external clinical evidence from systematic research.

It is the integration of clinical expertise, patient values, and the best evidence-based research into the decision-making process for patient care. Clinical expertise refers to the clinician's cumulated experience, education and clinical skills. The patient brings to encounter his or her own personal and unique concerns, expectations and values. The best evidence is usually found in clinically relevant research that has been conducted using sound methodology.

EVIDENCE-BASED NURSING

The process by which nurses make clinical decisions using the best available research evidence, their clinical expertise and patient preferences, in the context of available resources.

Why Evidence-based Practice?

- To ensure that the care delivered is appropriate and cost effective (better patient outcome)
- To reduce variations in clinical practice
- To assist health professionals to make evidence-based decisions on health care

Research Utilization

Research utilization refers to the use of research findings in practice to improve care. Research utilization occurs at three levels—instrumental, conceptual and symbolic.

- Instrumental utilization is the direct, explicit application of knowledge gained from research to change practice (allows the nurse to change nursing practice)



- Provide consumers with information to make informed decisions
- To provide advance quality of care by nurses
- To increase the satisfaction of patients
- To focus on nursing practice away from habits and tradition to evidence and research

Sources of Evidence-based Nursing Information

- **Systematic review:** It is a method of summarizing the findings of all methodologically sound studies addressing the same research question.
- **Evidence-based journals:** Rather than publishing original research, the objective of these journals is to summarize those studies that are valid and clinically useful. The journals are ACP journal club, evidence-based medicine, evidence-based cardiovascular medicine, evidence-based health policy and management, evidence-based mental health, and evidence-based nursing. Though they are similar in format they provide a brief description of evidence-based nursing.
- **Centers for evidence-based nursing:** In the past few years, a number of countries, including the UK, Canada, Germany, New Zealand, Australia and others, have created centers for evidence-based nursing. The goals of these centers are—to educate nurses through workshops/formal courses based on evidenced based nursing practice, education and research; to conduct original research and systematic reviews; and to design and evaluate strategies for disseminating research findings to nurses.
- **Evidence-based practice guidelines:** Clinical practice guidelines are systematically developed statements to assist practioner's decisions about appropriate health care for specific clinical circumstances. Guidelines can be used to reduce inappropriate variations in practice and to promote the delivery of high quality, evidence-based health care. It is based on the best available research with feasibility, reviewed regularly and modified to incorporate new knowledge evidence.

Steps Involved in the Practice of Evidence-based Nursing (Fig. 4)

- Construct a question - PICO (Patient or Problem, Intervention, Comparison Intervention and Outcomes)
- Track down the evidence
- Critique evidence for validity, impact and applicability (Systematic review)
- Integrate knowledge gained into practice (develop clinical guideline/protocol)
- Evaluate the effectiveness of change (audit/research)

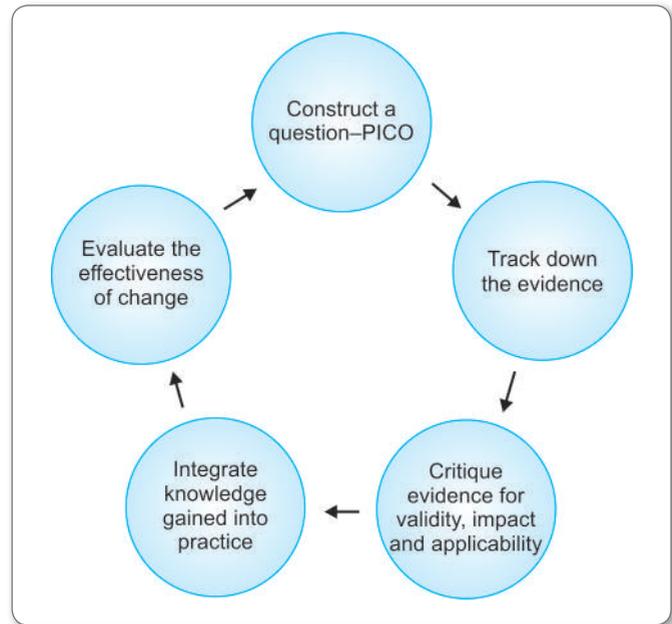


Fig. 4: Steps involved in the practice of evidence-based nursing

Hierarchy of Evidence and Research

The hierarchy of evidence has evolved as a response to the notion that some research designs, especially those using quantitative research to provide evidence of effectiveness. The most common type of hierarchy places the evidences gathered through research at the top and others were below.

Hierarchy (levels) of evidence

- **Level 1:** Evidence from a systematic review of multiple well-designed randomized controlled trials
- **Level 2:** Evidence from one or more well-designed randomized trials
- **Level 3:** Evidence from experiments without randomization or from single before and after studies, cohort, time series or matched case controlled studies or observational studies
- **Level 4:** Evidence from well-designed descriptive studies or qualitative research
- **Level 5:** Opinions from expert committees or respected authorities based on practice-based evidence
- **Level 6:** Personal, professional and peer expertise and experience

This hierarchy of evidence is appropriate for research questions that are seeking an answer about what works. **Example:** If the nurse wants to know the best way to dress a particular type of wound such as burns, then the above would help in making decisions about the best type of evidence. This would be well-designed randomized controlled trials, or even better, a systematic review of randomized controlled trials. However, if nurse wanted to develop understanding about what it feels like having severe burns, so that they could develop their



communication and empathetic skills, then qualitative research would be more informative.

Limitation of Evidence-based Practice

- Shortage of research in some areas of nursing especially effectiveness of nursing care
- Nurses are not adequately trained in skills of evidence-based practice like literature search, reviewing, critical appraisal, audit and changed management
- Nurses in practice may be hampered in their search for evidences (time constraints)

The limitations can be overcome with help of education and training; there are ways to find the evidences these are: Cochrane reviews (systematic reviews of healthcare interventions and promotes the search for evidence in the form of clinical trials and other studies of interventions), Effective health care bulletins (based on a systematic review and synthesis of research on the clinical effect, cost effectiveness and acceptability of health service interventions) and National institute for clinical excellences (an independent organization responsible for providing national guidance on promoting good health and preventing and treating ill health).

BASIC TERMINOLOGY RELATED TO RESEARCH PROCESS

It is required for the researcher to understand the basic terms used in nursing research. The basic terms used are described as mentioned below:

Abstract: A brief description of a completed or proposed study, usually located at the beginning of a report or proposal.

Problem statement: The statement of the research problem, often phrased in the form of a research question where the researcher wants to answer the questions.

Quantitative research: It is a formal, objective and deductive approach in problem solving. Quantitative research collects numerical data in order to explain, predict and control phenomena of interest.

Qualitative research: The investigation of phenomena, typically in depth and holistic fashion, through the collection of rich narrative materials using a flexible research design.

Variable: An attribute of a person or object that varies, that takes on different values (e.g. temperature, age, heart rate).

Extraneous variable: A variable that confounds the relationship between the independent and dependent variables and that needs to be controlled either in the research design or through statistical procedures.

Objectives: Research objective is the result sought by the researcher at the end of the research process, i.e. what the researcher will be able to achieve at the end of research study.

Assumption: A principle that is accepted as being true based on logic or reason, without proof.

Hypothesis: A statement of predicted relationships between variables or predicted outcomes.

Conceptual frame work: Interrelated concepts or abstracts that are assembled together in some rational scheme by virtue of their relevance to a common theme.

Literature review: A critical summary of research on a topic, often prepared to put a research problem in context or to summarize existing evidence.

Research design: The overall plan for addressing a research question, including strategies for enhancing the study's integrity.

Population: The entire set of individuals (or objects) having same common characteristics.

Sample: A subset of a population, selected to participate in a study.

Sampling: The process of selecting a portion of the population to represent the entire population.

Validity: A quality criterion referring to the degree to which inferences made in a study are accurate and found well in measurement, the degree to which an instrument measures (what it is intended to measure).

Reliability: The degree of consistency or dependability with which an instrument measures an attribute.

Pilot study: It is a trial study carried out before a research design is finalized to assist in defining the research questions or to test the feasibility, reliability and validity of the proposed study design.

Data: The information collected during the course of a study may take the form of narrative information (qualitative data) or numeric values (quantitative data).

Data analysis: The systematic organization and synthesis of research data and, in quantitative studies, the testing of hypotheses using those data.

Research report: Report summarizes the measure element of the study and the contribution of that study of nursing knowledge.

Limitation: It is a factor that may or will affect the study, but is not under control of the researcher.

STEPS OF RESEARCH PROCESS

Conducting research is a vigorous and laborious activity for which the researcher needs to have adequate training and experience and better understanding of research process. It is always recommended to follow the guidelines



and procedure for conducting research activities. There are three common methods of nursing research which are: quantitative research, qualitative research and mixed method research (triangulation). The choice of design depends on statement of problem, and purpose of study. Regardless of any type of research, there are required steps to be followed for conducting the research.

Quantitative Research

Quantitative research is a formal, objective, rigorous and systematic process for generating information, which is carried out to describe new facts, findings, events or concepts. It is commonly conducted to examine the relationships among concepts, ideas or variables. It usually involves a specific intervention (treatment to test the effect of intervention), comparison (control to develop comparisons for interpreting results), and control of extraneous variables (to get unambiguous results). It collects numerical data in order to explain, predict or control the phenomena of interest. Quantitative research process involves the conceptualizing a research project planning and implementing the project and communicating the results.

Quantitative Research Process

The steps of conducting quantitative research are mentioned as follows (Fig. 5):

Step 1: Define statement of problem and purpose: Research problem is a situation which needs to be answered or find solution, and it is a most significant stage for initiating research activities. The research problem must be clear, focused and explicit in nature. The research questions/problems are always generated from daily clinical nursing practice, as well as the best research questions arise from the daily observations and past experiences. The other sources, which significantly contribute in identification of problem are—researchers insight, review of literature, recommendations of previous research studies and existing theories, etc. The purpose of research is to generate new or refine existing knowledge in the form of identify, predict, describe, or control the phenomena.

Step 2: Conduct review of literature: It is important for conceptualization of research problem as well as to have insight for research problem. It helps the researcher to understand and comprehend what is known and unknown about the research problem. Further, it helps to predict whether there is adequate knowledge (through primary and secondary sources) existing pertaining to the specific topic or there is a need for conducting research.

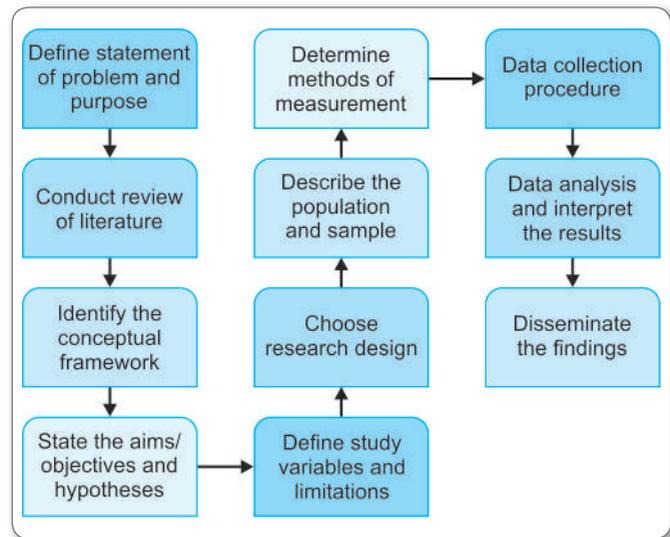


Fig. 5: Steps of conducting quantitative research

Step 3: Identify the conceptual framework: Framework is a guideline which enables the researchers/readers to connect the findings to body of nursing knowledge. Usually the theories and models from nursing and other discipline such as psychology, sociology, anthropology and physics, etc. are commonly used to guide the research in appropriate manner. Wherein the research scholars can develop conceptual framework based on the concepts or themes which is developed through field work.

Step 4: State the aims/objectives and hypotheses: Formulate the research aim, objectives and hypotheses for making the research more focused, concrete and systematic in nature. The research must have overall objective (aim) and specific objectives to achieve the overall outcomes of research. Hypotheses are formulated (usually in experimental studies) to identify the existing relationship between two variables under investigation.

Step 5: Define study variables and limitations: Study variables are the concepts or phenomena that are measured, manipulated or controlled in research. It can be classified as independent variable (cause) and dependent variable (effect) and the extraneous variables (confounding). The researcher must be clear that what variable he is interested in and how the independent variable produces effect on dependent variables, alongside how the extraneous variables influences the outcome of research. It is always important to control extraneous variables to have precise sample effect.

Limitations are the restrictions of study, which are focused and do not permit to generalize the results to whole population. Limitations may be individual difficulties (lack of skill and training), methodological limitations (lack of time, inadequate sample, ethical issues and lack of



standardized tools, etc.) which hinder the generalization of research findings.

Step 6: Choose research design: Research design is a blue print or backbone of research, which guides the researcher to conduct the study in systematic and time bound manner. The statement of problem, purpose and objectives will determine the selection of research design; and they are generally classified as quantitative research, qualitative research and mixed method research. Importantly, properly devised research methodology avoids numerous technical and ethical issues to be encountered during the study.

Step 7: Describe the population and sample: Population is infinite in nature which comprises of individuals, objects, elements and records, etc. which fulfills the inclusion criteria of research. Sample is a subset of population and finite in nature, which is chosen for conducting research work. The samples always represent the entire population and it must be determined by scientific methods rather than deciding by convenience (arbitrary method). However, before selection of sample there is a need to consider the availability and willingness to participate in study.

Step 8: Determine methods of measurement: The process of assigning numbers to the objects is based on certain guidelines. Here the tool (questionnaire, interview, checklist, observation, rating scale, etc.) is chosen to determine a specific variable of study, where the tool must be pretested, validated and reliable one to have valid and reliable data. In simple term the tools must be a standardized one.

Step 9: Data collection procedure: Data collection is the systematically prescribed procedure/plan for gathering data relevant to the study (consider the objectives and hypotheses) with help of specific tools. The data are generated by conducting survey or by experimentation with help of using variety of tools as per the variables to be investigated. The researcher needs special training for data collection procedure as well as how to use the research tools in comprehensive manner.

Step 10: Data analysis and interpret the results: After the data collection, the data are coded, tabulated and analyzed with help of descriptive and inferential statistics wherever required. It is carried out primarily to assess whether the objectives and hypotheses are achieved or otherwise carry research. The analysis helps to interpret the results and draw inference. Based on the types of data they are presented appropriately for better understanding of readers.

Step 11: Disseminate the findings: The research is said to be incomplete, if the result of the research is not

communicated to others or society. There are many methods to communicate, they are—writing manuscript, abstract, article, monograph, thesis, dissertation and oral and poster presentation at conferences, etc. Once the findings are disseminated it must be utilized in clinical practice for the benefit of patients, and profession as a whole.

Qualitative Research

In quantitative research, the researcher follows predetermined steps, whereas in qualitative research the researcher can make numerous decisions and revisit the research process in circular fashion. The researcher himself may not know in advance how the study will proceed in the field. It is the systematic, interactive, subjective approach used to describe the life experiences as well as to give them a meaning. In simple terms, it is a research carried out to discover the meaning/theme rather than cause and effect relationship. The unique characteristic of qualitative research is selection of sample, data collection and data analysis, which take place simultaneously. The qualitative studies cannot be described in a linear fashion.

Qualitative Research Process

The steps of conducting quantitative research are mentioned as follows (Fig. 6):

Step 1: Identify the research problem: Research problem is a guide for deciding the research design and methods which enables to know the focus of research. Usually in qualitative research focuses on exploring the phenomena which is minimally known to others, and subjective in nature.

Step 2: State the research purpose: The qualitative research is used to explore the natural phenomena and its associated factors with broader scope, as well as to develop theories from social structure/process. The main purpose

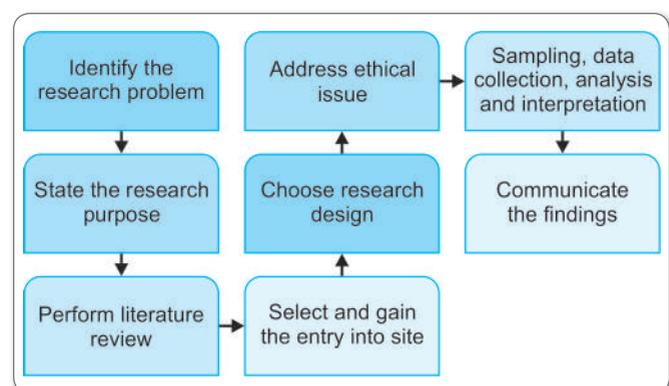


Fig. 6: Steps of conducting qualitative research



is to understand the subjective feelings or perception, and to discover the meaning rather than identifying the cause and effect relationship. It answers about “what”, “how” or “why” of a phenomena rather than “how many” or “how much”.

Step 3: Perform literature review: Reviewing the literature always helps the researcher to understand the existing solutions and facts, however it does not provide/explain new observations. The initial review helps the researcher to have insight into the problem and more familiar with the phenomena under study. However, many scholars suggest the review of literature should not be carried out because the previous knowledge on phenomena may influence the observation and interpretation leads to biased results.

Step 4: Select and gain the entry into site: After the basic understanding on research problem and review of literature, the researcher needs to choose the setting where the suitable participants available and the study phenomena will be observed and explored in detail. He has to choose the most appropriate site, as well as to get the access into the site by getting the permission from gatekeeper (e.g. village leader is a gatekeeper for getting entry in the village).

Step 5: Choose research design: Though the researcher may choose research designs in advance, new study design may emerge during the time of data collection and analysis of data. The commonly used designs in qualitative research are: Ethnography—study of culture, Phenomenology—study of lived experience, Grounded theory—study of social process and social structure and Case study—study of individual or group in detail.

Step 6: Address ethical issue: Qualitative research is conducted with help of direct observation and in-depth interview where the confidentiality, anonymity and privacy must be maintained. Moreover gaining entry into the research site is an ethical issue where no one is permitted to observe and collect information related to sensitive issues (patient rights must be protected).

Step 7: Sampling, data collection, analysis and interpretation: Here samples are not fixed one, it is flexible, similarly the studies can be carried out with smaller sample size rather than larger size. Mostly the samples are selected purposively instead of probability sampling methods. The data collection is done with help of variety of tools like interview, observation, focus group discussion and records and evidence; simultaneously data are analyzed (content analysis) and results/themes were drawn.

Step 8: Communicate the findings: Findings are communicated as quantitative research methods.

Table 2: Comparison between quantitative and qualitative research

Quantitative research	Qualitative research
○ Considered as hard science	○ Considered as soft science
○ More objective	○ More subjective
○ Deductive reasoning used to synthesize data	○ Inductive reasoning used to synthesize data
○ Focus is concise and narrow	○ Focus is broad and complex
○ It tests the theory	○ It develops theory
○ Basis of knowing is cause and effect relations	○ Basis of knowing and discovery of meaning
○ Basic elements of analysis – numbers and statistical analysis	○ Basic elements of analysis – words and narratives
○ Single reality that can be measured and generalized	○ Multiple realities that are continually changing with individual interpretation

Comparison of Quantitative and Qualitative Research

The quantitative research parallels the positivist paradigm and qualitative research parallels the naturalistic paradigm. Table 2 depicts the characteristics of quantitative and qualitative research in simple and understandable manner.

ETHICS IN NURSING RESEARCH

- **Ethics:** It is a moral code of conduct, which defines the right and wrong behavior in a civil society and comes from within individuals. For example: Asking for fees from the patients in case of natural calamities, is not a good ethical practice.

Ethics in research: It is a moral code of conduct to be followed in research activity. The basic **ethical principles** to be followed in nursing research are:

- **Autonomy (consent):** The participant does have independent decision making and his participation in research must be voluntary and not by force
- **Beneficence:** The participant must get benefit or purpose from the intervention/treatment while participating in research
- **Nonmaleficence:** Do not harm, i.e. the participants should not get any harm out of the treatment
- **Justice:** In research every participants must get the treatment, wherein the control group participants should not be left without intention as they are



entitled to get treatment, thus researcher needs to offer placebo or other treatment

- ❑ **Confidentiality and anonymity:** The researcher needs to maintain the confidentiality of participants information, which are sensitive and the identity should not be revealed to others. The information and data must be accessed only by the researcher and statistician not by others.

The Indian Council of Medical Research (ICMR) provided guidelines for conducting biomedical research on human beings. For nursing research, we follow code of ethics and American Nursing Association (ANA) guidelines for conducting research.

Importance of Ethics in Research

Ethics are the major component in research, and the researcher must adhere to the aims and methods of the research for imparting knowledge and outcomes. Following are the importance of ethics in research:

- Following ethics enables scholars to deal collaboratively to their study with help of their colleagues, supervisors and other contributors. This requires values like accountability, trust, respect, fairness, justice and autonomy among all parties in a study.
- Establishment and implementation of ethical consideration helps in protection of intellectual property rights of all contributors of research work
- Adhering to various ethical aspects makes accountability toward general public by protecting the human beings or animal used in the study
- It is important to follow the ethical principles for appropriate usage of public fund and gaining public support in research
- Applying ethical guidelines enables the participants to provide consent voluntarily without any influences, makes sure that the participants treated fairly and equally without discrimination
- Following the research, ethics shall certainly involve the benefit to participants as well as undoubtedly participant do not get harm from intervention or procedures of research
- Applying ethical principles positively maintains confidentiality and anonymity of data and participants identity.

Code of Ethics on Nursing Research

Ethics are the principle which deals with dynamics of decision making concerning what is right or wrong, where it can influence the previous consideration about choices and actions.

Code of ethics in research—it is a general principle of ethical conduct to be followed by research scholars to carry out the research work. The principles are applied to all the research scholars in various disciplines including nursing. It represents the inspirational goals and defines enforceable standards, which directs the researchers to the ethical course of action. It is mandatory that the code of ethics for research is followed scrupulously to carry out the scientific research in systematic and fair manner. Following are the code of ethics of research which needs to be followed by every researcher:

Principle of Respect and Protection

- Respect the autonomy of participants and therefore must obtain informed consent, and must follow the international norms to avoid harm to participants
- Respect the right of participants for refusing to participate research and withdraw their participation at any given time
- Ensure that the privacy and anonymity of participants and confidentiality of data must be scrupulously followed
- Respect the confidentiality and proprietary rights of our peers, colleagues, and students whose material we review for publication, presentation or funding by a grant
- Treat and recompense the every participants as fairly for their contribution and sacrifices by following the norms of justice and the avoidance of detriment
- Respect the role of cultural and individual differences of participants based on the age, gender, nationality, language and socioeconomic status
- Refrain from causing harm, stress or pain to the participants or animal that do not contribute substantial benefit to human society.

Principle of Transparency

- Refrain from accepting or undertaking research activity requires competencies that the researcher do not have, unless collaborating with or being supervised by knowledgeable scholar
- Aims, objectives, procedure and possible outcomes and benefits of research must be briefed clearly to the participants
- Follow the principles of honesty, transparency and scrutiny while communicating the research findings to the public
- Do not offer any financial or other inducements for their participation in the study
- Always be aware of potential conflict of interest related to sponsors, participants and investigators



- Avoid claiming or implying a degree of research competency that we do not possess.

Principle of Professionalism

- Always conduct research in accordance with the professional codes/guidelines of specific discipline
- Do not misuse the positions or knowledge as researchers for personal power or gain
- Always strive to achieve highest possible level of scientific quality in the research being conducted
- Provide proper acknowledgment and credit to resource/funding sources of research
- Grant and limit the authorship to those who made a significant contribution to the research work
- Do not plagiarize, i.e. to present portions of another's report or data as our own data, even if the other work or data source is cited occasionally.

Principle of Accountability

- Ensure that the researchers have an explicit written research mandate from participant, investigator and sponsor in terms of financial commitment, time framework, expected outcome and possible side effects, etc.
- The acceptance of mandate should be sealed by legally binding written contract or agreement between parties with specific terms agreed upon
- Recognize the right of participant, sponsor, and investigator and interference may jeopardize the integrity of research
- Ensure that only the correct data, information and research results shall be reported in journals, reports and conferences
- Avoid misleading statements or declarations and vague assertions that could be subject to misinterpretation.
- Avoid making exaggerated claims that are not warranted by the results of research study
- The scientific research carried out on human beings is governed by individual, community and social values. When nurse researcher participates in research activity they have to cope with value system of society, nursing and science. Thus the code of ethics in research enables the researcher to carry out the research work based on moral values. However, nurses must have awareness on these codes for flawless research work.

Informed Consent

It is a mutual agreement between researcher and participants for participating in the study. For getting

consent from participants requires open and honest communication between researcher and participant about the research purpose, procedure and outcome, etc. Consent is always voluntary process and participants does have liberty to withdraw from study at given point of time. Importantly the researcher needs to assure the participants that the anonymity and confidentiality will be maintained strictly. It is mandatory to take the consent in local (regional) language with presence of valid witness, and in case the participant is illiterate witness must be present. If the participant is incompetent, mentally challenged then a surrogate or guardian can give consent for them. If the study is conducted in community or villages, the researcher needs to get consent from village leader, panchayat head, and it is done in case of epidemiological studies. The researcher should not give any inducements for getting the consent for participation in study.

Process of Consent Procedure

Consent is taken from the participant (subject), and it represents the legal documents, it needs to be signed and dated with witness. In case of literacy issues thumb impression is allowed. The consent procedure must include the following elements which are:

- Purpose of research
- Expected duration of study
- Description of procedure/interventions
- Risk involved as well as the benefits
- Measures to maintain confidentiality
- Compensation, if any adverse effects
- The contact persons
- Right to withdrawal/refusal to participate. If all these components are communicated in local language, the consent will be incomplete and invalid one.

Elements/Information Included in the Informed Consent Form

Whenever the human subjects participate in research study, they need to be given adequate and comprehensive information to provide a truly voluntary and informed consent. Importantly, it must be provided in their preferred language at their reading level. The participants shall be provided with the following information, they are:

- Purpose/objectives of research
- Procedure/intervention involved in the research
- Data collection procedure and number of data collection points
- Actual and potential risk and discomfort (physical, psychological, social, economic or inconvenience, etc) to the participants



- Benefits of study to the society and individual
- Length of time the participant is expected to participate in the study
- Withdrawal or refusal of participation at any time and withholding the information
- Compensation if there is any adverse effects
- Contact details of the researcher(s) for clarification of research-related queries or in case of emergency
- Right to confidentiality and anonymity

It is mandatory that the above-mentioned elements should present in the informed consent format for the better understanding and voluntary participation in the research work.

Fresh/Re consent

Fresh consent is required if:

- There is a change in the treatment, procedure or protocol, etc.
- Participants regain consciousness from unconscious state
- Follow-up or study extension is planned
- Before publication, if there is possibility of disclosure of identity

Waiver of consent

Consent is not required if:

- Research is performed on publicly available information, document, records, reviews, archival materials
- Research on public health programs
- In emergency situations

Audio-visual Consent

Though it is not practiced in nursing research, it must be taken for the clinical/drug trials of medical studies. As per Hon'ble Supreme Court of India directives of November 19, 2013, it is mandatory to take audio-visual consent for all the clinical trials. The audio-visual consent must record the procedure of giving information to subject and his understanding, signing or putting thumb impression by the subject also recorded. The recording of images must be recognizable and audio must be clearly audible to others. These records need to be preserved safely for at least 5 years of duration.

Compensation for Participation

The participants may be paid for the inconvenience and time spent because of participating in research. In case of physical injury or disability, participants are entitled for financial and free ancillary care from the principal investigator (researcher), sponsoring agency or organization. All payments, reimbursement and medical services to be provided to the participants should be approved by Institutional Ethics Committee (IEC) and known to Clinical Trials Registry of India (CTRI).

Responsibilities of Researcher in Obtaining Informed Consent

Informed consent is a voluntary agreement provided by the participants to participate in the research study. It is not merely the form that is signed but it is a process where the participant understands the research, risk involved and benefits, etc. In every research it is mandatory requirement to obtain consent from all the participants. It is the primary responsibility of researcher which needs to be followed for every participant. The responsibilities of researcher in obtaining informed consent are:

- The researcher must ensure that the participants are informed thoroughly about the purpose of study, intervention/procedure to be undergone, potential risks and benefits of participation.
- The researcher must make sure that the participants are participating in the study willingly without any influence or inducements.
- The researcher must make sure that the consent document is written in language to be understood easily; and the same is explained clearly to the participant in their own language without any technical words
- The researcher must be certain that opportunity is given to ask questions about the study and the questions have been answered to their satisfaction
- The researcher must make sure that the consent is obtained from parents/guardians in case the participants of the study are children or minors
- The researcher must make sure that the participation is voluntary and participant shall withdraw from the study at any point of time without penalty
- The researcher must make sure that sufficient time is provided to consider participation in the study
- The researcher must make sure that the participant's safety, protection, respect, privacy and integrity of research is maintained
- The researcher must make sure that the consent does not take away any legal rights in the case of negligence or other legal fault of anyone who is involved in the study
- The researcher must make sure that the participants know about compensation provided if there is any adverse effects, and the contact persons
- The nurse researcher must make sure that above-mentioned responsibilities were followed without compromise, thus we can make sure that the research studies are carried out without bias. The Nuremberg Code envisages that the voluntary consent of the human subject is absolutely essential for the research activity.



Format of Consent

Informed consent is an ethical codes and regulations for research on human subjects, and the goal of consent process is to provide adequate information thus the

participant can make informed decision whether participate or not to participate in the research study without any inducement. Respect to individual autonomy is fundamental ethical principle of consent process.

Format of Informed Consent

Title of study: Must mention the title of study

Researchers: Include the name of all researchers including their contact numbers

Purpose/objectives of research: Include a statement on purpose of research and how research will be conducted, presented or reported

Role of participants: Include a statement on role and responsibility of participants, time commitment for participation

Risk and discomfort: Mention the actual or potential risk and discomfort for the participants, along with alleviation measures or treatment

Benefits of research: Reveal the benefits of research to the society and individual participants

Voluntary participation: Disclose that your participation is completely voluntary without any inducements, and you choose to withdraw at any given time.

Withdrawal from study: State that you may stop participating in the study at any time for any reasons, if you decide so. Your decision will not affect your relationships with the researchers.

Confidentiality: Indicate how data will be collected, stored, accessed and destroyed after the use. Indicate who shall have access to the data and mention the measures to be followed to maintain the confidentiality of data

Queries on research: State that if participant have questions on research in general or specific, whom they should contact. Provide researcher name and contact number along with supervisor details, and mention the study was approved by IEC/IRC and follows the ICMR guidelines

Legal rights: Include the following text - I ----- consent to participate in ----- (study title) conducted by ----- (Investigators name), I have understood the nature of study and wish to participate voluntarily. I am waiving any of my legal rights by signing this form. My signature below indicates my consent.

Name of participant:

Signature:

Date:

Principal investigator name:

Signature:

Date:

Witness name:

Template for Informed Consent Form

Study Title:

Principal Investigator:

Date:

You are invited to participate in a research study conducted by ----- (Name of researcher) ----- from (Name of University).

We are asking you to take part in this study because ----- (Purpose/brief description of study).

Your participation is voluntary and would consist of ----- (Provide procedures & length of time it will take).

There are no anticipated risks to your participation and there are no direct benefits to you for taking part in this study (or explain possible risks/benefits if applicable).

You will receive ----- (provide description of payment - If applicable) for your participation. You will be given a copy of this form.

If you have any questions about this research study, please contact: ----- (Provide contact information).

Name of participant:

Signature:

Principal investigator name:

Signature:



SELECTION OF SPECIAL GROUPS FOR RESEARCH

The researcher must take an extra cognition before selecting the special groups in research activities. The special consideration of research is mentioned below:

- **Pregnant or nursing women:** The pregnant women are not permitted to participate in clinical trial or any other interventional studies. Pregnant and nursing mothers are included in research, if the research carries no more than minimal risk to the fetus or nursing infant.
- **Children:** The parents or legal guardian of children can give proxy consent where the child is legally not eligible to give consent till 18 years of age. If the child is between 7 and 18 years of age, the details of study can be explained to make the child understand and get the willingness for participation in study is called "assent". However along with child's assent the parents/guardian consent is mandatory. In case if the child refuses to participate in research that must be respected. It is required in conducting research studies or choosing research settings, where the child and parent can get adequate medical and psychological care and support.
- **Vulnerable groups:** Persons who are economically or socially disadvantaged position should not be used for research studies. The rights and welfare of mentally challenged or those with behavioral disorders must be protected. In vulnerable groups a chance of reduced autonomy is present, thus consent is required.

List of vulnerable groups

- Prisoners, institutionalized individuals, students, mentally ill persons, elderly, children, critically ill, learning disabilities, sedated or unconscious persons.

SAFEGUARDING CONFIDENTIALITY

Maintaining or safeguarding the confidentiality of research data is important to avoid the sample identification. Failure to safeguard the confidentiality and anonymity leads to breach of confidentiality, which results to psychological and social implications on subjects. It is required to use all possible coding systems to maintain the anonymity. However, the disclosed data may be permitted under following circumstances such as:

- Only in a court of law under the orders of judge
- There is threat to a person's life
- In case of adverse reaction, and required to communicate
- If there is risk to public health.

Respect for Privacy

Invasion of privacy happens when private information is shared with others without patient's consent. It causes loss of dignity, employment, anxiety, guilt, embarrassment or shame. If the participants refuse to report personal information the researcher needs to respect their views and obligation. As a researcher he has to make all possible measures to protect the subjects from potential emotional and psychological damage.

PUBLICATION ETHICS

As ethics is important in research, similarly in disseminating the result the researcher should consider the ethical guidelines. To address the publication ethics for biomedical journals, in the year 1997 a Committee on Publication Ethics (COPE) was formulated. The following are some of ethics needs to be followed in publication, they are:

- It is mandatory to mention or disclose the conflict of interest, if any, with funding agency, co-researchers or with organization
- The maximum permissible limit of plagiarism is 12% (as per University Grant Commission - (UGC))
- Undertaking/Copyright for authorship needs to be submitted to publishing journal/company
- Mention Institutional Ethics Committee/Institutional Research Committee (IES/IRC) approval letter copy and number
- Gift authorship (here authorship is gifted to the research guide/supervisor by mentioning their name in abstract/article as second author)
- Acknowledgement (acknowledge the contributors for their help and support in completing the research).

The common publication issues are (Fig. 7):

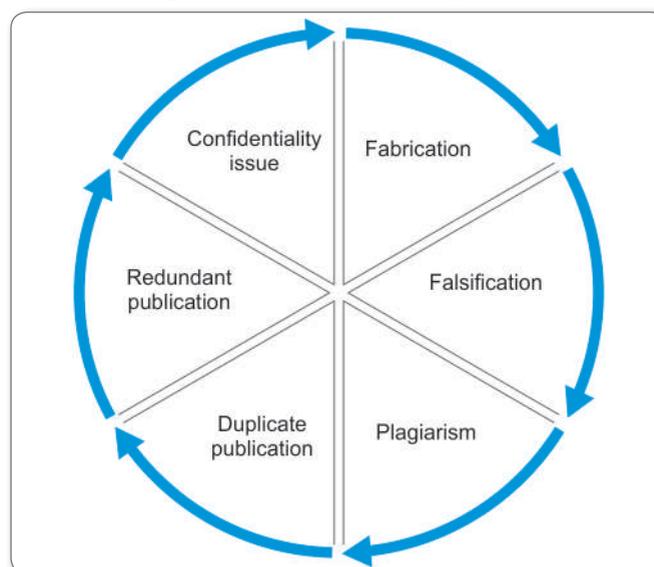


Fig. 7: Common publication issues



- **Fabrication:** Making up of data or result
- **Falsification:** Manipulation of data or result
- **Plagiarism:** Copying ideas, text from someone else (copy paste)
- **Duplicate publication:** Submission or publication of article in an two journals that are identical
- **Redundant publication:** When an article is republished as a part of an already published article
- **Confidentiality issue:** Maintain confidentiality and not to misappropriate data.

ICMR ETHICAL GUIDELINES FOR BIOMEDICAL AND HEALTH RESEARCH

The Indian Council of Medical Research (ICMR) brought out the “policy statement on ethical considerations involved in research on human subjects” way back in 1980 and the same was revised in the year 2000 as the “ethical guidelines for biomedical research on human subjects”. In the year 2006, the revised ethical guidelines for biomedical research on human subjects were released. Considering the rapid developments in science and technology in India after the release of the second version, it became necessary to update these guidelines to make adequate specific provision to meet ethical challenges posed by these advances. Thus in 2017 the revised national ethical guidelines for biomedical and health research involving human participants was released. The following are the 12 basic general ethical principles given by the ICMR, they are as follows:

- **Principles of essentiality** whereby the research entails, that the use of human participants is absolutely essential after the consideration of all alternatives and careful consideration, that the research is necessary and essential for the advancement of knowledge and for the benefit of all human species and for the ecological and environmental wellbeing of the planet.
- **Principles of voluntariness** whereby research participants are fully apprised of research and the impact and risk of such research on research participant and others; and whereby the research participants retain the right to abstain from further participation in the research irrespective of any legal or other obligation.
- **Principles of nonexploitation** whereby as a general rule, research participants are remunerated for their involvement in the research or experiment; and irrespective of the social and economic condition or status, or literacy or educational levels
- **Principles of privacy and confidentiality** whereby the identity and records of the human participants of the research or experiment are as far as possible kept confidential; and that no details about identity of said human participants, which would result in the disclosure of their identity, are disclosed without valid scientific and legal reasons.
- **Principles of precaution and risk minimization** whereby due care and caution is taken at all stages of the research and experiment to ensure that the research participant and those affected by it including community are put to the minimum risk.
- **Principles of professional competence** whereby the research is conducted at all times by competent and qualified persons who act with total integrity and impartiality and who have been made aware of, and are mindful of, preferably through training, the ethical considerations to be borne in mind in respect of such research or experiment.
- **Principles of accountability and transparency** whereby the research or experiment will be conducted in a fair, honest, impartial and transparent manner after full disclosure is made by those associated with the research or experiment of each aspect of their interest in the research.
- **Principles of the maximization of the public interest and of distributive justice** whereby the research or experiment and its subsequent applicative use are conducted and used to benefit all human kind and not just those who are socially better off but also the least advantaged; and in particular, the research participants themselves and or the community from which they are drawn.
- **Principles of institutional arrangements** whereby there shall be a duty on all persons connected with the research to ensure that all the procedures required to be complied with and all institutional arrangements required to be made in respect of the research and its subsequent use or application are duly made in a bonafide and transparent manner.
- **Principles of public domain** whereby the research and any further research, experimentation or evaluation in response to, and emanating from such research is brought into the public domain so that its results are generally made known through scientific and other publications subject to such rights as are available to the researcher and those associated with the research under the law in force at that time.
- **Principles of totality of responsibility** whereby the professional and moral responsibility, for the due observance of all the principles, guidelines or prescriptions laid down generally or in respect of the research or experiment in question, devolves on



all those directly or indirectly connected with the research or experiment including the researchers, those responsible for funding or contributing to the funding of the research.

- **Principles of compliance** whereby, there is a general and positive duty on all persons, conducting, associated or connected with any research entailing the use of a human participant to ensure that both the letter and the spirit of these guidelines, as well as any other norms, directions and guidelines which have been specifically laid down or prescribed and which are applicable for that area of research or experimentation, are scrupulously observed and duly complied with.

CODE OF ETHICS FOR NURSES IN INDIA

In 1973, the International Council of Nursing (ICN) adopted the code of ethics as follows. Nurses render health services to the individual, the family and the community and coordinate their services with those of related groups.

Nurses and People

- The nurse's primary responsibility is to those people who require nursing care.
- The nurse in providing care, promotes an environment in which the values, customs and spiritual beliefs of the individual are respected.
- The nurse holds in confidence personal information and use judgement in sharing this information.

Nurses and Practice

- The nurse carries personal responsibility for nursing practice and for maintaining competence by continual learning
- The nurse maintains the highest standards of nursing care possible within the reality of a specific situation.
- The nurse uses judgement in relation to individual competence when accepting and delegating responsibilities
- The nurse when acting in a professional capacity should at all times maintain standards of personal conduct which credit upon the profession.

Nurses and Coworkers

- The nurse maintains a cooperative relationship with coworkers in nursing and other fields.
- The nurse takes appropriate action to safeguard the individual when his care is endangered by a coworker or any other person.

Nurses and the Profession

- The nurse plays a major role in determining and implementing desirable standards of nursing practice and nursing education
- The nurse is active in developing a core of professional knowledge
- The nurse acting through the professional organization participates in establishing and maintaining equitable social and economic working conditions in nursing.

Nurses and the Legislation

- The nurse should be familiar with some of the legal principles that are to be practiced in her profession.
- The law imposes certain obligations on the nurse.
- A nurse in order to discharge her functions as a legally qualified person, should register herself as a licensed nurse.
- This means, the nurse must hold a valid certificate and license showing that she has met the requirements to practice as a registered nurse (RN) in the state in which she is employed.
- When the nurse registers herself with any of the state registration council, in India, automatically she becomes the member of the Indian Nursing Council.
- To practice as a midwife, she should register herself as a Registered Midwife (RM), she may place the initials "RNRM." after her name.

NURSING PROCESS VERSUS RESEARCH PROCESS

The nursing process and research process are usually used to answer the questions or solve problems. Both have goal and objectives which are systematic and scientific process and is useful in their own entity. The difference between these two is depicted in Table 3.

Table 3: Comparison between nursing process and research process

Nursing process	Research process
○ It focuses on assessment of patient and planning of care	○ It focuses on answering the question or hypothesis
○ It helps in restoring, maintaining and promoting health	○ It helps in gathering new knowledge through experiment
○ It has steps like assessment, nursing diagnosis, planning, implementation and evaluation	○ It has research question or hypothesis, review of literature, design, data collection, analysis and interpretation of data
○ It can be applied or used for all variety of patients	○ It cannot be used for critical and vulnerable patients
○ Outcome of nursing process is promotion of health and prevention of illness	○ Outcome of research process is to acquire, refine information



ROLE OF NURSES IN NURSING RESEARCH

Nurses are the one who have first hand direct contact with patients where the research evidences can be used for making appropriate decisions in nursing practice. The major roles of nurses in nursing research are:

- Nurses can participate in conducting journal clubs in clinical areas where the merits and demerits of research is deliberated or critiqued
- Nurses can attend number of continuing nursing education programs to disseminate research outcomes to the community
- Nurses can carry out number of clinically relevant research and discuss the implications and relevance in nursing
- Nurses can participate as member in Institutional Ethics Committee and Institutional Research Committee (IEC/IRC) and contributes for guiding novice researchers
- Nurses can incorporate the research findings into nursing education, practice and administration, thereby innovation and newer methods arises
- Nurses can work in interdisciplinary research as senior researcher, research associate, data collector, etc
- Nurses can able to fill the existing gaps in the knowledge and practice by conducting clinically relevant and worth research



Assess Yourself

Short Answer Questions

1. Define research and write importance of nursing research.
2. Write a note on historical development of nursing research.
3. What are the areas of conducting nursing research?
4. Write the scope and significance of research.
5. Describe the importance of research in nursing profession.
6. Enlist the criteria's of good research.
7. Write the steps of scientific method.
8. Define evidence-based practice and depict the diagrammatically the steps of evidence-based practice.
9. Define research and enlist the characteristics of research.
10. List out the ethical principles to be followed while conducting research.
11. Write a note on consent process in research.
12. Differentiate between nursing process and research process.

Long Answer Questions

1. Define quantitative research, and elaborate in detail on quantitative research process with suitable example.
2. Define qualitative research, and enumerate on steps of qualitative research process.
3. Define ethics, and discuss on ethical aspects involved while conducting research on human beings.
4. Write the scope of research and elaborate on the problems in utilization of research in nursing.

Multiple Choice Questions

1. Which of the following is highest evidence in hierarchy of evidence in research?
 - a. Meta analysis
 - b. Randomized control trial
 - c. Case control study
 - d. Case studies

2. Characteristics of quantitative research; EXCEPT:

- a. Formal
- b. Objective
- c. Rigorous
- d. Subjective

3. A variable that is presumed to cause a change in another variable is called:

- a. Categorical variable
- b. Dependent variable
- c. Independent variable
- d. Intervening variable

4. Which of the following is a type of research comes under the category of outcome based research?

- a. Descriptive research
- b. Analytical research
- c. Explorative research
- d. Clinical research

5. Obtaining consent from participants for the participation in research comes under which of the following principle:

- a. Beneficence
- b. Autonomy
- c. Justice
- d. Anonymity

6. Manipulation of data or result is considered as:

- a. Fabrication
- b. Falsification
- c. Plagiarism
- d. Duplication

7. The most concrete means of obtaining nursing knowledge is through:

- a. Tradition
- b. Trial and error
- c. Scientific research
- d. Experience

8. As per UGC, the maximum permissible limit of plagiarism in research report is:

- a. 08%
- b. 10%
- c. 12%
- d. 15%

9. The knowledge acquired through experience is called:

- a. Rationalism
- b. Deductive reasoning
- c. Logic
- d. Empiricism



10. End stage of research process is to:

- a. Analyze the data
- b. Interpret the findings
- c. Communicate the findings
- d. Utilize the findings

11. Which of the following is *not* the goal of scientific method of acquiring knowledge?

- a. Explanation
- b. Fact finding
- c. Control
- d. Prediction

12. Which of the following is against the research ethics?

- a. Bias in experimental design
- b. Self deception
- c. Personal interest
- d. All of the above

13. Standards, we use to determine right from wrong, or good from bad, in through and behavior is known as

- a. Ethics
- b. Values
- c. Beliefs
- d. Attitudes

14. Applied research builds a body of knowledge for nursing practice because it is the basis of

- a. Evidence based practice
- b. Clinical pathways
- c. Nursing process
- d. Nursing diagnosis

ANSWERS TO MCQS

1. a. 2. d. 3. c. 4. d. 5. b 6. b. 7. c. 8. c. 9. d. 10. d. 11. c. 12. d. 13. a.
14. a.

