

NURSING RESEARCH EDUCATION IN THE UNITED STATES OF AMERICA: ONE APPROACH

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In addressing nursing research education in the United States of America a short overview of the development of nursing research will be given and then one specific approach to nursing research education will be discussed fully.

The development of nursing research in the United States of America is closely linked to the education of nurses, the staffing patterns of hospitals, and the emergence of nursing as a profession (Polit and Hungler, 1989:5).

After World War II nursing education was established within tertiary education institutions rather than in hospitals and graduate programmes began to increase (Chinn & Jacobs, 1987:38). In the 1950's nursing research rapidly progressed because of the increase of number of nurses with advanced academic preparation, the establishment of the Nursing Research journal, the availability of federal funding to support nursing research, and the upgrading of research skills in nurse educators. In the 1960's doctoral programmes in nursing were established, and efforts seriously to consider and formulate knowledge were more apparent in nursing literature. There were three major trends in the 1970's that encouraged the development of nursing knowledge as basis for practice, namely: nurses started developing conceptual models and philosophies of practice; the value of the application of theories from other disciplines were acknowledged, and there was a strong movement to develop theories within nursing as a discipline (Chinn & Jacobs, 1987:39 & 40). Based on these trends more nursing journals were established with the focus on nursing research. Nursing research emphasis changed from related areas of nursing to direct patient care.

In the 1980's the debate developed whether the appropriate research approach for nursing researchers lies in descriptive, qualitative methods or in more controlled quantitative procedures. The current approach is that both types of research approaches are needed to develop a scientific base for nursing practice.

In the United States of America recent developments contribute to and support nursing research. These include the:

- * establishment of a National Center for Nursing Research within the National Institutes of Health;

Samevatting

Onderrig in verpleegnavorsing is 'n integrale deel van die voorgraadse en nagraadse programme in verpleegkunde by Oral Roberts University Anna Vaughn School of Nursing. Die fokus in die voorgraadse program in verpleegkunde is op die bemeesting van die navorsingsproses en gebruik van navorsingsbevindings in verpleegsorgbeplanning. Die fokus in die nagraadse program in verpleegkunde is op die gebruik van die hipotetiese-deduktiewe proses van redenering om hipoteses gebaseer op "Nursing for the Whole Person" teorie te formuleer en te toets en kennis te genereer wat gebruik kan word in verpleegpraktyk, verpleegonderrig en verpleegnavorsing.

Studente word gesosialiseer ten opsigte van die belang van navorsing en die internalisering van die navorsingsproses. Omdat teorie tegelykertyd met praktiese opdragte aangebied word in die verpleegnavorsingsproses word die student die geleentheid gegun om die werklikheid van navorsing eerstehands te ervaar en die navorsingsproses 'n integrale deel van die professionele raamwerk van verwysings in verpleegkunde te maak. In verpleegkunde word teorie, praktyk en navorsing as interafhanklik van mekaar beskou.

- * announcement of a new funding programme that supports feasibility, pilot, and other

small-scale research studies by the National Institutes of Health;

- * creation of the Center for Research for Nursing in 1983 by the American Nurses' Association (Polit & Hungler, 1989:7).

The major focus of nursing research in the United States of America today is the development of a scientific base of knowledge for nursing practice. Currently there is a growing interest in nursing research in building a firmer knowledge base by repeating studies, using the identical procedures of previous research but with different clients, in various types of clinical settings and different times.

Nursing research and nursing theory are interdependent. Many nursing studies that are now appearing in research literature have theoretical models of nursing as basis. Polit and Hungler (1989:7 & 8) states "On the basis of theory, nurse researchers draw inferences about what will occur in specific situations and then rest their predictions through research investigation.....Nursing theories provide a integrative framework into which new information can be placed."

Because there are so many Schools of Nursing in the United States of America with different approaches to nursing research education the Oral Roberts University Anna Vaughn School of Nursing's approach to nursing research education will be used specifically as basis for discussion for this article.

In nursing, theory has to permeate the process and content of the curriculum and guide the practice of nursing. The inherent goal of the curricular plan is to influence nursing practice (Oral Roberts University Anna Vaughn School of Nursing, 1990:139 & 230). In Oral Roberts University Anna Vaughn School of Nursing, Nursing for the Whole Person theory provides the framework for the undergraduate (baccalaureate) and graduate (master's) level programme (Oral Roberts University Anna Vaughn School of Nursing, 1990:136-139).

Nursing for the Whole Person theory is founded on historic Christian faith and Bible care principles and values. The philosophy of the Oral Roberts University on education for the whole man provided the basic belief for the philosophical statements about person, health, illness and nursing. Nursing for the Whole

Person theory focuses on the whole person - body, mind and spirit. A person is viewed as a spiritual being who functions in an integrated bio-psycho-social manner to achieve his quest for wholeness. Each person, though a unique individual, is an integral member of a family, group and community. Health is viewed as a state of spiritual, mental and physical wholeness. The person's pattern of interaction with his internal and external environment determines his health status. Nursing is viewed as a goal-directed service to assist the individual, family and community to promote, maintain and restore health (Oral Roberts University, 1990-1992:229).

In conclusion Nursing for the Whole Person theory's major concepts can be classified as follows:

- * Parameters of nursing service : individual, family and community.
- * Beliefs about the person : body, mind and spirit.
- * Possible client/patient outcomes : illness, health and wholeness.
- * Goals of nursing service : promotion, maintenance and restoration of health.
- * Determinants of health status : internal environment, external environment and patterns of interaction between internal and external environments.

Five propositions have been formulated under each of the parameters of nursing: individual, family and community. These propositions qualify nursing and the nurse's role, and the patient. These fifteen propositions serve as basis of research, education and practice. Nursing research is integrated into the undergraduate and graduate level programmes. The viewpoint is adhered to that nursing research is imperative to identify and generate knowledge essential for the practice of nursing through the hypothetico-deductive process. Nursing research is differentiated as follows:

- * In undergraduate nursing research the focus is on learning the research process. It is a tool for looking at problems which arise from the application of the conceptual framework.
- * In graduate nursing research at the master's level, the focus is on the hypothetico-deductive process. It is a process to generate and test knowledge derived from the School's theoretical framework, and at the same time, contribute to the knowledge base of nursing.
- * At post-master's level nursing research is used to generate new theoretical formulations in relation to the School's theoretical framework of Nursing for the Whole Person and to the healing team (Oral Roberts University, 1990-1992:231).

In the following discussion the approach to nursing research education on undergraduate and graduate level will be highlighted within the broader framework of the curriculum.

NURSING RESEARCH EDUCATION IN THE UNDERGRADUATE CURRICULUM (Oral Roberts University, 1990-1992:235-237)

The undergraduate curriculum in nursing will be outlined broadly as the context wherein nursing research education takes place and then nursing research education in the undergraduate curriculum will be discussed specifically.

UNDERGRADUATE CURRICULUM IN NURSING

At the baccalaureate level of nursing education the theory of Nursing for the Whole Person provides the structure within which the student is enabled to synthesize knowledge and apply it to nursing practice by means of the nursing process to assist the individual, family, and community to promote, maintain and restore health (Oral Roberts University Anna Vaughn School of Nursing, 1990:230).

This curriculum takes a minimum of four years to complete. The curriculum consists of a liberal arts core, prerequisite courses and professional nursing courses which consist of the following subjects:

Liberal Arts Core : These subjects, taken from the first to the sixth semester during the first three years of the curriculum, include English, Communication Arts, Humanities, Bible, Theology, Chemistry, Biology, Mathematics, American History, Government, Health and Physical Education and Recreation.

Prerequisite Courses : These courses are taken from the first semester to the fourth semester over the first two years of the curriculum. Subjects include Chemistry, Biology, Sociology, Psychology, Sociology : Marriage and Family, Nutrition, Human Growth and Development and Physiology.

Professional Nursing Courses which are studied from the fourth semester to the eighth semester during the last two-and-a-half years. Subjects include The Nursing Process, Family Nursing in the Child Bearing Phase, Community Mental Health Nursing, Nursing in the Child Rearing Phase, Nursing for Individual Wholeness, Socialization to the Nursing Profession, Critical Care Nursing for the Whole Person, Leadership in Nursing, Research Senior Paper I, and Research Senior Paper II.

UNDERGRADUATE NURSING RESEARCH EDUCATION (Oral Roberts University Anna Vaughn School of Nursing, 1990:174).

Table 1 shows samples of learning experiences in the professional nursing courses which demonstrate the research component in the curriculum for undergraduate nursing education.

"The research process and its contribution to nursing practice are included in the curriculum. Two approaches are used when including the research process in the curriculum. Firstly, in courses with a clinical practicum, students are expected to (a) identify researchable problems related to the care of their assigned client and (b) use research-based articles to support proposed nursing care actions in the care plan. Secondly,

the two courses, NUR 498 and 499, Research/Senior Paper, provide the structure within which students generate a proposal for a systematized study of a clinical nursing problem, and conduct the study. The theory of Nursing for the Whole Person provides the basis for the study of the clinically significant nursing problems" (Oral Roberts University Anna School of Nursing, 1990:174).

Findings from research articles are utilized in the implementation part of the research and no real life subjects are involved. Students are divided into groups of five students and have a nursing educator as mentor in planning and implementing the research process. Peer group evaluation is an inherent part of the nursing research educational process. Students hand in a written report of the completed research process. Each student also presents a paper in class and receives peer feedback. Annually one senior paper is identified by nursing educators as particularly outstanding and is recognized through a Research Award (the Tjelta Research Award). The recipient receives a monetary gift, and presents the paper at the annual School of Nursing Research Day. All junior (third year) and senior (fourth year) nursing students attend the Research Day which experience provides opportunity to select among concurrent sessions papers of particular personal clinical interest. Presenters come from a wide geographic area (Oral Roberts University Anna Vaughn School of Nursing, 1990:186).

NURSING RESEARCH EDUCATION IN THE GRADUATE CURRICULUM

Nursing for the Whole Person theory provides the structure within which the student learns to test hypotheses and generate knowledge essential for the practice of nursing through a hypothetico-deductive process to assist the individual, family or community to promote, maintain and restore health (Oral Roberts University Anna Vaughn School of Nursing, 1990:230).

The graduate curriculum will be broadly outlined and then the nursing research education specifically highlighted.

GRADUATE CURRICULUM IN NURSING

The curriculum takes a minimum of two years to complete and consists of a Nursing Theory sequence, Functional Role sequence, Research sequence and Related Other course sequence (Oral Roberts University, 1990-1992 : 244-247). These courses are made up of the following subjects:

Nursing Theory sequence : Theories in Nursing (Semester 1, first year), Nursing Theory for Individual, Family or Community (Semester 2, first year), Theory in Area of Specialization - Individual : Critical Care or Gerontology; Family, Child, Community Health or Community Mental Health (Semester 3, second year), Practicum in Area of Specialization (Semester 4, second year).

Functional Role sequence : Nursing Leadership (Semester 1, first year), Leadership Roles and Processes (Semester 2, first year).

TABLE 1

Research Component in the curriculum for Undergraduate Nursing Education : Sample Learning Experiences indicated for each course (oral Roberts University, Anna Vaughn, School of Nursing, 1990:180-188)

SEMESTER 4 (SECOND SEMESTER, SECOND YEAR)	SEMESTER 5 (FIRST SEMESTER, THIRD YEAR)	SEMESTER 6 (SECOND SEMESTER, THIRD YEAR)	SEMESTER 7 (FIRST SEMESTER, FOURTH YEAR)	SEMESTER 8 (SECOND SEMESTER, FOURTH YEAR)
<p>NUR 201 The Nursing Process (Fundamental Nursing)</p>	<p>NUR 302 Family Nursing : Childbearing</p>	<p>NUR 306 Family Nursing : Childbearing NUR 308 Nursing/Individual Wholeness</p>	<p>NUR 404 Critical Care Nursing</p>	<p>NUR 405 Leadership in Nursing</p>
<p>1. Content is presented on epidemiologic research. Students are assisted to use the research process in problem solving.</p> <p>2. Students use all aspects of the research process to identify and address a problem within the community.</p> <p>3. Students must identify a researchable problem associated with the care of their client.</p> <p>4. Content is based on research findings.</p>	<p>1. Students submit a written evaluation of a research article related to their current clinical experiences.</p> <p>2. Students identify a researchable nursing problem in written assignment related to community clinical experiences and teaching projects.</p>	<p>1. Students submit a written evaluation of a current research article related to their client each week.</p>	<p>1. Students use current research articles to substantiate nursing orders in each nursing care plan.</p> <p>2. Students apply research findings to specific nursing interventions to improve oxygenation.</p>	<p>1. Didactic material is presented to assist the student to attain the ability to identify research problems in nursing practice and carry out a study within the quality assurance framework.</p> <p>2. Students select a specific standard used at their clinical agency. A tool is developed to measure the standard and a study carried out to evaluate attainment of that standard. The study findings are presented in class by the clinical group.</p> <p>3. Students develop a set of nursing care, professional behaviour, and leader behaviour standards. A tool is developed to measure the standard attainment. A methodology is developed to assist the student to evaluate standard attainment throughout the semester. Data are analyzed at the end of the semester and conclusions drawn. This entire study is presented in a formal written paper submitted by the clinical group.</p>
	<p>NUR 304 Community Mental Health Nursing</p>	<p>NUR 498 Research/Senior Paper 1</p>	<p>NUR 499 Research/Senior Paper 11</p>	
	<p>1. Content is presented on research as it relates to the community mental health setting.</p> <p>2. Written assignments include references from current research articles.</p>	<p>1. Content is presented to assist the student to identify a researchable nursing problem and formulate a research proposal.</p> <p>2. Students identify a clinical nursing problem as the basis for their research proposal.</p> <p>3. Students evaluate selected research articles with a mentor group setting and in class according to a designated format. Articles are examined as examples of components of the research process.</p> <p>4. Students develop a written research proposal based on an identified clinical nursing problem. This proposal includes problem statement, purpose statement, definitions, conceptual framework, literature review, proposed methodology, and plan for data analysis.</p>	<p>1. Content is designed to assist the student to complete the study proposed in NUR 498 and communicate findings orally and in writing.</p> <p>2. Students evaluate published research articles in group and class settings using a given format.</p> <p>3. Students evaluate research proposals of peers in mentor group settings.</p> <p>4. Students carry out the research proposal developed in NUR 498 which was based on a current clinical nursing problem. This culminates in a formal research paper which includes all components of the research process.</p> <p>5. Students present research findings within the context of a formal written paper and give an oral presentation to the class.</p> <p>6. Some students choose to prepare a poster presentation for the School of Nursing Research Day.</p>	

TABLE 2

Research Component In the Graduate Nursing Curriculum: Sample learning experiences Indicated for each course

SEMESTER 1, FIRST YEAR	SEMESTER 2, FIRST YEAR	SEMESTER 3, SECOND YEAR	SEMESTER 4, SECOND YEAR
GNUR 571 Theories in Nursing	GNUR 572 Nursing Theory for Individual, Family or Community (example : GNUR 572-30 Nursing Theory for Community)	GNUR 673 Theory In Area of Specialization (example: GNUR 673:50 Community Mental Health Nursing)	GNUR 674 Practicum in Area of Specialization (example : GNUR 674:50 Community Mental Health Nursing)
<p>A written assessment and care plan developed using the Nursing for a Whole Person conceptual framework is submitted for a selected patient in the clinical setting.</p> <p>The evaluation of a theory is written and graded.</p> <p>Students design a chart depicting similarities and differences of the main concepts of Nursing for the Whole Person conceptual framework from the University's Statement of Purpose and the Oklahoma Nurse Practice Act. An Assessment and Care plan using the Nursing for the Whole Person conceptual framework is submitted for a selected patient in the clinical setting. Students write hypotheses derived from the theoretical framework using the hypothetico-deduction process. Students lead a discussion on one of the nursing theories, interrelate functions of theory, research and practice in nursing.</p>	<p>A concept development paper is written based on a literature review and Nursing for the Whole Person framework. The defining characteristics of the concept are tested in the clinical setting with clients.</p> <p>A nursing care plan on a community based on the Nursing for the Whole Person theory is written.</p>	<p>Using the theory of Nursing of the Whole Person, care plans are written for four mentally ill clients based on an assessment and testing of hypotheses.</p> <p>Research findings are used in the development of four care plans written for mentally ill clients.</p>	<p>Using the theory of Nursing for the Whole Person and theories compatible with it, the students write nursing care plans for five different mentally ill clients in a variety of settings, based on an assessment of the use of the hypothetico-deductive process for developing nursing diagnoses. Ten hours per week for seven weeks are spent working with the mentally ill client in a variety of settings. Case presentations are given in the classroom and to agency staff.</p> <p>Research findings are used in the development of care plans written for four mentally ill clients.</p>
GNUR 551 Nursing Leadership	GNUR 552 Leadership Roles and Processes	GNUR 653 Role Specialization (Clinical Specialist, Educator, Administrator) example : GNUR : 653-20 Clinical Specialist	GNUR 654 Practicum in Role Specialization. example : GNUR 654-20 Clinical Specialist
<p>Students investigate a professional nursing issue and its impact on the delivery of health care and debate both sides of the issue as a group.</p> <p>The students research a trend and its impact on the health care needs of society illustrated as a prediction in a poster format.</p>	<p>Students plan, implement, and evaluate an existing human service program utilizing an evaluation research model.</p>	<p>Research findings are utilized and tested in the process of providing consultation to a selected R.N.</p>	<p>The ten hour per week for eight weeks practicum experience in a clinical nurse specialist role provides opportunities for the student to derive from the practice setting propositions which are then systematically tested and recorded in their role implementation log.</p> <p>Implementation of the clinical nurse specialist role involves the analysis of research findings and the testing of these findings for resolution of an identified clinical dilemma.</p> <p>Nursing theories are tested in a written project whereby students identify an administrative dilemma in a clinical setting and project a resolution.</p>
GNUR 591 Advanced Statistics	GNUR 592 Nursing Research Seminar	GNUR 693 Research Methodology	GNUR 694 Independent Nursing Research
<p>Students utilize the computer as resource to analyze data collected in research project, statistically.</p>	<p>Students identify a clinically relevant problem and write a problem identification paper as part of the research proposal.</p> <p>Critique of research articles in classroom discussions. Written annotated bibliography for a clinically relevant problem.</p> <p>Students write a research problem identification paper and a research proposal.</p> <p>Students write a research proposal based on the theoretical framework.</p>	<p>Student develops a research design, including data collection instruments, a proposed analysis, and interpretation of data.</p>	<p>An aspect of the theory of Nursing for the Whole Person is tested in the research conducted by the students and reported in their master's theses.</p> <p>The student implements a research proposal and evaluates research findings in relation to the theoretical framework of the School.</p> <p>Each student makes a poster of presentation of the research completed for their master's thesis.</p>

Research sequence : Special Topics, Advanced Statistics (Semester 1, first year), Nursing Research Seminar (Semester 2, first year), Nursing Research Methodology (Semester 3, second year), Independent Nursing Research (Semester 4, second year).

Related Other Courses sequence : Healing Team Perspectives (Semester 1, second year), Role Specialization - Clinical Specialist, Educator and Administrator (Semester 3, second year), Practicum in Role Specialization (Semester 4, second year).

NURSING RESEARCH EDUCATION ON GRADUATE LEVEL

Table 2 gives samples of learning experiences in the graduate nursing courses which demonstrate the nursing research component in the curriculum for graduate nursing education.

In nursing research education on graduate level attention is given to scientific inquiry, application of research findings in clinical practice and nursing theory development. In the Nursing Theory sequence the student spends time on concept development, formulating hypotheses, writing a concept paper and utilizing the hypothetico-deductive process in formulating nursing diagnosis. Research findings are used to direct nursing actions in the nursing care plan.

Within the Functional Role sequence and Related Other sequence research findings are utilized as basis for decision making and problem solving. A group assignment is given to work through the process of grant application.

Within the Research sequence research education begins with a theoretical foundation of statistics and research and students' research evolves through seminars and independent pursuit (Oral Roberts University, 1990).

At Oral Roberts University Anna Vaughn School of Nursing research is viewed from its relationship to the University mission of going into every man's world with healing for the whole person, body, mind and spirit.

Objectives for the Research sequence are the following:

- * Appreciation of the interrelatedness of revelation, creativity, disciplined inquiry and techniques in the discovery of knowledge.
- * Appreciation of the contribution of nursing research to the realization of the University's mission.
- * Derivation of hypotheses from the theoretical framework.
- * Utilisation of the hypothetico-deductive process to test hypotheses and generate knowledge.
- * Implementation of the research process in an individually conducted study (Oral Roberts University Anna Vaughn School of Nursing, 1990:240,246).

In GNUR 591 Advanced Statistics students are given the opportunity for hands-on computer data-analysis experience. The next course in the

Research Sequence, GNUR 592 Nursing Research Seminar views research within the context of Nursing for the Whole Person theory. The viewpoint taken is that trends within society and nursing influence the direction of research. Problems are identified within the theory, and specific research purposes are formulated through a hypothetico-deductive process. Students' written assignments include an annotated bibliography, a research problem identification paper and a research purpose paper (Wessman, 1989:2).

Within GNUR 693 Nursing Research Methodology the student focuses on an appropriate research design to obtain the most precise answer possible to the research question derived from a research problem. Conventions of sampling, method and data collection and analysis techniques are adhered to as part of the discipline reflected in the development of the design. The design becomes the blueprint which guides all subsequent data collection and analysis activities of the student. Written assignments include the research design which too, is an inherent part of the institutional board review application by the student which must be approved before the student may continue with the research project. This application includes an indication of the risk/benefit ratio, an example of a subject voluntary consent form, the tool that will be utilized and the qualifications of the researcher (Wessman, 1990:3).

The last course in the Research sequence, GNUR 694 Independent Nursing Research gives the student the opportunity to implement the research proposal as blueprint for data collection and analysis activities. The implementation of the research proposal is evaluated in relation to conformity to the proposal and adequacy of original plans. After the findings have been analyzed it is communicated to the nursing community through oral and written reports with interpretations, conclusions, implications, and recommendations for actions offered. The student is judged in terms of the research project's theoretical importance for nursing and contribution to individual, family and community health. The student comes to value the research process after implementation of the research project, and begins to incorporate the research process to an overall pattern of role implementation and professional growth. Nursing research is promoted with professional colleagues.

Assignments include a thesis which must be defended orally before an examination committee and a poster presentation displayed at a local or regional nursing research conference (Wessman, 1990:2 & 3).

CONCLUSION

Nursing research education is an integral part of the undergraduate and graduate nursing programmes at Oral Roberts University Anna Vaughn School of Nursing. In the undergraduate nursing programme the focus is on mastering the research process and utilizing research findings in nursing care planning.

In the graduate nursing programme the focus is on utilizing the hypothetico-deductive process of reasoning to formulate and test hypothesis based on Nursing for the Whole Person theory

and generate new knowledge that can be utilized in nursing practice, nursing education and nursing research.

Students are socialized to the importance of research and to internalize the research process. Because theory is given concurrently with practical assignments in the nursing research education process the student is given the opportunity to experience the reality of research at first hand and make the research process an integral part of the professional framework of reference in nursing. In nursing - theory, practice and research are viewed as interdependent of each other.

BIBLIOGRAPHY

CIHINN P L AND JACOBS M K 1987 : Theory and nursing. St. Louis : CV Mosby.

ORAL ROBERTS UNIVERSITY ANNA VAUGHN SCHOOL OF NURSING, 1990: Self Study Report, submitted to the council of Baccalaureate and Higher Degree Programmes, National League for Nursing, August 1990. Volume I - Narrative by Criteria. Tulsa, Oklahoma : Oral Roberts University Anna Vaughn School of Nursing.

ORAL ROBERTS UNIVERSITY, 1990-1992 : *Catalog, Schools of Arts and Sciences, Business, Education, Nursing, and Theology and Missions*, Volume 17, Number 1. Tulsa, Oklahoma : Oral Roberts University.

WESSMAN J P 1989 : *A Syllabus and General Guide for Nursing Research Seminar - GNUR 592*, Spring Semester. Tulsa, Oklahoma : Oral Roberts University Anna Vaughn School of Nursing.

POLIT D F AND HUNGLER B P 1989. *Essentials of nursing research*. St. Louis : J B Lippincott.

WESSMAN J P 1990 : *A syllabus and General Guide for Nursing Research Methodology - GNUR 693*, Fall Semester. Tulsa, Oklahoma : Oral Roberts University Anna Vaughn School of Nursing.

WESSMAN J P 1990 : *A Syllabus and General Guide for Independent Nursing Research - GNUR 694*, Spring Semester. Tulsa, Oklahoma : Oral Roberts University Anna Vaughn School of Nursing.

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