

ADHERENCE TO PROTOCOLS BY MEMBERS IN THE NURSE PRACTITIONER
PILOT PROJECT

by

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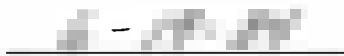
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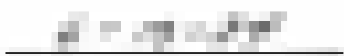
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ABSTRACT

The Nurse Practitioner Pilot Project (Senate Bill 198) was initiated in June 1980 in Utah. Senate Bill 198 legalized prescriptive practice for specific nurse practitioners for a three-year period. Protocols selected for guidelines in practice were required for use by pilot project members. Two evaluations were conducted studying compliance to protocols by pilot project participants. The purpose of the research was to determine if the remaining 44 nurse practitioners were adhering to protocols.

General systems theory was used to describe prescriptive practices by nurse practitioners. The focal system was the relationship between the nurse and the health care needs of the cultural suprasystem. Input from the patient consists of information concerning the health problem. The nurse practitioners process information through adaptation and throughput to construct a management plan. The output of the nurse practitioner is primary care, including prescribing medications.

A random chart review was conducted in the practice of each nurse practitioner. All information recorded in

the client's chart to justify the appropriate diagnosis and use of medications was noted. Eighty-four percent of the sample were practicing at the level required for project participation. Nurse practitioners educated at the Bachelor's level in Adult Practice received the highest total performance scores.

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CHAPTER I

INTRODUCTION

The concept and use of the nonphysician provider is not new in today's health care system. The appropriateness of auxiliary health care professionals in prescribing medications, however, remains a controversial issue. To fully understand the conflict surrounding nonphysicians performing tasks traditionally reserved for physicians, it is necessary to study the history of the development of auxiliary health care professionals.

The term "nonphysician provider" refers more specifically to the physician's assistant and the nurse practitioner. The need for primary care providers arose in the 1960s in response to a shortage of primary-care physicians. Medical specialization, the rising cost of medical care and the implementation of new social health-care programs dramatically increased the need for more primary health-care providers (Yankauer, 1982). The development and utilization of nonphysician providers helped alleviate the shortage of primary care physicians and satisfied the need for low-cost, quality, primary health care.

The role development of the nonphysician provider was regarded with skepticism by the medical community. Were the new health-care providers independent professionals or dependent primary health-care assistants?

Physicians viewed nonphysician providers as assistants, to whom they could delegate specific tasks. Physician's assistant programs were developed based on the concept of task delegation. Physician's assistants relied on physicians to define the role of nonphysician providers in the health care system. The majority of physician's assistants consisted of Medical Corpsmen returning from Vietnam. Corpsmen were taught physical assessment, diagnosis and treatment strategies to become physician's assistants.

Nurses, with something more unique to offer the practice of primary health care, viewed the concept of the nonphysician provider in a different way. Nurses considered the role as independent and collaborative, rather than as assisting the physician. The desire to become more autonomous and responsible in the health care management of clients influenced nurses to become nurse practitioners rather than physician's assistants.

Nurse practitioners' focus on primary care is the restoration and maintenance of health, with an additional emphasis on client education. Nurse practitioner programs teach students to guide the client in identifying

health care behaviors conducive to preventing illness while maintaining optimal health. Nurse practitioners and physicians collaborate in patient care; however, the nurse practitioner is the client advocate, assisting the client rather than the physician in identifying health care needs (Brown, 1977).

During the period of identifying the exact responsibilities of the new health care professionals, it was suggested that they be granted the right to prescribe medications. The issue of granting prescriptive privileges to nurse practitioners has been the focus of disagreement among health professionals. It is difficult to understand denying prescriptive practice for nurse practitioners when considering the extensive clinical experience and advanced educational preparation of the nurse practitioner. In-depth pharmacology courses are required in both undergraduate and graduate nursing programs. In addition to understanding the action, side effects and indications for drug use, the nurse practitioner must apply pharmacological concepts in clinical-practice settings. Nurse practitioners are also taught to utilize medications as a component of primary health care management plans.

Two important factions support prescriptive practice for nurse practitioners: the National League for Nursing and the Graduate Medical Advisory Committee. In 1970,

the National League for Nursing Social Policy Statement stated,

Primary care emphasizes health and primary prevention, the clinical use of medications is principally developed within the framework and is generally consistent with the nurturative, generative and protective scope of advanced nursing practice (N.L.N., 1979).

The Graduate Medical Advisory Committee also advocated prescriptive practice for nurse practitioners when it recommended that additional health-care providers be granted limited prescriptive privileges (U.S. Health Resources Administration, 1981).

Prescriptive Practice in the State of Utah

Traditionally, licensed physicians in the State of Utah were granted the exclusive right of prescribing medications. Many states, however, including Utah, are attempting to legalize prescriptive practice for nurse practitioners. Federal statutes governing the use of medications are drug (not practitioner) oriented. The Federal Food, Drug and Cosmetic Act and the Controlled Substance Act regulate the use of specific drugs but not who may prescribe those drugs (Fink, 1975). The responsibility of deciding who may prescribe is left to the medical and nursing boards within each state.

Nurse practitioners in the State of Utah provide primary health care to clients legally by working in col-

laboration with a physician sponsor. The provision of primary health care includes the initiation and evaluation of medications to treat minor, acute and chronic illnesses. Physician sponsors can be geographically located in the same clinical setting or available for telephone consultation for nurse practitioners working in rural areas.

A problem arose in Utah when the physician sponsor was unavailable for direct or telephone consultation to authorize medications prescribed by the nurse practitioner. Several alternative methods of prescribing were developed to alleviate the prescriptive practice problem. Alternative methods included: signing the prescription blank with both the physician and the nurse practitioner's names, signing a prescription blank initially prescribed by the physician, or telephoning the prescription to the pharmacist under the approval of the physician sponsor. All of the described practice methods were illegal unless the physician directly consulted with the client. Yet, the alternative prescriptive methods were used to expedite joint practice and provide primary health care to underserved areas.

The illegal nature of the prescription practice in use was unacceptable to nurse practitioners. Rural nurse practitioners voiced concern regarding the legality of prescriptive practice to the Nurse Practitioner Confer-

ence Group. The Nurse Practitioner Conference Group was developed to address problems encountered by nurse practitioners in the State of Utah. The prescriptive practice problem was recognized as a key issue by the Conference Group. Legislative action was initiated. In 1980, the Nurse Practitioner Pilot Project, or Senate Bill 198 was passed by the legislature in Utah. Senate Bill 198 granted prescriptive practice privileges to those Nurse Practitioner Pilot Project members who worked in collaboration with physician sponsors. The project would begin in January 1980 and end in December of 1982. Nurse practitioners participating in the project were required to follow specific protocols for prescribing. Participation of each nurse practitioner would be evaluated and statistics gathered to demonstrate that participants were following specified protocols and prescribing accordingly. A Pilot Project Supervisory committee was appointed by the governor of Utah consisting of 3 nurse practitioners, 3 physicians and 1 registered pharmacist.

All nurse practitioners in the State of Utah were notified by letter with information concerning the initiation of the pilot project. Interested nurses were requested to apply to the Governor's Committee for instructional materials with numbered prescription blanks thus identifying Nurse Practitioner Pilot Project members.

Pharmacists throughout the state were also notified of the project which granted prescriptive privileges for a 3-year period.

The text of protocol guidelines required for participation in the pilot project was entitled, Patient Care Guidelines for Family Nurse Practitioners by Hoole, Greenberg, and Pickard (1976). The protocols of Hoole et al. represented guidelines for the management of common health-care problems throughout the life span. The protocols had been used in both rural and urban settings for over 10 years (Hoole et al., 1976). Nurse practitioners who used or needed additional guidance were required to formulate new protocols in collaboration with the physician-sponsor. New protocols were then to be sent to the Governor's Committee for approval. The initial evaluation of the project began January of 1980 and consisted of 30 nurse practitioners.

Purpose of the Research

The Nurse Practitioner Pilot Project (Senate Bill 198) legalized prescriptive practice for specific nurse practitioners in Utah for a 3 year period. The purpose of this research was to determine if the prescriptive practice of pilot project members was in compliance with protocols stipulated for use by project members. Medications prescribed by nurse practitioner pilot project participants were studied from a random review of medical

records to determine if prescriptions were appropriate and if justification for use was properly recorded.

CHAPTER II

REVIEW OF THE LITERATURE

Numerous articles in the medical literature attest to the fact that nurse practitioners provide quality, low-cost primary health care which is satisfactory to consumers (Conte, 1978; Edmunds, 1978; Paxton & Scobic, 1978; Runyan, Spector & Sackett, 1981; Sohigikan, 1978). The expanded role of the nurse in prescribing medications is recent enough that few articles in the medical literature specifically describe the practice. This review of the literature will include studies describing prescriptive practice by nurse practitioners in addition to evaluations of protocol use by nonphysician providers.

Prescriptive Practice of Nurse Practitioners

The prescriptive practice patterns of 6 nurse practitioners working in an urban university clinic were studied. Each nurse practitioner in the study was prepared at the master's level and certified by the American Nurses' Association. All of the nurses studied had an additional 9 to 17 years of nursing experience (Monroe, Pohl, Gardner & Bell, 1982).

One hundred patients seen by the 6 nurse practitioners were evaluated. A detailed chart audit examined three aspects of prescriptive practice: a) Was the use of the drug indicated? b) Was the drug used consistent with the drug protocol formulary? c) Was the drug use safe and were appropriate instructions for necessary follow-up provided?

Results of the study by Monroe et al. (1982) concluded that nurse practitioners documented the use of appropriate medications in compliance with drug protocol guidelines. Drugs used by the nurse practitioners in managing both acute and chronic illnesses were safe, and follow-up instructions were provided for all patients (Monroe et al., 1982).

Another study, perhaps the most significant to research concerning prescriptive practice and adherence to protocols by nurse practitioners, was conducted by a master's degree student (La Scala, 1981). The study by La Scala evaluated 30 nurse practitioners participating in the pilot project, initiating prescriptive practice for nurse practitioners in Utah. The 30 nurse practitioners studied were practicing in a variety of settings and practice specialties including: Family Practice, Adult Nursing, Pediatrics and Nurse-Midwifery. In an ex post facto random chart review, approximately 25 charts for each practitioner were examined. The appropriateness of

the medications used by the practitioners in adherence to specified protocols was measured. Numerical evaluation scores for each nurse practitioner were recorded from information documented in the client's medical record. Study data revealed that 97% of the nurse practitioners were practicing at levels higher than the minimal requirements stipulated by the protocol guidelines.

Protocol Use by Nurse Practitioners

The remainder of the articles found in the medical literature addressed adherence of nonphysician providers to specified protocols or algorithms for patient care. Typically, clinical protocols or algorithms provide the nonphysician with explicit directions for decision making regarding primary health care management of clients. Initial studies of the effectiveness of protocol use were conducted by physicians in primary health care settings. The settings included health maintenance organizations and public health or ambulatory health care clients (Komaroff, Black, Flatley, Knopp, Reiffen & Sherman, 1974; Komaroff, Sawyer, Flatley & Browne, 1976).

The first studies concerning protocol use did not evaluate nurse practitioners. The studies evaluated high school level medical assistants and nurses in ambulatory care clinics. Nurses and medical assistants were instructed to gather data from patient interviews directed

by specific protocols. Checklists were used to determine the need for further lab studies or physician consultation. The protocol checklists were used for clients with common health problems such as upper respiratory infections, genitourinary problems, headaches, hypertension and diabetes. Results indicated that both the nurses and medical assistants complied with protocols and provided efficient, effective, safe health care which was satisfactory to the beneficiaries (Greenfield et al., 1976).

The management of hypertension using protocols by nurses and physician's assistants was studied in a group of patients from Kaiser Permanente in 1978 by Soghikan (1978). Despite the fact that patients managed by the nurse practitioner were seen more frequently, the cost per patient was reduced. No difference was found in blood-pressure control of patients treated by the nurse practitioner or the physician's assistant (Soghikan, 1978).

Three nurse practitioners and 126 patients were studied in a university ambulatory care clinic (Conte, 1978). Conte found that both data collection and recording were well performed and in compliance with protocols, and the cost of health care to the patient reduced. In clients requiring physician consultation, physicians agreed with the diagnosis of the nurse practitioner in 100% of the referral cases (Conte, 1978).

In a more recent study the effect of algorithms on the cost and quality of primary health care delivery by nurse practitioners was measured (Orient, Kettel, Sox, Berggren, Woods, Brown & Lebowitz, 1983). Six nurse practitioners in a Veterans Administration medical ambulatory care clinic were studied over a 3 year period. The study measured length of visits, utilization of time and the use of diagnostic tests, prior to and after the initiation of algorithms, for 12 common chief complaints. Results of the study indicated that the process of care was improved, as reflected by a more complete data base. The productivity of the nurse practitioner was unaffected once the nurses became familiar with the algorithms used in the study. The most significant finding in the research indicated a 40% reduction in the use of radiographic studies, due to protocol use (Orient et al., 1983).

One study examined the implementation of an adult health program utilizing nurse practitioners and protocols (Thompson, Basden & Howell, 1982). Conclusions of the study revealed that protocols provided nurse practitioners with a desired set of guidelines for use in assessing the health maintenance needs of clients. The researchers also found that the expense of health care, even in clients requiring follow-up care, was reduced when protocols were used (Thompson et al., 1982).

A 2-part study (Wilson, Wilson, Wheeler, Canales &

Wood, 1983) evaluated the use of algorithms by still another group of nonphysician providers called "Army Pamosists." Pamosists are military corpsmen who have received an additional 2 weeks of specialized classroom experience, followed by 12 weeks of supervised clinical experience in pediatrics. The Pamosists studied received an additional 4 weeks of clinical experience with the clinical algorithm for upper respiratory infections. In patients cared for by Pamosists, it was found that comprehensive data bases were collected following algorithm logic in 62.5% of patients. Part 2 of the study concluded that health care delivery by Pamosists was safe, satisfactory to clients, and as accurate as that provided by pediatricians (Wilson et al., 1983).

Studies Opposing the Use of Protocols

Two studies were found in the medical literature opposing protocol use by nonphysician providers (Dutton, Hoffman & Ryan, 1975; Grimm, Shimoni, Harlan & Estes, 1975). Dutton et al. (1975) found that nurse practitioners were neglectful in attempts to document patient-care histories in the medical record. Lab tests were ordered in compliance to protocols; however, the initiation of therapeutic management plans was inconsistent. The protocols for use in the study were revised and a system of dictation was initiated to alleviate the problems

identified in the study. The results of the new study have not been published.

Conclusions of a study of protocol use by both nurse practitioners, physicians and physician's assistants (Grimm et al., 1975) found an improvement in data collection and recording and in the use of antibiotics by all three groups. Researchers, however, could not support protocol use, based on the fact that the patient-care outcomes, despite protocol use, remained unchanged (Grimm et al., 1975).

Conclusions Regarding Prescriptive Practice and Protocol Use

In conclusion, most research studies indicate that protocols are useful patient-care management tools when used by providers with adequate educational and clinical experience. Protocols are considered useful to facilitate decision making in assessing the quality of care and for use as standards in clinical practice (Paxton & Scobic, 1978). Collaboration in development of protocols between nurse practitioners and physicians was encouraged. Joint development of protocols is one method of enhancing communication among health-care providers.

CHAPTER III

THEORETICAL FRAMEWORK

The issue of who may prescribe certain medications is important to any profession providing health care, as it dramatically affects perceptions of accountability. Independent professionalism for nurse practitioners is highly dependent on the issue of accountability and autonomy. If nurse practitioners are to become and remain autonomous in the primary health care management of clients, it is not reasonable to rely on another profession to take responsibility for clients they may never have seen (Murphy, 1982).

For the past 15 years, nurse practitioners have been exercising prescriptive practice under the auspices of a supervising physician. Legalizing prescriptive practice will clarify the role functions and responsibilities of the nurse practitioner. The use of protocols will enable nurse practitioners to develop minimal practice standards for the administration of primary health care. Documented evidence based on adherence of nurse practitioners to protocols can then be used to support the role of the nurse practitioner in prescribing.

The conceptual framework for this study is based on the General Systems Theory. General Systems Theory was developed in an attempt to describe living systems as a dynamic order of parts and processes standing in mutual interaction (Bertalanffy, 1967). General Systems Theory provides a description of relationships as a set of ways of looking at the world. The framework for this theory is based on the assumption that all forms of life can be regarded as systems with specific properties. A system is a whole comprised of parts or subsystems, which mutually interact and are mutually interdependent. Each subsystem of a system is also a part of a larger suprasystem. It is the interaction between subsystems which makes a system greater than the sum of its parts.

Systems are separated from each other by boundaries. Boundaries define a system and permit exchange of energy and goods between systems. A system is defined as open or closed based on the permeability of its boundaries.

Adaptation is one function of boundary maintenance vital to the survival of the system. The process of adaptation consists of four factors: Obtaining, retaining, containing and disposing. Boundaries are adaptive by obtaining matter, energy, information, or service from a system; by retaining selective portions of energy, information or service from a system; by containing selective portions or preventing specific input from en-

tering the system; and disposing or discarding undesirable parts.

Stimuli from the environment are defined as inputs (Clements, 1983). Input can be absorbed or rejected by the system and influences the output of that system. Accepted input passes through the system and is transformed by the system into its own energy by a process called throughput. The process of throughput includes receiving, then transforming, creating and processing the input in a goal directed manner. The process of output is defined as the export of a product to the outside systems and represents functions necessary for the survival of the system.

Feedback is the return of a small amount of the systems energy to its input, to correct and guide further output (Putt, 1978). The characteristics of input, throughput, and output can exist between focal and suprasystems, subsystems and the focal system, and subsystems (Bertrand, 1972).

A living system is an open system which engages in interchange with the environment, an essential factor underlying the growth, reproduction, mastery and survival of the system. The focal system is the component of primary attention, and is composed of interacting subsystems which are a part of a number of suprasystems.

A human social system is a system with a set of re-

relationships and roles, living in several suprasystems. A human social system is capable of acting collectively with the relationships and roles of the system in the suprasystem defined by the culture (Bredemier, 1965). In human social systems, input consists of the interaction between linking suprasystems.

The focus of this study was to examine prescriptive practice by Nurse Practitioner Pilot Project participants in the State of Utah. The nurse practitioner and the client form the focal system operating in a larger environmental suprasystem. The nurse practitioner, client and physician are all subsystems of the focal system. The function of the nurse practitioner is determined by the needs of the cultural suprasystem. Individual health care needs of clients determine the function of the nurse practitioner in prescribing medications. Selection of the appropriate medication is based on the process of adaptation and throughput. Information or input is derived from the client subsystem and received by the nurse practitioner subsystem. Through the process of adaptation, valuable information for the development of a comprehensive health care management plan is obtained and retained, while nonvital information is prevented from entering the system by containment or disposed by the subsystem of the nurse practitioner. The process of the throughput allows the nurse practitioner to transform,

process, and formulate a management plan based on information received, upon completion of the adaptation process. The output of the nurse practitioner subsystem consists of the administration of primary health care, including the prescription of medications. The response of the client to the primary care output is determined by evaluating the feedback information or the client's response to the management plan. By evaluating feedback information, the effectiveness of medications prescribed can be measured and then altered, if necessary, to guide further output by the nurse practitioner subsystem.

General Systems Theory is an appropriate framework to conceptualize prescriptive practice by the nurse practitioner. For the purpose of this study, the concepts have been limited to: the focal system; input, throughput and output; boundaries; and adaptation, through obtaining, retaining, containing and disposing. The focal system is the relationship between the nurse and the health care needs of the cultural suprasystem. The major input of the system is the information provided by the client concerning primary health care needs. Adaptation and the process of throughput allow information from the client to be processed by the nurse practitioner in the development of a comprehensive management care plan. Output of the nurse practitioner subsystem is primary health care, including the prescription of medi-

cations. Assessment of the effectiveness of the management plan is based on evaluating client response or feedback. The need for further consultation or referral to the physician subsystem is based on the client's response to the output or primary health care administered by the nurse practitioner.

Research Questions

The following research questions were utilized in this investigation:

1. To what degree did Nurse Practitioner Pilot Project members comply with protocols required by the Pilot Project?
2. Are there significant associations among the subjective, objective, lab and plan (SOLP) categories? Does the association between the SOLP categories affect the total performance score?
3. Was there any significant difference in compliance to protocols between nurse practitioners evaluated once versus nurse practitioners evaluated twice?
4. To what degree did the demographic variables of educational preparation and practice specialty relate to adherence to protocols?
5. Was there a significant association between SOLP categories as well as total performance scores and practice specialty?

Operational Definitions

Nurse Practitioner

A nurse practitioner was defined as a registered nurse with additional didactic and clinical education, who has extended nursing practice to include specialties in adult, family, women's health, midwifery and pediatrics.

Nurse Practitioner Pilot Project

The Nurse Practitioner Pilot Project was defined as a 3-year project enacted by Utah Senate Bill 198 granting prescriptive practice privileges to specific nurse practitioners working in physician-sponsored settings under specified protocols.

Nurse Practitioner Pilot Project Member

A Nurse Practitioner Pilot Project Member was defined as any interested licensed nurse practitioner in Utah who formally applied and was accepted for participation in the pilot project.

Protocols

Protocols are criteria for nursing practice jointly developed by the nurse practitioner and physician sponsor for diagnosing and managing health problems.

Practice Specialty

The area of expertise and extra educational emphasis of the nurse practitioner was defined as the practice specialty. They include: family, adult, pediatrics, women's health and midwifery.

Subjective, Objective, Lab and Plan

Subjective - Information offered verbally by the client concerning the health problem, for example, "I have a severe pain in my stomach." The scores ranged from 0 to 235.

Objective - Visual information obtained by physically examining the client, for example, if the abdomen were distended and firm on palpation. The scores ranged from 33 to 270.

Lab - Diagnostic lab tests that aid in making a diagnosis of the health problem, for example, lab values include CBC, Differential and SMAC. The scores ranged from 40 to 200.

Treatment Plan - The plan of action or steps necessary to help alleviate the health problem, including the prescription of medications, for example, bedrest, nothing by mouth, transfer to physician for possible hospitalization. The scores ranged from 56 to 192.

Individual Health Problem Scores - Numerical scores derived by combining and averaging scores obtained in each subjective, objective, lab and treatment plan cate-

gory. The ranges of scores varied for each health problem evaluated.

Total Performance Score - A numerical score obtained by combining and averaging all individual health problem scores. The scores ranged from 66 to 184.

CHAPTER IV

METHODS AND RESEARCH DESIGN

The Nurse Practitioner Pilot Project (NPPP) (Senate Bill 198) legalized prescriptive practice for specific nurse practitioners in Utah for a 3 year period. Forty-four NPPP members were studied to determine their degree of compliance with protocols stipulated for use in the Pilot Project.

To determine the degree of compliance with protocols, each nurse practitioner's practice was studied by examining information documented by the nurse practitioner in client medical records. Medications prescribed by the nurse practitioner were studied to determine if the prescriptions were appropriate and justification for use was properly recorded.

Design

The design was a descriptive study measuring each nurse practitioner's degree of compliance with specified protocols for prescribing. The design included an analysis of demographic information including practice specialty and educational preparation. In this way any sig-

nificant difference existing between these factors and adherence to protocols could be determined.

Population

All nurse practitioners in Utah were invited to formally apply for participation in the 3 year project. Only licensed nurse practitioners were eligible to apply. Eligibility for licensure as a nurse practitioner in Utah includes completion of either a Master's, Bachelor's, or Certified nurse practitioner program. Of 192 total nurse practitioners, 62 applied for participation in the project. Eighteen nurse practitioners either moved out of state or dropped out of the project. The sample population of this study consisted of the remaining 44 nurse practitioners.

Two separate evaluations of performances of participants were made. The first study consisted of 30 nurse practitioners and was conducted during the spring and summer of 1982 (La Scala, 1982). The second study was conducted during the spring, summer, fall and winter of 1981-82 and consisted of 44 participants. Twenty-one nurse practitioners were evaluated in both studies. Twenty-three nurse practitioners were included only in the final study.

Patient Care Guidelines for Nurse Practitioners, by Hoole et al. (1976) was the recommended manual used for the recommended protocols specified for use by pilot pro-

ject members. Nurse practitioners needing additional or alternative guidelines were asked to submit individual protocols to the Governor's Committee for approval.

Pilot project members were issued instructional materials, daily record sheets and prescription pads identifying them as pilot project members. Daily record sheets consisted of preprinted forms to include patient's name, age, chart number, diagnosis, and a box to check if a prescription had been written (Appendix A). Prescription pads were designed to include a carbon of each prescription written (Appendix B). Participants were required to keep all daily record sheets and carbon prescriptions for use in the evaluation. All nurse practitioners were notified upon application to the pilot project that performances would be evaluated.

Instrument

The instrument used to evaluate prescriptive practice of Nurse Practitioner Pilot Project Members was based on a modified system of documentation. This modified system is called the subjective, objective, lab and plan (SOLP) format. The SOLP format involves identifying a health problem based on information obtained from the client. That information is systematically divided into subjective (S), objective (O), lab (L) and treatment plan (P) categories. Subjective information consists of

information verbally offered by the client concerning the health problem. Objective information is information the nurse practitioner obtains on physically examining the client. The lab portion of care consists of lab tests performed to aid in the diagnosis of the problem. An assessment or diagnosis is made based on subjective, objective and lab information.

The treatment plan is the plan or action of steps necessary to help alleviate the health problem, including the prescription of medications. Nurse practitioners systematically recorded all SOLP information in the client's medical record using this method.

Data Collection Procedure

Each nurse practitioner project member was notified in advance of the evaluation to arrange a meeting time. Personal contact with the nurse practitioner was not required for the evaluation study. Prior consent was obtained from each nurse to review medical records, daily record sheets and carbon prescriptions.

The researcher used random medical record (chart) reviews to evaluate prescriptive practice of pilot project members. When possible, five of the most common health problems encountered by each nurse practitioner were identified by reviewing the daily record sheets. A total of 25 charts, 5 charts for each of the five health problems identified, were then randomly selected and stu-

died. When the types of health problems identified were less than five, a total of 5 charts for whatever number of health problems encountered were obtained. The Pilot Project Governor's Committee felt that an evaluation of five types of health problems for each participant would be appropriate. A total of five varieties of problems represented a sufficient diversity in management of patients by nurse practitioners. The varieties of health problems identified for each nurse practitioner ranged from one to five types of health problems. The quota of charts reviewed for each participant varied from 25 to 5 charts.

All of the SOLP information recorded in the client's chart for each encounter was recorded on a checklist designated for that health problem (Appendix C). Medications prescribed in the chart were compared with the carbon prescriptions. Verification of the appropriate medication, signature, dose and format were noted on the checklist.

Nurse practitioners were referred to by identification numbers rather than names to diminish bias and assure anonymity. A master copy of nurse practitioner's names and identification was retained for legal purposes.

Minimal practice standards for nurse practitioners were identified by a team of health care experts using Hoole's protocols as a guideline. The minimal level of

information necessary to make an appropriate diagnosis of health problems most frequently encountered by nurse practitioners were defined. SOLP categories were assigned numerical values based on the defined minimal level of information for each health problem.

A total performance score, reflecting the degree of adherence to protocols was obtained for each project participant. Numerical values were assigned to each SOLP category of health problems most frequently encountered by nurse practitioners. The total performance score was derived by averaging the sum of scores obtained in each SOLP category for all health problems evaluated.

Nurse practitioners following protocols received total performance scores of 100. Nurse practitioners documenting additional relevant information in the client's record, exceeding that required by protocol, received scores in excess of 100. A score of 100 meant that nurse practitioners were administering minimal levels of health care. Scores in excess of 100 meant that nurse practitioners administered care above the minimally-required standard, as reflected in documented nurses' notes.

The pilot project required all participants to receive a total performance score of 100. Nurse practitioners receiving total performance scores below 100 were reported to the regulatory board of the pilot project called the Governor's Committee. Nurse practitioners not

in compliance with the requirements of the pilot project were notified by letter. The warning letter stated that prescriptive privileges would be withdrawn for any nurse practitioner violating the regulations of the pilot project.

Statistical Analysis

In conducting an analysis of features influencing adherence to protocols statistical analysis included: Pearson Product-Moment correlations, analysis of variance (ANOVAs), ETA coefficients, a t-test, and a frequency distribution.

The Pearson Product-Moment correlation coefficient (r) was computed for variance between each SOLP category and the variance in each SOLP subgroup to total performance scores.

ANOVA tests were used to determine the variance between mean to total performance plus SOLP scores and practice specialty and educational preparation. Significance was defined at the .05 level. ETA coefficients were tabulated to measure the strength of the association between each SOLP category plus total performance score with practice specialty and educational preparation. ETA coefficients do not measure the direction of the association thereby requiring an examination

of mean scores. A t-test was the final statistical method used to compare scores between the two groups of nurse practitioners.

CHAPTER V

DISCUSSION OF THE FINDINGS

Adherence to Protocols

This chapter presents a discussion of the results of an analysis of the degree of adherence by nurse practitioner pilot project members to required protocols. The relationship between adherence to protocols, practice specialty, educational preparation and number of times each nurse practitioner was evaluated, is presented.

The first research issue addressed the question: to what degree did NPPP members adhere to protocols stipulated for use in the pilot project? The results are presented in Table 1.

Total performance scores (TP) scores, ranged from 66 to 184, with a mean of 125.6 and a standard deviation of 30.7. Sixteen percent (7 nurse practitioners) received TP scores below 100, while 14% (6 nurse practitioners) received scores above 160. The largest percentage, 34% (15 nurse practitioners) received TP scores between 101 and 130. Seven percent (3 nurse practitioners) of the group studied obtained TP scores of 100. The remaining 29% (13 nurse practitioners) received TP scores ranging

Table 1
Overall Total Performance Scores

Rating	<u>N</u>	%
Below 100	7	16.0
100	3	7.0
101-130	15	34.0
131-160	13	29.0
Above 160	6	14.0

Note. Range = 66-184, \bar{X} = 125.6, S.D. = 30.7

from 131 to 160. Eighty-four percent of the sample of nurse practitioners were following the specified protocols.

The second research question examined the relationship between each of the SOLP categories, as well as the relationship of the SOLP categories to the total performance score (TP). By examining Table 2 it is worth noting that all the correlations between each of the SOLP categories and between TP scores are positive. It is also important to note that all correlations are significant, with the exception of that between the lab and plan categories. This means that the high performance scores in one category were associated with high scores in each of the other scales.

Among each SOLP category, the strongest associations were between the subjective and objective categories ($\underline{r} = .59, \underline{p} < .001$) and the subjective plan categories ($\underline{r} = .46, \underline{p} < .01$). Furthermore, both a high level of significance and magnitude of correlation was found between the total performance score and each of the SOLP categories. The highest correlation of TP scores and SOLP subgroups were between the TP scores and both the objective and subjective categories ($\underline{r} = .82, \underline{p} < .001$).

The strong association between each of the SOLP scores and TP scores received indicates that as nurse practitioners improved in one category, the scores in the

Table 2
 Correlation Matrix: Overall Rating
 Scores (N = 44)

	Subj	Obj	Lab	Plan
Obj	.59***			
Lab	.32*	.35*		
Plan	.46**	.31*	.24	
Total Average	.82***	.82***	.64***	.61***

Note. *p < .05; **p < .01; ***p < .001.

remaining categories also increased, as did the total performance score. For example, nurse practitioners who improved recording vital information in the subjective category, also reflected increased scores on all other objective lab plan and total performance scores.

It is interesting to note that information recorded in both the subjective and objective categories most heavily influenced the TP score. Perhaps nurses concentrate more attention on the client's complaints and objective physical examination findings than on the lab or treatment plan data. Return of lab work ordered to help substantiate a diagnosis may take several days. Lab results that are telephoned or returned by mail can easily be misplaced in any busy practice.

Evaluation of the treatment plan category, not only included medications prescribed but client education. Nurse practitioners offering valuable health teaching to the client may lack sufficient time or forget to record teaching performed in the chart.

The lowest score of .24 in the lab category may be attributed to the fact that the lab results are often misplaced. This researcher may have been unfamiliar with the system of retrieving lab results for each specific practice setting.

The information in Table 3 addresses the third research question: was there any significant difference

Table 3
 T-Test for Comparing Mean Differences
 in Overall Rating Between
^a
 Evaluation Groups

Rating Criterion	Group 1 (<u>N</u> = 23)	Group 2 (<u>N</u> = 21)	<u>T</u> -Value
Subjective	131.3	146.9	-1.13
Objective	110.8	134.1	-1.56
Lab	121.7	130.6	-0.73
Plan	113.2	117.9	-0.54
Total Average	119.2	132.0	-1.40

Note. No significant differences. ^a Group 1 = first evaluation; Group 2 = second evaluation.

in adherence to protocols between nurse practitioners evaluated once versus twice? No significant difference was found between nurse practitioners evaluated once (Group 1) versus those evaluated twice. The highest mean score of 146.9 was obtained by nurse practitioners evaluated twice (Group 2), in the subjective category. The lowest mean score of 113.2 was obtained in the plan category by Group 1. Mean total performance scores varied, with the highest score of 132.0 received by Group 2, followed by a mean score of 119.2 by Group 1. The lack of a statistical difference between Group 1 and 2 may be a result of the small size (44) of the population studied. Despite the lack of statistical significance, it is important to examine the difference in scores obtained by both groups. It is interesting to note that the group of nurse practitioners evaluated twice received higher scores in all categories. The trend of higher scores received by group two may be analogous to scores received on midterm and final examinations. Perhaps nurses evaluated twice made a conscious effort to improve. Nurse Practitioners evaluated twice were given the chance during the initial evaluation to observe what type of information the researcher sought for evaluation. In addition, nurse practitioners not adhering to protocols were given a verbal and written warning that the daily record sheets, prescription blanks and charting

needed to be more organized.

The results of the question, did educational preparation influence the nurse practitioners' adherence to protocols, are presented in Table 4. It is interesting to note that a significant difference at the .05 level existed between educational preparation and practice specialty of the nurse practitioner ($p < .05$, $\eta^2 = .36$).

A total of 9 nurse practitioners was educated at the bachelor's level. Five nurse practitioners specialized in adult health, 3 in family planning and 1 in pediatrics.

There were 19 nurse practitioners educated at the master's level. Three of the practitioners specialized in family practice, 3 in pediatrics, 2 in women's care and 11 in midwifery.

Sixteen participants were certified. Five nurse practitioners specialized in adult health, 6 in family practice, 4 in women's care and 1 in occupational nursing.

TP score means varied from 117.2 to 145.3. Nineteen nurse practitioners were prepared at the Master's level and received the lowest mean TP score of 117.2. Fifteen nurse practitioners were prepared by certification. The overall mean TP score of this group was 123.1.

Ten nurse practitioners prepared at the bachelor's level received the highest mean TP scores of 145.3. It

Table 4
Overall Total Performance Scores by
Level of Educational Preparation

Variable	<u>N</u>	Educational Preparation		
		Certificate	B.S.N.	M.S.N.
<u>Training Level</u>				
Mean	15	123.1	145.3	117.2
<u>Practice Specialty</u>				
Adult health	10	5	5	0
Family	12	6	3	3
Pediatrics	4	0	1	3
Women's care	6	4	0	2
Midwifery	11	0	0	11
Occupational	1	0	0	1
Total	44	16	9	19

is interesting to observe that nurse practitioners prepared at the bachelor's degree level received the highest mean TP scores. Certified nurse practitioners followed with nurses prepared at the Master's level receiving the lowest mean TP score. One reason which may account for the variation in TP scores and practice specialty was the system used to record health problems in the medical record. The majority of Bachelor's prepared nurse practitioner participants used a system of dictation to record client visits. Each health problem was systematically evaluated in the SOLP format and dictated into a recorder. The tape recorded message was then typed on a small disc of microfilm and filed in the patient's chart. Dictating, rather than handwriting the charts concerning the client's health problem was utilized to save time. Dictated notes, however, often include more information than is necessary to assess the client's health problem. The system used to evaluate adherence to protocols, however, gave each participant additional numerical points for including extra pertinent information. Extra relevant information concerning a client's health problem may have been obtained by all nurse practitioners, but due to time, was omitted in written documentation. The majority of Bachelor's prepared nurses receiving the highest total performance scores used the dictation system of documentation.

The information provided in Table 5 examines the question: was there any significant difference between practice specialty scores obtained in each SOLP and TP category? Table 5 represents mean SOLP and TP scores for each of the six practice specialties.

A significant difference at the .0001 level was found between scores obtained in the subjective category and practice specialty ($p < .0001$; $ETA = .70$). Of all the SOLP categories, the subjective category received the highest mean score of 138.1, for the entire six nursing specialties. Nurse practitioners specializing in adult practice received the highest mean subjective score of 169.8, while nurse midwives scored the lowest at 90.8.

The difference between practice specialty and scores obtained in the objective category were statistically significant at the .01 level ($p < .01$; $ETA = .56$). The highest mean objective score of 156.8 was received by family nurse practitioners. The lowest mean objective score was 87.8, received by women's health care practitioners. The volume of patients seen may account for the difference in TP scores between these two groups. Midwives and women's health care practitioners may provide care to a greater quantity of patients with specific problems. Adult and family practitioners with a wider variety of health care problems to consider may limit the quantity of patients. Limiting the quantity of patients

Table 5
Specialty Area by SOLP and Total Performance
Category Score Ratings

Specialty	(N)	Mean Scores				Total Average
		Subj	Obj	Lab	Plan	
Pediatrics	(4)	146.5	143.5	114.3	143.3	136.0
Occupational	(1)	136.0	121.0	130.0	98.0	121.0
Midwife	(11)	90.8	90.3	118.5	101.9	100.4
Women's Care	(6)	121.3	87.8	99.7	93.5	100.5
Family Pract.	(12)	164.4	156.8	121.3	118.7	140.3
Adult Pract.	(10)	169.8	129.3	159.0	130.6	147.1
Sign of F		.0001	.01	.05	.01	.001
ETA		.70	.56	.50	.55	.67

seen may improve the quality of care administered.

A difference which was statistically significant at the .05 level ($p < .05$, $\eta^2 = .50$) was also found between the lab category and practice specialty.

One factor influencing the consistent high level of performance by the adult nurse practitioners was the system used to record information in the client record. The majority of adult nurse practitioners used a dictation/microfilm system, allowing them to elaborate on care provided to the client. It can be speculated that nurse midwives and women's health care practitioners may be more relaxed in recording information in the client record.

CHAPTER VI

SUMMARY

In 1981, Senate Bill 198 or the Nurse Practitioner Pilot Project, was initiated. Specific nurse practitioners were granted prescriptive practice privileges for a 3 year period. The object of the pilot project was to examine the ability of nurse practitioners to prescribe medications. Protocols were selected as guidelines. This research indicates how well nurse practitioners followed approved protocols.

A measure of adherence to protocols was reflected by a total performance score for each nurse. Scores were obtained through random chart reviews of information recorded in the client's record by the nurse practitioner. A total performance score of 100 or more was required for project participation.

Eighty-four percent of the 44 nurse practitioner pilot project members met the minimal total performance score requirement. Drugs prescribed were found to be safe and within the limits of protocols. The style and quality of recording varied among each nurse; however, overall nurse practitioner pilot project members were

following protocols and prescribing appropriately.

Limitations of the Study

The major limitation of the study was relying solely on information recorded in the client's record to evaluate adherence to protocols. An additional percentage of nurse practitioners may have been following protocols, but due to lack of recording all information in the client record, lower TP scores were reflected.

The alternative to gathering data recorded in the client's chart would be in-person observation. A research assistant could be hired to record all client/nurse practitioner interactions. However, such a data collection system would be too costly.

Another major limitation of the study was the lack of organization by pilot project participants. The rules for participation -- including keeping daily record sheets and prescription blanks in order for the evaluation -- were often ignored. Data collection was extremely difficult and time-consuming in such practice settings.

The final limitation of the study was selecting only nurse practitioner pilot project members for the study. Prescriptive practices of nurse practitioners working with co-signed prescriptions could have served as a control group.

Implications for Further Research

A study of protocol adherence would be even more valuable with a larger sample size. The introduction of a specific tool for use by nurse practitioners to record in client records would help improve data collection. An interesting study would be a comparison of adherence to protocols in prescriptive practice by physicians versus nurse practitioners. Pilot project participants with Bachelor's education received the highest total performance scores. Original speculation was that high total performance scores could be attributed to the type of system used to document care administered. Mean TP scores of nurses using dictation, however were 147. Mean TP scores of the bachelor's prepared nurse practitioners not using dictation were 143. Further research needs to be conducted to explain the variation in performances by each educational level of nurse practitioner.

Implications for Nursing Practice

The goal of each health care provider is to provide care which is efficient, low in cost, and as safe as possible. One method of providing safe care is by adherence to specified protocols for nursing practice. Opponents to protocols feel that adherence is limiting and merely an attempt by physicians to limit nurse practitioners' practice scope (Clark & Dunn, 1976).

Protocols can be viewed in a positive way to define practice standards. Defined practice standards can aid in guiding care and defining the role of nurse practitioners. Formulating protocols in a collaborative fashion with physicians or health maintenance organizations is one positive method of establishing consistent levels of care rendered by all health providers.

The final implication for nursing practice is that all nurse practitioner programs need to stress the importance of systematic organized charting. Charting provides proof in writing of the care provided for the client. In this way, through peer review, charts can be reviewed to insure that the client is receiving safe, judicious care.

General systems theory is one method of conceptualizing prescriptive practice for nurse practitioners. The use of a systematic process of decision making could help improve the methods in which patient information is received. Information, both subjective and objective, can then be processed to make an appropriate decision concerning medication therapy, a vital component of primary health care.

APPENDIX A

DAILY RECORD SHEET

APPENDIX B

PRESCRIPTION BLANK

UTAH
NURSE PRACTITIONER
PILOT PROJECT

No. 36192

Date _____

Practitioner's Name _____

Address _____ Phone No. _____

Name _____

Address _____ Age _____

Ry

Refills NR
Label Contents

_____ R.N.P.

Dea No. _____

APPENDIX C

EXAMPLE OF DATA COLLECTION TOOL

cystitis (219) (adult)	dysuria, frequency, urgency _____ occasional gross hematuria _____ occasional low back abdominal pain. No flank or CV pain _____ no frank chills _____ no GI complaints _____ no vaginal, ure- thral discharge _____	temperature less than 101°F _____ only slight lower abdomen tender- ness _____ no peritoneal signs _____ normal bowel sounds _____ no CV tender- ness _____	urinalysis _____ urine cul- ture _____	Antibiotics: Sufisoxazole _____ Ampicillin _____ Phenazopyri- dine HCL (Pyridium) _____ Increase fluids _____
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