

Second Edition

RESEARCH METHODS

for Undergraduate
Students
in Nursing



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Phyllis J. Verhonick

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RESEARCH METHODS

**for Undergraduate
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*This book is affectionately dedicated to my family:
John; Cathy, Dick, Kitty, Rick, Jack;
Gwendolyn, Jim, Jamie, Elizabeth; Tony, Diana, and Andrew; Mama;
and all of my kin.*

PREFACE

The second edition of this book endeavors to meet the expanding interest of nurses in research. The primary goal is to organize the research process into a simple framework that not only provides a step-by-step introduction to the construction of research projects, but answers questions such as: What makes nursing research scientific? How does scientific reasoning enter into research? How are nursing observations and theory related? What are the various designs and methods used in nursing research? How does the student obtain study subjects? Collect and measure the data? Summarize the findings?

The book is written for both the undergraduate nurse, and for the graduate student who has not had an undergraduate research course. The aim of the book is to assist the student to understand the research process well enough to read the publications in nursing research with a critical perspective; propose and carry out a circumscribed research project; and integrate the reasoning and observations that make nursing research scientific.

Because of the growth of nursing research, the revision of the book has been a sweeping one. Every chapter has been rewritten although occasional portions of the first edition remain. Every page was written with the image of Phyllis Verhonick in mind. Consultation with her was sorely missed.

My thanks go to my colleagues who read and commented on the book as it was being revised, and to Charles Bollinger who encouraged and stimulated the publication.

CONTENTS

Preface	xi
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PART 1: Introduction to the Research Process

1. Scientific Research in Nursing	3
Applied and Basic Research in Nursing/3; The Purpose of Nursing Research/5; The Rise of Scientific Research in the Art of Nursing/7; Summary/14; Study Questions/15; References and Suggested Readings/16	
2. Theory, Hypothesis, Concept and Related Research Terms	19
A Model of the Basic Elements and Methods of Research/20; Summary/32; Study Questions/33; References and Suggested Readings/34	
3. Phases and Steps in the Research Process	37
The Model/37; Phase I: Planning the Research Project/39; Phase II: The Collection of the Data/45; Phase III: Analyzing and Interpreting the Data/47; Phase IV: Communicating the Research Findings/50; Summary/50; Study Questions/51; References and Suggested Readings/52	

PART 2: The Research Proposal, Ethical Issues and Review of Literature

4. The Research Proposal	57
Sources of Significant Researchable Problems in Nursing/58; Characteristics of a Researchable Problem/61; Formulating the Research Proposal/64; Summary/69; Study Questions/71; References and Suggested Readings/71	
5. Ethical Issues in Nursing Research	73
Values and Ethics/73; The Rights of Human Subjects/74; Vulnerable Subjects Who Need Special Protection/78; Withholding Information/80; Steps to Take to Secure In-	

formed Consent/80; The Role of the Nurse in Research/82; Summary/83; Study Questions/84; References and Suggested Readings/84

- 6. A Critical Review of the Literature 87**
 The Literature Review: An Essential Part of Every Project/87; The Preliminary Review of the Literature/88; How to Criticize a Research Report/94; Summary/99; Study Questions/101; Selected Sources of Research in Nursing and Allied Fields/101; References and Suggested Readings/103

PART 3: Theory and Sampling

- 7. Theory in Nursing Research 107**
 Major Theories Reported in the Nursing Research Literature/108; Learning Theory/108; Developmental Theory/111; Theories of Adaptation, Stress, and Homeostasis/114; Systems Theory/116; Social Theories/120; Culture Theory/124; Theory Construction/126; Summary/127; Study Questions/129; References and Suggested Readings/129
- 8. Sampling 133**
 Basic Terms in Sampling/133; Advantages of Sampling/135; Scientific Sampling/136; Probability Theory/136; Probability Sampling/138; Nonprobability Sampling/141; Sample Size/142; Bias in Sampling and Measurement/143; Summary/143; Study Questions/145; References and Suggested Readings/145

PART 4: Research Designs

- 9. Research Designs 149**
 Descriptive-Exploratory Designs/151; Experimental Designs/154; Quasi-Experimental Designs/158; Pre-Experimental Designs/160; The Survey/163; The Documentary-Historical Research Design/165; Methodological Designs/168; Ex-Post-Facto and Correlation Designs/168; Summary/171; Study Questions/174; References and Suggested Readings/175

PART 5: Collecting the Data

- 10. Research Methods 181**
 Observation/182; Scientific Observation/182; The Means and Methods of Observation/187; Summary/198; Study Questions/199; References and Suggested Readings/200; References for Selected Instruments/202

- 11. Asking Questions: Questionnaire and Interview Methods 205**
The Questionnaire/206; The Interview/217; Summary/
226; Study Questions/229; References and Suggested Read-
ings/229
- 12. Measurement, Scaling, Validity and Reliability 231**
Measurement/231; Scaling/233; Validity/237; Reliability/241;
Summary/243; Study Questions/245; References and
Suggested Readings/245

PART 6: Analyzing Data

- 13. Data Analysis, Central Tendency and Variance 249**
Coding the Data/249; Ratios, Proportions, Percentages, and
Rates/250; Index Numbers/251; Tabulating the Data/
252; Measures of Central Tendency and Variance/
257; Summary/265; Study Questions/267; References and
Study Questions/268
- 14. Statistical Inference 269**
Concepts Utilized in the Study of Inferential Statistics/
270; Comparison of Descriptive and Inferential Statistics/
270; Summary/280; Study Questions/281; References and
Suggested Readings/282
- 15. The Use of the Computer in Research 285**
How a Computer Works/286; Steps to Take in Using the
Computer/289; Summary/292; Study Questions/293; Ref-
erences and Suggested Readings/293
- 16. The Student's Report: Organization and Self-Evaluation 295**
The Audience/295; Organization of the Content of the Re-
port/296; Summary/303; Study Questions/304; References
and Suggested Readings/305

Glossary 307

Bibliography 319

Appendix A 331

Appendix B 343

Index 349

PART 1

Introduction to the Research Process

CHAPTER 1

Scientific Research in Nursing

CHAPTER 2

Theory, Hypothesis, Concept, and Related Research Terms

CHAPTER 3

Phases and Steps in the Research Process

CHAPTER 1

SCIENTIFIC RESEARCH IN NURSING

Scientific research is a process in which observable, verifiable data are systematically collected from the empirical world—the world we know through our senses—in order to describe, explain, or predict events. Scientific research differs from nonscientific research undertaken by scholars such as theologians, whose work may be careful and systematic, but concerned with unseen phenomena such as supernatural spirits. In contrast, scientific research deals only with what can be observed by one scientist and verified by another. The objectives of scientific research are to answer questions, to discover or revise facts or theories, and/or to solve problems. Scientific research as Notter notes (1963, p. 49) is every nurse's business.

Upon completion of this chapter, the student will be able to: 1) define basic and applied research; 2) state the purposes of research in nursing; 3) trace the rise of scientific research in the ancient art of nursing; 4) describe the place of research in the emergent profession of nursing; and 5) identify trends in the future of nursing research.

APPLIED AND BASIC RESEARCH IN NURSING

Applied research is a process whereby the researcher collects nursing data to be used—that is, *applied*—in the clinical, administrative, or instructional areas. Applied research is designed to: 1) find solutions to nursing problems; 2) evaluate nursing practices, procedures, policies,

or curricula; 3) assess the needs of patients, staff, or students; and/or 4) make decisions to change or continue various aspects of nursing.

Chapman's (1977) study is one example of applied research. Chapman conducted a clinical study to determine whether measures of patient stress and welfare differed when various approaches to nursing care—individualized, informative, and routine—were used in the perioperative period. She found that the individualized and the informative approaches to nursing care were more effective than routine nursing care to reduce both the patient's requirement for postoperative analgesics and the length of hospitalization. Her findings suggest solutions to nursing problems concerned with using postoperative analgesics and with length of hospital stay. The study also evaluates nursing approaches and provides data upon which to base decisions to change the approach to nursing care.

Another example of applied research is that of Hain and Chen (1976), who assessed the health needs of the elderly who were living in high-rise apartments. After identifying various health problems, the researchers recommended a number of solutions, including screening and also employing health personnel.

McGillicuddy's research (1977) on the relationship between mothers' rooming-in with their child during the child's hospitalization and the change in the child's behavior enabled her to recommend both administrative changes, such as changes in visiting regulations, and changes in nursing education, for example, experience for the nursing student in caring for a family.

Each of the studies above centers upon the practical application of research, clearly relating research to problem solving, evaluation, assessment, and intervention.

In contrast, basic research undertakes to advance scientific knowledge, whether or not this knowledge is immediately usable in nursing. One example of basic research by nurse scientists is that of Parsons et al (1981), who examined the extent of nerve fiber degeneration in rats' brains following a single cerebral concussion. Since such experimental research is impossible using human subjects, findings from lower mammals may cast some light upon concussion in general. However, using the research findings in nursing practice is not the immediate objective of such basic research. Similar research is that of Raff (1977), who studied the relationship between prenatal exercise and postnatal growth and development in the offspring of albino rats. Basic research adds to the pool of scientific knowledge, but the implementation of this knowledge in nursing is left to others.

Many nursing studies contain elements of both basic and applied

research. Often, the distinction between the two has more to do with administrative decisions about financial support than with study content. In this sense, basic research may only imply that the researcher was free to work in the area of choice without justifying the work by immediate practical advantage.

THE PURPOSE OF NURSING RESEARCH

The purpose of nursing research may be summarized as follows: to observe in order to know; to know in order to predict; to predict in order to control; to control in order to practice and prescribe in a professional manner. Each of these purposes will be briefly examined.

To observe in order to know is the aim of all nursing research. The nurse who observes, verifies, and documents her observations works at a crucial level of research. These studies are often called *descriptive* or *exploratory*. They begin when the nurse asks the question "What?" "What are bedsores?" Verhonick (1961) asks, "What are the objective criteria to use to measure bedsores? What causes skin to break down in the first place?" Williams (1972) asks, "What factors contribute to skin breakdown?" Once the factors are discovered and named, the nurse can then explore how they are related to one another. For example, are the factors of age, skin thickness, and diagnosis interrelated to the occurrence of bed sores? Thus, descriptive studies are closely oriented to observation. Yet, the very perception of nursing data is often structured by the scientist's background and education. That is, the nurse observes, or "sees," data from a viewpoint that differs from that of a psychologist or geneticist. For example, the nurse mid-wife wants to describe, or "know," the physiological, psychological, social, and cultural factors associated with maternal and child care. She wants to know how the procedures are alike for all patients and how they differ for some, such as the rural or urban woman, the lower class or middle class, and women of various ethnic origins. However, all scientists ultimately use their observations to try to explain how concepts are interrelated to one another. Such explanations lead to the second purpose of nursing research—to predict.

To predict, the nurse begins with an explanation, predicts what should be found on observation, and tests these predictions in nursing research. The researcher may either predict causality or she may predict that correlations will be found between specified factors. Causality means that one variable such as germ X causes a change in another variable, such as the state of health. Causality is established if the events

under specific conditions may be related in such a way that event Y (such as syphilis) will always be observed to follow event X (exposure to the spirochete). However, because many complex factors influence human health and welfare, it is not always possible to establish causality as neatly as the germ theory allows. For example, scientists cannot yet say exactly what causes lung cancer. However, they can say that lung cancer increases as pollution of the inhaled air increases. Predictions can be made that certain factors appear to be associated with a rise in lung cancer.

Correlations, or concomitant variations and associations as these are also called, state that a change in the amount of one variable is related to a change in the amount of another. Correlations may either be positive or negative: As one increases, the other also increases; or, as one increases, the other decreases.

Once such interrelations are made, the nurse can predict that certain populations are at risk to get lung cancer, for example, those who smoke. Predictions such as these can be tested further in research; if the research findings support the predictions, steps can be taken to control harmful factors.

To control is a major purpose of applied nursing research. It means that the nurse has the ability to check, regulate, and exercise directing power over factors that influence the health and comfort of patients or clients. To control pain, discomfort, sickness, anxiety, or fear is an objective of patient care; to control ignorance and superstition is an objective of nursing teaching; and to control the proper flow of information and communication is a goal of nursing administration. A revolutionary approach in nursing is to return control of the patient's body and mind to the patient, with as little recourse to drugs and dependence upon health personnel as possible.

When nursing is able to describe, understand, and explain nursing phenomena; when we can predict what will happen each time we intervene; and if our ability to predict allows us to control the harmful factors and promote the positive, then nursing can fulfill the final purpose—to prescribe.

To prescribe requires a deep involvement in research and practice. In addition it involves a conception of what is good and desirable—the values of the profession and society. A prescription is based on the fact that the goal to be achieved is a desirable one, and the way to achieve the goal is to follow the prescription. To bring about and maintain good health, the prescription states, one must comply with the prescribed regimen of treatment, diet, and/or medication.

Nurses have long practiced and prescribed intuitively. Experience often told them to do one thing rather than another. However, the

research process helps nurses put experience and intuition into a statement that summarizes or predicts relationships among concepts and variables. It helps them test the statement in research, and then share the findings with the profession as a whole. In this way, research adds to the accumulating body of nursing science and enables nurses to solve problems and recommend changes.

THE RISE OF SCIENTIFIC RESEARCH IN THE ART OF NURSING

Long before nursing was a science, it was an art. Many aspects of contemporary nursing are rooted in the thousands of years during which nurses attempted to care for and cure the sick with tender, loving care rather than with science. Nursing helped others do what they could not do for themselves—deliver a baby, feed the wounded, or bathe the helpless.

Scanty evidence exists from the archeological record to indicate who were the nurses of antiquity. The work of Solecki (1971) in an ancient cave in Iraq suggests that about 60,000 years ago, women, children, and occasionally an old man remained close to the hearth fires of home. Perhaps they were the first nurses. Evidence from ancient bones found near the hearth suggests the early patients were the handicapped and the injured. The cave dwellers of Shanidar, called the *flower people* by Solecki because they placed clusters of flowers in the graves of their dead, may have utilized local plants as poultices or herbal remedies. Elsewhere in the ancient world, Marshack (1972) found finely made figurines that, he suggests, may have been used in magical rites to assist women in childbirth.

Nursing care moved out of the home when priests established a causal link in the minds of their followers between evil spirits and sickness. For example, in Greece by 1200 B.C., the sick were being treated in temples, where the priests prescribed rest, diet, and bathing.

Among early Christians, both women and men cared for the sick and aged, this practice continuing as the Church gained control over society. However, the dirty and unpleasant work associated with the art of nursing was often left to the lower levels of nurses, who performed disagreeable tasks in hope of a later reward in heaven. The well-to-do and educated tended to supervise rather than deliver direct care. During the Crusades men and women from high statuses served as nurses. In fact, the association of nursing with war and the military left its mark on the character of nurses' training, as well as on the military-like stratification that has long been a part of nursing practice. In the

West, nursing tended to become a task of women, while research tended to be exclusively in the hands of men.

Following the Protestant Reformation, the status of nursing, now based on wage labor supported by taxes, declined. Low wages, lack of education, and the servant-like status of women who were nurses soon brought nursing to a position of disrespect and contempt. The art of nursing fell to untrained, uneducated women, some of whom were inmates of work houses or penal institutions. However, humanitarian reform arose in reaction to the industrial revolution with its accompanying exploitation of the poor and the sick. In Germany, Pastor Fliedner established a five-year program to train nurses. Among those who examined the functioning of the school was Florence Nightingale who, in 1860, founded a school of nursing at St. Thomas's Hospital in England. Nightingale approached nursing primarily as an art but was likewise the first nurse scientist. Her *Notes on Nursing* (1859) not only stresses the use of observation but also contains a wealth of material inviting research.

The most important practical lesson that can be given to nurses, Nightingale writes (*Ibid*, p. 65), is to teach them how to observe and what to observe. In Nightingale's view, devotion is useless without ready and correct observations. While statistics inform us what percent of the population may die, she writes, observation tells us which one will die.

Nightingale was a firm believer in applied research, noting that observations are for the sake of saving lives and increasing comfort rather than for piling up miscellaneous information or curious facts (Nightingale, 1859, p. 70).

Nightingale's approach to nurses' training assisted in the rise of the modern hospital, which came into being along with the improvement of bedside nursing, hospital management, the science of bacteriology, and the introduction of aseptic surgery. At that time, nurses' training included the mastery of scientific techniques and procedures, if not scientific theory. The rise of science and research in nursing was nonetheless underway.

The Development of Nursing Research

Following Nightingale's era, research in nursing practice declined for nearly a century. It was replaced in the United States by research in nursing education and administration, such as that conducted by Nutting (1907), and by research on the function of nurses, such as that reported by Hughes et al (1958).

During the decade of the 1950s, more and more nurses entered the universities to complete undergraduate or graduate education. Research