

**RESEARCH UTILIZATION OF REGISTERED NURSES  
IN US ARMY HOSPITALS**

**A Dissertation Presented**

**by**

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of the requirements for the degree of**

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## DEDICATION

To my ever-supportive husband and sons.

## ACKNOWLEDGEMENTS

A dissertation is never a solitary project and there were many involved in the realization of this, either directly or indirectly. I must first acknowledge my parents, who planted the seed for higher education and encouraged me to set my sights high many years ago. Maureen McMullen, my committee chair, provided continual reinforcement, insight and encouragement through out this process. I also extend my sincerest thanks to my committee, Dorothy Gilbert, for asking the hard questions, and to Mike Sutherland for his assistance with statistics and in keeping me focused on the forest. I greatly appreciate the support, tears, and laughter and memories provided by my classmates, Margie Laccetti, Hung Ru Lin, Corrine Jurgens, Pat Bruckenthal, and Barb Aronson. I must acknowledge Carole Estabrooks for allowing me to adapt her instrument for use in this study and to Jacques Mylle for translating his instrument for my use. This work could not have been completed without the assistance of LTC(p) Laura Brosch and MAJ Maleta Novak who helped me gain access to the study hospitals and the Chiefs, Department of Nursing at each of the study sites for allowing me to survey their nurses.. Financial support was provided by the TriService Nursing Research Program and administrative assistance was provided by staff at the school of nursing and at each of the study sites. Last, but certainly not least, I am deeply appreciative of the support and encouragement of my husband, Bill and my sons, Chris and Brian.

ABSTRACT

RESEARCH UTILIZATION OF REGISTERED NURSES

IN US ARMY HOSPITALS

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The use of research findings in clinical nursing practice has been studied extensively in civilian institutions or with civilian nurses. However, little research utilization study has been done in U.S. military facilities. Everett Rogers' theory on diffusion of innovations posits that a system's social structure and cultural norms affect an innovation's diffusion in several aspects, including innovation decisions, rate of diffusion, and the consequences of innovation (Rogers, 1995). Due to differences in organizational culture between civilian and military facilities, it is difficult to generalize the research done in civilian nursing facilities to the military organization.

All nurses working at three US Army Medical Treatment Facilities were asked to participate in the study, of which 313 returned surveys. Use of research findings in practice was measured using an adapted version of Estabrooks' Research Utilization Survey (Estabrooks, 1997). Perception of organizational climate was measured using Mylles' Organizational Climate Index for Military Units (Mylle, 1998).

Nurses indicated a generally positive attitude toward use of research for practice, stating that they believed it would enhance patient outcomes and they would use it if they could. There were direct relationships between several factors and research utilization, including attitudes toward research, time to read and implement research, access to research findings and support. Nursing support was directly correlated with all aspects of organizational climate indicators. There were inverse relationships between years worked in nursing and research utilization. Sources of research findings were primarily general nursing journals rather than research journals. The internet is an increasing source of information as unit access to the internet becomes more prevalent. Results of this study describe the influencing factors of research utilization by nurses in US Army hospitals, which can provide information for encouraging use of research findings by nurses and for conducting further intervention studies.

## TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS.....	v
ABSTRACT.....	vi
LIST OF TABLES.....	xi
LIST OF FIGURES .....	xiii
CHAPTER	
I. INTRODUCTION .....	1
Statement of the Problem.....	1
Relevance to Military Nursing.....	3
Background and Significance .....	4
Theoretical Framework.....	7
Purpose Statement and Research Questions .....	13
Definition of Research Variables.....	16
Assumptions.....	17
II. REVIEW OF THE LITERATURE .....	20
Introduction.....	20
Beginnings of Research Utilization in Nursing .....	21
Current Nursing Research Utilization Literature.....	23
Informational Literature.....	23
Utilization Studies.....	32
Implementation Studies .....	36
Summary of Nursing Literature.....	37
Knowledge Utilization in the Disciplines Outside Nursing.....	39
Military Organizational Culture.....	48
Theoretical Models for Knowledge Utilization .....	50
Nursing Models.....	50
Organizational Models.....	56
Utility of Rogers' Model for Nursing Science.....	65
Linking the Two Bodies of Literature Together.....	68

III.	METHODS .....	70
	Introduction.....	70
	Setting .....	70
	Sample.....	71
	Power Analysis .....	72
	Protection of Human Subjects .....	73
	Measures .....	73
	Reliability and Validity of the Instruments.....	74
	Data Collection Procedures.....	76
	Pilot Study.....	77
	Study Sites .....	79
	Data Management .....	80
	Data Analysis.....	82
	Summary .....	86
IV.	STUDY FINDINGS.....	87
	Introduction.....	87
	Characteristics of the Sample.....	87
	Data Analysis.....	91
	Reliability of Scales .....	93
	Research Utilization Survey .....	93
	Organizational Climate Index for Military Units.....	97
	Analysis of Research Questions.....	98
	Question 1 .....	98
	Question 2 .....	108
	Question 3 .....	112
	Question 4 .....	115
	Question 5 .....	118
	Question 6 .....	125
	Question 7 .....	130
	Other Findings .....	131
	Findings of the Organizational Climate Index.....	134
	Summary .....	141

V.	DISCUSSION .....	142
	Summary of the Findings.....	142
	Comparison with the Literature .....	146
	Implications for Nursing Practice .....	150
	Strengths and Limitations .....	151
	Summary and Recommendations .....	154
APPENDICES		
A.	STUDY INTRODUCTION LETTER .....	155
B.	RESEARCH UTILIZATION SURVEY.....	156
C.	ORGANIZATIONAL CLIMATE INDEX FOR MILITARY UNITS.....	165
	REFERENCES .....	169

## LIST OF TABLES

Table	Page
1. Breakdown of Surveys Sent and Returned, Total and From Each Site .....	88
2. Military Survey Responses by Rank.....	89
3. Demographics of Study Sample.....	91
4. Comparison of Means of Selected Variables, Raw versus Imputed Data .....	92
5. Reliability Coefficients for Organizational Climate Index for Military Units for Study Sample.....	98
6. Mean Research Utilization Scores and Frequency of “Do Not Know” Answers.....	106
7. Nurses Responses to Items Presented as Forms of Research Utilization .....	107
8. Significant Correlations Between RU Variables and All Other Variables .....	109
9. Effect of Professional and Organizational Factors on Research Utilization.....	112
10. Correlations Between Organizational and Professional Factors.....	114
11. Partial Correlations of Organizational Factors with Professional Factors, Controlling for Professional Factors.....	115
12. Group Differences Between Nurses in Management Positions and Staff Nurses on Professional and Organizational Factors Affecting Research Utilization .....	119
13. Means of Time to Read and Implement Research by Management Position .....	120
14. Comparison of Professional and Organizational Factors Affecting Research Utilization Between Nurses in Management Positions and Staff Nurses .....	121
15. Group Differences Between APNs and Non-APNs on Professional and Organizational Factors Affecting Research Utilization.....	122
16. Means of Attitudes Toward Research of APNs and Non-APNs .....	123

17. Comparison of Professional and Organizational Factors Affecting Research Utilization Between APNs and Non-APNs .....	124
18. Comparison of Professional and Organizational Factors Affecting Research Utilization Between Military and Civilian Nurses.....	126
19. Means of Military versus Civilian Nurses on Attitudes Toward Research, Trust, Access to Research Findings, and Support.....	127
20. Comparison of Means of Perceived Support by Military and Civilian Nurses .....	127
21. Comparison of Professional and Organizational Factors Affecting Research Utilization Between Military and Civilian Nurses.....	129
22. Differences in Research Utilization Among Different Sized Hospitals .....	130
23. Top Ten Nursing Journals Read by Nurses in Study Sample.....	131
24. Top Ten Non-Nursing Journals Read by Nurses in Study Sample.....	132
25. Top Ten Sources of Research Information by Nurses in Study Sample.....	133
26. Top Ten Interest Groups Belonged To by Nurses in Study Sample.....	133
27. Derived Scores from the Organizational Climate Index for Sub-groups within the Study Sample .....	135
28. Comparison of Mean Research Utilization Scores Between Estabrooks' Study and This Study .....	149

## LIST OF FIGURES

Figure	Page
1. Stages in the Innovation Decision Process .....	9
2. Independent Variables Related to Organizational Effectiveness.....	12
3. Stages in the Innovation Decision Process with Concepts Highlighted .....	57
4. A Three-Dimensional Model of Organizational Effectiveness .....	63
5. Mylle's Model of Organizational Climate.....	64
6. Distribution of Overall Research Utilization #1 Scores .....	100
7. Distribution of Overall Research Utilization #2 Scores .....	101
8. Distribution of Direct Research Utilization Scores .....	102
9. Distribution of Indirect Research Utilization Scores.....	103
10. Distribution of Persuasive Research Utilization Scores .....	104
11. Distribution of Overall Research Utilization #3 Scores .....	105
12. Comparison of Research Utilization Between Managers and Staff Nurses .....	116
13. Comparison of Research Utilization Between APNs and Non-APNs.....	117
14. Comparison of Organizational Index Scores of Military and Civilian Nurses.....	137
15. Comparison of Organizational Index Scores of Hospital Sites .....	138
16. Comparison of Organizational Index Scores of APNs and Non-APNs.....	139
17. Comparison of Organizational Index Scores of Managers and Staff Nurses .....	140
18. Comparison of Organizational Index Scores of Male and Female Nurses.....	141

# CHAPTER I

## INTRODUCTION

### Statement of the Problem

The ability to evaluate research findings and assimilate them into practice is an important skill for the practicing nurse. Several implementation studies have indicated that incorporating research into nursing practice has resulted in improved patient outcomes and quality of care (Bach, 1995; Cole & Gawlinski, 1995; Gerdner, 1999; Gordon & Montgomery, 1996; Gray, Dostal, Ternullo-Retta, & Armstrong, 1998; Lund, Osborne, Kuller, Lane, Lott, & Raines, 2001; Lundin, Sargent, & Burke, 1998; McCollam, 1995). Steelman (1995) reported a project that used the Iowa Model of Research-Based Practice to implement a protocol for latex allergy precautions. After implementation of the protocol, no serious reactions to latex were reported whereas two anaphylactic reactions had occurred prior to implementation. Specht, Bergquist, and Frantz (1995) examined the issues of pressure ulcer care in a long-term facility. Previous research by the authors in that same facility found that nurses tended to rely on a variety of methods to treat pressure ulcers that were based primarily on personal preferences, physicians' orders or past effectiveness without regard to research findings. A research-based protocol was developed using moist wound healing techniques. Outcomes of pressure ulcer care before utilization of the research-based protocol were compared with those after implementation of the new protocol and demonstrated that more ulcers were being treated using methods identified by research as supportive of healing and the

variability of treatment modalities declined. While the outcome of wound healing was not addressed in this paper, the average cost for treatment was lowered by 53%.

Many projects designed to implement research findings have failed to persuade nurses to make changes in practice for a variety of reasons including lack of understanding of research (Brett, 1987; Grap, Pettrey, & Thornby, 1997), the belief that research and its utilization is outside the realm of clinical nursing (MacGuire, 1990; Mayberry, 1994) and prevailing physician practices (Shermer & Raines, 1997). Druding (1997) found that despite numerous research studies indicating that saline instillation during tracheal suctioning did not enhance removal of secretions and in some cases was harmful to the patient, nurses were continuing to instill saline into endotracheal tubes before suctioning. Brett's 1987 study of the use of specific research findings in practice concluded that while 70% of nurses were aware of the research findings, only 33% used them sometimes and 28% were using research findings always.

Implementation projects that considered themselves successful reported differing levels of success and many impediments. Lack of several factors including organizational support, organizing committees to develop protocols, and education of clinical nurses to interpret research findings were a few of the obstacles needed to be overcome (Dufault, Bielecki, Collins, & Willey, 1995; Howell, Foster, Hester, Vojir, & Miller, 1996; Janken, Blythe, Campbell, & Carter, 1999; Meier, 1994). Lund, Kuller, Lane, Lott, Raines and Thomas (2001), in a multi-site intervention study of neonatal skin care protocols, reported that short implementation time-frames and logistic hurdles of the hospital systems hindered the nurses most in implementing practice changes. They also cited reluctance on nurses' parts to change the long-established practice of applying

isopropyl alcohol to umbilical cords, even though research has shown that other products are as safe and more effective in promoting cord detachment. Most of the "successful" implementation studies had no long-term follow-up to determine if the practice change persisted.

For the last 27 years, beginning with Ketefian (1975), literature on research utilization has continued to address the knowledge-practice gap and the difficulties in creating a research-based profession rather than one that continues to rely on ritual and tradition. There has been little progress toward closing that gap. Opinions as to its cause appear to have evolved from the nurses themselves to a more complex systems approach, recognizing also that the context in which the innovation is introduced often determines its success or failure (Barnsteiner, 1996; Beason, 2000; McCormack et al., 2002).

#### Relevance to Military Nursing

The use of research findings in clinical nursing practice has been studied extensively in civilian institutions or with civilian nurses. Yet, only one other research utilization study has been done in U.S. military facilities. Schempp, Ashley, and Kutaka (2002) used the BARRIERS Scale developed by Funk, Champagne, Wiese, and Tornquist (1991b) at a large Army Medical Center. Their preliminary results were similar to civilian studies.

Everett Rogers' theory on diffusion of innovations posits that a system's social structure and cultural norms affect an innovation's diffusion in several aspects, including innovation decisions, rate of diffusion, and the consequences of innovation (Rogers, 1995). Due to differences in organizational culture between civilian and military

facilities, it is difficult to generalize research on civilian nurses to the military organization. Therefore, in order to understand research utilization in military facilities, research is needed in this arena to assess both organizational diffusion of research knowledge and nurses' individual perceptions of the barriers to and facilitators of using research in clinical practice.

Military nurses, as their civilian counterparts, must be able to translate research findings into practice. In addition, they must be able to translate research findings into protocols applicable to combat situations in which patient care is very different from that of the fixed facilities. Because the patient care mission and organizational culture of military facilities is different from civilian institutions, results from civilian studies cannot be generalized to military nurses; the military's unique culture must be accounted for when studying research utilization in this population. Some studies applicable to combat scenarios have been conducted however, they have not yet been translated into protocols for military nursing practice (Bridges, Schmelz, Mazer, & Bass, 2002; Lemay, Bridges, & Pashos, 2002; Robison, 2002). This study will provide the foundation to extend evaluative research throughout the US Army healthcare system and to the Navy and Air Force. Results from descriptive studies such as this can provide a basis for intervention strategies and intervention studies to increase the use of research findings in clinical practice.

### Background and Significance

As early as 1975, studies evaluated the adoption of research-based nursing innovations by practicing nurses at the same time researchers were identifying a widening

gap between research findings and their implementation into practice (Ketefian, 1975). Several different definitions and models of research utilization emerged from some of these studies. Though research utilization and evidence-based practice are currently at the forefront in the profession, the knowledge-practice gap persists as nurse researchers continue to look for ways to interest clinicians in research evaluation and enhance dissemination, diffusion, and implementation of clinical research findings into practice.

According to Kirchhoff (1982), tradition and ritualism form much of a nurse's practice. A ritual is established because it may work or make sense at the time, and then finds its way into the literature. Because of this practice into literature sequence, the notion of nursing as a research-based profession becomes diluted. Nursing textbooks, available on nursing units, are usually what the staff nurse turns to for answering procedural questions and getting information on disease processes. To get up-to-date research-based information, a nurse must go to a library for its journal collection or turn to the Internet to browse for information. Both of these can be time-consuming and take the nurse away from the patient, unless getting the information is done on his or her own time.

Research-based practice has taken a front seat in the eyes of nursing accrediting bodies and in healthcare organizations as a way to improve practice and patient care outcomes and much has been written about research or knowledge utilization. Three themes have been noted in the literature on research utilization in nursing. First, literature contained information regarding research utilization and its process; secondly, there were studies conducted on the research utilization process itself; and finally, research-based implementation projects were described. The first group of papers, those that contained

information regarding research utilization and its process contained one central theme. A sizeable "gap" between nursing research findings and its implementation into practice exists. This theme was found from the earliest articles to those published within the last year implying that, for the last 27 years, much has been said about the topic, but little progress has been made. Krueger (1978) describes researchers' frustrations that research findings are not being implemented by working nurses and nurses' difficulties with trying to understand the research reports. Almost twenty years later, Miller and Matthey (1997), in discussing the "journey" of navigating through the research utilization process, describe nurses' frustrations as they ask, "...what do we do about those research studies that are so obtuse and abstract that we can not get past the problem statement..." (p. 6).

The term "research utilization" appears to have given way to the expression "evidence-based practice" in much of current nursing literature, despite differences in their scope. This stems from the evidence-based medicine movement that began in Canada in the 1980's and continued with development of the Cochrane Database Collaboration (Jennings & Loan, 2001). Definitions of evidence-based nursing practice have been introduced in the nursing literature, however, many do not distinguish between use of research and other sources of evidence for use in practice. Some use the terms interchangeably (Gerrish & Clayton, 1998; Goode & Piedalue, 1999; Jennings & Loan, 2001; Lund, Kuller, Lane, Lott, Raines, & Thomas, 2001; Lund, Osborne, Kuller, Lane, Lott, & Raines, 2001; Melnyk, Stone, Fineout-Overholt, & Ackerman, 2000; Stetler, 2001).

Recent literature on research utilization from fields other than nursing is vast and does not appear to have a focus. This lack of direction may indicate the diversity of

disciplines dealing with the issue, or it may reflect confusion over terms that are not defined clearly or are defined differently. Nevertheless, several themes have emerged as important in considering innovation dissemination and implementation. These include the concept of critical mass in adoption of innovation (Holland, 1997; Mahler & Rogers, 1999; Rogers, 1995), the role of social networks in innovation diffusion (Kim & Srivastava, 1998; Maier, 1997; Midgely, Morrison, & Roberts, 1992; Valente, 1996), the use of champions or change agents (Backer & Rogers, 1998; Holland, 1997; Stoller, 1994), organizational culture and climate ( Bierly, Kessler, & Christensen, 2000; Ledlow, Bradshaw, & Shockley, 2000; Mylle, 1998; Ogbonna & Harris, 2000; Royle, Blythe, Ciliska, & Ing, 2000), and the impact of organizational size in adoption of innovation (Mazzoleni, 1997; McKormick, Steckler, & McLeroy, 1994; Royle, Blythe, Ciliska, & Ing, 2000). These will all be discussed in the review of literature.

### Theoretical Framework

Dissemination and diffusion of information has been studied in sociology since the beginning of the twentieth century when Tarde, in 1903 (as cited in Rogers, 1995), looked at why 90% of innovations failed to be adopted. His conclusion was that the closer an innovation was to the current behavior of a culture, the more likely it was to be accepted. Since then, the growth of diffusion studies has proliferated, though mainly in sociological and anthropological areas. Rogers (1962) was one of the first to develop a model for the process of diffusion of innovations. This model is the theoretical framework for many of the nursing studies on research utilization.

The theoretical framework to be used for this study will be Rogers' (1995) Diffusion of Innovations. Rogers examined the process by which innovations are diffused through systems, both societal and organizational. He defines diffusion as, "the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). An innovation is an idea or practice that is seen as new or practical by an individual or group, with various factors that may enhance or hinder its adoption. The salient point is that diffusion of innovations is a process that consists of a series of decisions that lead to actions. There are several prerequisites that must exist prior to an innovation's diffusion into a decision-making unit. These include an established practice, perceived problems or needs within that practice, and an innovation or new method of practice. The culture and norms of the organization in question must also be considered when determining the likelihood of an innovation's acceptance or rejection. He cites the classic example of the failed attempt to induce Egyptian women to use clean, piped-in water for drinking. Investigators discovered several reasons for these women wanting to continue walking miles to collect contaminated canal water, including the fact that canals provided a setting for the women to congregate and socialize. Rogers (1995) developed a model depicting several stages through which an individual or group progresses in putting knowledge into practice. Figure 1 displays Rogers' (1995) innovation decision process.

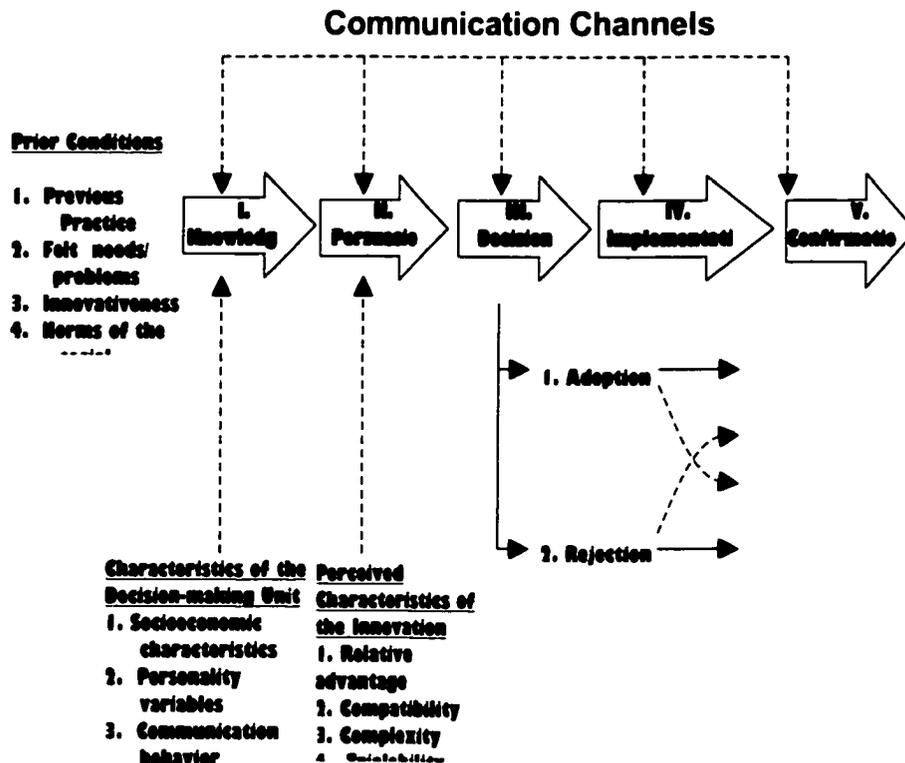


Figure 1: Stages in the Innovation Decision Process

The first stage, knowledge, is defined as the stage in the process when an individual or group becomes aware of an innovation and gains an understanding of its function. Rogers (1995) posits that there is current argument as to whether an individual becomes aware of an innovation by accident or actively seeks out innovation. He states that, in most cases, individuals are likely to engage in selective exposure to innovations, those which are most congruent with their own beliefs and attitudes.

Rogers (1995) describes three different types of knowledge. “Awareness-knowledge” is simply information that an innovation exists. Dependent on the needs of the individual or organization, further “how-to knowledge” will be sought. This is the information that is required in order to use an innovation properly. The amount of how-to

knowledge needed depends on the complexity of the innovation. Adoption or rejection of the innovation may be influenced by the amount of how-to knowledge gained prior to a trial of the innovation. The last type of knowledge described by Rogers is “principles-knowledge” or the underlying principles related to the innovation. For example, the physiology of pain receptors underlies certain interventions in pain control. Principles knowledge is the "why" an innovation will work. According to Rogers (1995), failure of adoption can be traced to inadequate levels of both how-to and principles knowledge before introducing an innovation.

Several other variables help to account for adoption or rejection of innovations. Personality characteristics of individuals within the system must be considered when introducing an innovation. Rogers (1995) describes early adopters and late adopters. Communication channels within a system can also determine how well innovations will be adopted. Sometimes it may be the organization or a policy that causes adoption of certain innovations, as in Joint Commission for Accreditation of Hospital Organizations (JCAHO) or Department of Defense (DOD) requirements.

The second stage of the model is the persuasion stage. In this stage, attitudes and/or beliefs must be changed. The agent introducing the innovation must be able to transform an individual or group's thinking from cognitive, or awareness of the innovation, to affective, or valuing and owning the innovation. Several factors at this stage can enhance or hinder the likelihood of adoption of the innovation. The characteristics of the innovation have an important role at this stage. If the innovation is perceived as advantageous and compatible with current beliefs or practice, adoption will

be more likely to occur. If it is complex, requires large amounts of how-to knowledge and is much different from current practice, adoption will be difficult, if it occurs at all.

It is during the persuasion stage that the potential for a Knowledge-Attitudes-Practice (KAP) gap occurs. It is not enough to possess knowledge of a new practice. If attitudes of an individual or group cannot be changed to adopt an innovation, then the result will be maintenance of the status quo. In nursing, the KAP-gap has been investigated by Estabrooks' (1999b) work in research utilization that indicated that attitudes and belief suspension were two factors that accounted for nurses' use or non-use of research findings in practice.

The third stage, the decision, usually occurs after an individual or group has gained the necessary knowledge and taken on the attitudes required to decide to adopt the innovation. The intent is to try the innovation. At this point, the consequences of the innovation may not be clear. Adoption on a trial basis may occur to determine if the innovation should be adopted fully or discontinued.

Rogers' fourth stage, implementation, involves an observable behavior or practice change. Generally, if initiation of an innovation is carried out by an organization rather than an individual, problems may arise. Those adopting the innovation are usually not those who made the decisions to adopt it. The process of education and persuasion must begin again on the level of the adoption with logistical problems needing to be worked out. The very structure that gives stability to an organization may impede implementation of an innovation. This stage can be lengthy and last until either the innovation is used regularly and has become part of ongoing operations or until it has been deemed non-



positive attitude regarding change, the organization will tend to be more innovative.

There are several characteristics subsumed within the organizational structure. Some of these have a positive impact on innovativeness and include complexity, interconnectedness, size and organizational slack. Others have a negative impact and include centralization and formalization.

Rogers' Diffusion of Innovations model provides the framework for which many of the factors that enhance or hinder nurses' use of research findings in their practice can be examined. Within the military hospital system, some of these factors include the organizational culture and structure of Army Medical Treatment Facilities (MTFs), the decision-making process and lines of authority for implementing innovations, and the skills and motivation of staff nurses for using research findings in their practice. Only one formal study could be found that examined how nurses in military facilities utilize research and what would enhance it (Schempp, Ashley, & Kutaka, 2002). Using Rogers' model as a foundation, with particular attention paid to the organizational culture, it is evident that a descriptive study, as proposed, is needed in order to further identify factors that could lead to an understanding of research utilization of nurses in military facilities.

#### Purpose Statement and Research Questions

The purpose of this study is to describe factors that enhance or hinder research utilization of registered nurses in US Army Medical Treatment Facilities (MTFs).

Specifically, answers to the following research questions will be sought:

1. To what extent do registered nurses in US Army medical treatment facilities use research findings in their clinical practice?

2. What professional and organizational factors enhance or hinder research utilization by registered nurses in US Army medical treatment facilities?

3. To what extent does organizational climate affect the professional factors of belief, attitude toward research, trust, cosmopolitanism and support in research utilization by registered nurses in US Army medical treatment facilities?

4. Are there differences in the ways research findings are used between nurse administrators, advanced practice nurses and staff nurses?

5. Are there differences in professional and organizational factors that enhance or hinder research utilization as perceived by nurse administrators, advanced practice nurses and staff nurses?

6. Are there differences in professional and organizational factors that enhance or hinder research utilization as perceived by civilian and military staff nurses practicing in US Army medical treatment facilities?

7. Are there differences in research utilization among staff nurses in different sized military hospitals (large medical center, small medical center, community hospital)?

In this study, research utilization is defined as the use of findings of scientific research in one or more ways when involved in the practice of nursing. There are different ways in which research findings can be applied to clinical practice. These include direct utilization, where research findings are applied in a usable form such as a protocol; indirect utilization, in which research findings may change a nurse's thinking, but not necessarily actions; and persuasive utilization, where research findings are used persuasively or politically to justify one's position or practice (Estabrooks, 1999a).

Here, it is appropriate to differentiate between research utilization, knowledge utilization and evidence-based practice. Often these terms are used interchangeably within the literature, however, they differ in terms of their scope. Knowledge utilization crosses disciplinary boundaries and a wide range of backgrounds. Its focus is on how new knowledge is transformed into practicable innovation (Loomis, 1985). Research utilization is a subset of knowledge utilization in that its interest is in using research evidence in practice (Estabrooks, 1999c). Evidence-based practice includes the use of not only research, but evidence from other sources as well. These sources vary according to which definition as described in the literature is used, but generally includes information ranging from randomized clinical trials to expertise (Jennings & Loan, 2001). It can be thought of as an umbrella term under which research utilization falls. The emphasis of evidence-based practice is on the scientific clinical trials. Knowledge utilization also has a broader scope than research utilization, but generally does not have the emphasis on the clinical trials given to evidence-based practice.

Evidence-based practice has become the latest "buzzword" in the establishment of health care policies and protocols, yet it could be considered in and of itself to be an innovation. Paradoxically, according to Nutley and Davies (2000), "It remains an irony that so many of the activities surrounding evidence-based practice are not in themselves evidence-based. While the existing literature in several fields can offer guidance and insight, there is as yet only a limited empirical base evaluating specific evidence-based practice strategies." (p. 41).

### Definition of Research Variables

“Research Utilization” is defined as the use of research, the findings of scientific studies, to guide clinical practice (Estabrooks, 1999c). For this study, it will be measured using an adaptation of Estabrooks’ Research Utilization Scale (1997). Three types of research utilization will be measured: (a) Direct- Research findings are used directly by a nurse to change his/her own practice, (b) Indirect- Research findings are used to change thinking or opinions regarding the approach to patient care situations, (c) Persuasive- The use of research findings to persuade others to make policy or protocol changes.

“Nurses working in US Army Hospitals” are defined as a group of nurses including (a) Registered nurses (RN) who are commissioned officers in the US Army Nurse Corps and working in any capacity in a US Army medical treatment facility; all of these RNs have at least a baccalaureate in nursing; and (b) Registered nurses who are Department of the Army Civilians and working in any capacity in a US Army medical treatment facility; these RNs have at least an Associate degree in nursing.

“Practice Level” is defined according to a nurse's experience, education and position. Nurses in management positions will be grouped according to lower (unit head nurse), middle (section chief or supervisor) or upper management (administrative positions, such as chief nurse or assistant chief nurse). This is so that individual nurses cannot be readily identified and anonymity is maintained. Those nurses working in a clinic or unit will be identified as staff nurses. Those working as Nurse Practitioners or Clinical Nurse Specialists will be identified as Advance Practice Nurses. Education and years of experience will be considered when analyzing data.

“Professional Factors” are defined as those factors inherent to the individual nurse and/or the special nursing environment that may hinder or facilitate research utilization. They will be measured using Estabrooks’ (1997) adapted Research Utilization Survey and include demographics, types and level of research utilization, beliefs about research, attitudes towards research, sources of knowledge, access to knowledge, trust, aspects of cosmopolitanism, time, and support from others.

“Organizational Factors” are defined as those factors inherent within the organization that may hinder or facilitate research utilization. They will be measured using the Organizational Climate index for Military Units and include respect for rules, supportiveness, innovativeness, and purposive information flow. Size of the organization will also be considered during data analysis.

### Assumptions

There are several assumptions inherent in the study of research utilization. The first is that research-based innovations are positive and should be adopted. Rogers (1995) uses the term, “pro-innovation bias” to imply that an innovation should be adopted, as is, by all members of a group. Innovation is perceived as positive and desirable in an organization. Because research has focused on innovations that are typically successful, this bias has resulted in the failure to critically examine rejection, adaptation, and discontinuance of innovations or those where diffusion is slow. The consequences of the pro-innovation bias are that too much is known about innovation success and too little known about what causes innovation failure.

Another assumption found often in the literature is that research-based nursing practice will result in improved patient outcomes. Generation of a sound knowledge base for practice is accomplished through scientific research (Barnard, 1986) and the intended use of that scientific knowledge in clinical practice is to positively affect outcomes through the provision of higher quality, more cost effective patient care.

Thirdly, it is assumed that nurses have a responsibility to utilize research and they are aware of and have the desire to use it in their practice. Crane (1995) elaborates on this when she states, "...research utilization will be assumed, and nursing practice will be redefined in a way that mandates that it is based on the best available scientific knowledge and on one's ability to think critically about the implications of that knowledge for the achievement of desired patient outcomes" (p. 573).

Finally, it is assumed that nurses are aware of knowledge based on research and that they are interested in implementing new findings, but do not know how to go about it, either because of individual or organizational barriers. Cronenwett (1995) iterates that, while most nurses are aware of the presence of research-based information, they are not adept at finding and interpreting it.

This proposed study will use the Research Utilization Survey developed by Estabrooks (1997) to evaluate US Army nurses' use of research findings in their practice and factors that hinder or assist in the use of those findings. Further, it will use the Organizational Climate Index for Military Units developed by Mylle (1998) to determine which organizational factors affect research use in practice. Future projects in a program of research will look at this issue on a wider scale, expanding to include nurses in the US

Navy and Air Force. From this, interventions aimed at increasing evidence-based practice in military institutions can be developed.

## CHAPTER II

### REVIEW OF THE LITERATURE

#### Introduction

The purpose of this literature review is to present a synopsis of the nursing literature in the area of research utilization and to bring an organizational perspective of the knowledge utilization and dissemination literature. From there, ideas and main themes from the two bodies of literature will be compared and merged to form the ideas that make up the basis for this study.

A search of the published nursing literature was conducted using the database CINAHL from the years 1966 through 2002. A search in MEDLINE for the same years' database yielded further studies in the area of medicine and allied health. Keywords used to identify applicable articles were: *research utilization, evidence-based nursing, research-based practice, and research based nursing*. To find writings on research utilization in the organizational literature, the LEXIS-NEXIS Academic Universe, General Business File ASAP, and ERIC databases were used for available years. The keywords: *research utilization, diffusion of innovations, organizational climate, dissemination of information, research-based practice and knowledge utilization* were used. Locating literature on military culture was done using the search engine, google.com and the Electric Library database using the keywords: *military culture and military culture since 9/11*. The abstracts of articles deemed to be useful were examined and those that were relevant to this study were obtained. Several more pertinent articles were obtained from scanning article bibliographies.

The following outline will be used in presenting the literature review. First the background and history of research utilization will be discussed, followed by a review of the nursing literature and general organizational literature. Models of research utilization developed and used by nurses as well as important organizational models will be outlined. The two bodies of literature and will be compared and central ideas linked together. Because of the military focus of this study, a brief discussion of military culture will be included in the review. A summary will look at how the links will be used in this study.

### Beginnings of Research Utilization in Nursing

Nursing research as a process had its early beginnings with Nightingale as she developed plans for patient care based on data she gained from observations of the patient and his environment. From Nightingale's era through the 1930's and 1940's nursing's emphasis was on enhancing the education, status and working conditions of nurses. Little thought was given to research, but on education in order to stay "abreast of the rapid advances in medicine and other sciences" (American Nurses Association, 1996a). Sigma Theta Tau began funding nursing research in 1936 and the American Nurses Association developed a Master Plan for Research in 1951 (LoBiondo-Wood & Haber, 1998). The American Nurses Foundation was established for the purpose of conducting research and providing grants for nurse researchers (American Nurses Association, 1996b). The emphasis on research as a foundation for nursing knowledge arose from the need to articulate the crux of what nursing was as a profession in the 1950s and 60s. Early research focused mainly on education and curriculum for nursing programs (Meleis,

1997) and practice was based on early theory. At that time, nursing lacked clinical research to provide knowledge unique to nursing and was defined by institutional policy and medicine. It was economically and interprofessionally driven (Briones & Bruya, 1990). In the 1970s, clinically oriented research began to predominate as nursing leaders saw a need to base clinical practice on research findings. Research nursing journals began to flourish as a mechanism to disseminate findings and the era of research utilization began (LoBiondo-Wood & Haber, 1998). These journals remain the primary method for reporting research findings today.

Despite an increasing volume of research in many aspects of nursing practice, nurses continue to perform patient care based on convention and tradition (Johnson & Griffiths, 2001; Kirchoff, 1982; Shorten, Wallace & Crookes, 2001; Tordoff, 1998). For various reasons, even nurses who are aware of research and innovations in a particular area appear to maintain their practice based on what has succeeded previously. Johnson and Griffiths (2001) concluded that the volume of research literature and variability in its quality hinder clinicians' capacity to judge their merit for use. Others believe that nurses generally lack the skills necessary to access, interpret and evaluate research findings (Beyea & Nicoll, 1997; Bock, 1990; Shorten, Wallace, & Crookes, 2001; Thompson, 2001). There is an emerging viewpoint that, in addition to the above reasons for nurses' individually not using research for practice, organizational factors also contribute to the knowledge-practice gap (Goode & Bulechek, 1992; Kitson, 1999; Melnyk, Stone, Fineout-Overholt, & Ackerman, 2000; Van Der Weide & Smits, 2001).

## Current Nursing Research Utilization Literature

Review of the current literature revealed that writing on research utilization in nursing tended to fall into one of three categories: (a) information papers regarding research utilization and, more recently, evidence-based practice; (b) studies of the utilization process in nursing; and (c) implementation studies or projects where research findings were applied. The first group of papers, those that contained information regarding research utilization and its process all contained one central theme; there is a sizeable "gap" between nursing research findings and its implementation into practice. This theme was found in the earliest articles to those published within the last year, implying that for the last 27 years, much has been said about the topic, but little progress has been made. Stetler and Marram (1976) discussed the absence of useful guidelines to help nurses in the decision processes inherent in evaluating and implementing research findings. Twenty-six years later, Klassen, Karshmer, and Lile (2002) state that while "...research use and evidence-based practice have become the maxims for healthcare delivery and nursing practice in the 21<sup>st</sup> century..."(p. 121), there is much continuing evidence to suggest that it is not the norm. Dooks (2001) aptly described the still unmet challenge of bridging the gap between the "high hard ground of academia" and "the swampy lowlands of practice" (p. 101). It is apparent that not much has changed.

### Informational Literature

The papers in this category discussed and defined the process of research utilization and put forth several models used to implement findings. There seems to be little consistency in the definition of the term "research utilization" and it is often used

interchangeably with the newer term "evidence-based practice" (EBP). According to Horsley, Crane, and Bingle (1978), research utilization is "...the process...directed toward transferring specific research-based knowledge into actual practice." (p. 5). Stetler and Marram (1976) first defined the process of research utilization as the evaluation of research findings to assess their applicability to nursing practice. They believed that it required critical thinking skills to determine how the nurse would use research information, whether it was used directly in nursing practice, or cognitively as an influence for decision-making. Their early model was based on this conceptualization. Stetler later refined and broadened the original model to include both the product and the process of research and knowledge utilization (Stetler, 1994). Her model has been further advanced to include sources of evidence other than research and it highlights the "synthesis of findings" step to assist in the implementation decision (Stetler, 2001).

Crane (1985a) recognized both the process and the outcome of research utilization. She stated that research utilization is a complex process, involving the synthesis of multiple studies that results in practice protocols. Several authors define research utilization as a particular type of knowledge utilization (Estabrooks, 1999a; Feldman et al., 1993; Loomis, 1985). Estabrooks (1999b) further defines it as the use of scientific research findings to change or influence practice. She differentiated three ways in which research knowledge is utilized; (a) directly, where research is applied concretely as an action or protocol; (b) indirectly, where research may change one's thinking, but not necessarily be put into action; and (c) persuasively, where research is used to persuade others or used to legitimate a practice politically. Estabrooks (1999b) clearly iterated that research utilization is only a part of evidence-based practice, in that evidence-based

practice uses other data in addition to research, though she did not specify those other sources. Barnsteiner (1996) describes both research utilization and evidence-based practice as using knowledge from various sources in practice. She does not differentiate between the two. Buss, Halfens, Abu-Saad, and Kok (1999) describe both research utilization and knowledge utilization as pillars of evidence-based practice and that using research-based outcomes are equivalent to evidence-based medicine. Omery and Williams (1999) describe research utilization as a process and discuss it in terms of Lewin's change theory (as cited in Hatch, 1997), where the goal is to change practice. Previous practice must first be "unfrozen" and then "re-frozen" once the change has been made. They did not differentiate between research utilization and evidence-based practice. Asselin (2001) also uses the term "knowledge utilization" and refers to it conceptually as how knowledge is applied by the user. It can be used in two ways, both of which Stetler and Marram (1976) described in their early model; (a) to change beliefs and influence decisions, but not result in action or, (b) to change practice. Asselin (2001) never clarified where new knowledge for application came from.

The term "evidence-based practice" (EBP) has become the prevalent term in recent literature, often used instead of research utilization (RU). Titler, Mentes, Rakel, Abbott, and Baumler (1999) state, "The term EBP has been enfolded into the nursing literature, somewhat surreptitiously, and nursing has started using it interchangeably with RU" (p. 546). Jennings and Loan (2001) searched both medicine and nursing literature and found several definitions of evidence-based practice. The common theme in nursing is that the evidence for practice is derived from research, however the definitions differ in terms of what other sources of knowledge constitute evidence. In their definition of

evidence-based nursing practice, Goode and Piedaloe (1999) include research, chart review and quality management data, cost effectiveness and benchmarking data, patient preferences and clinical expertise. Ingersoll (2000) describes evidence-based practice as that derived from theory and research and adds the dimension of considering patient needs and preferences.

Fawcett, Watson, Neuman, Walker, and Fitzpatrick (2001) describe evidence-based practice as the current "buzzword" in terms of nursing research and practice. They discuss concerns that evidence-based practice is taking a step back towards a more positivistic view of nursing practice because it places primary emphasis on the randomized clinical trial as the best type of evidence for practice. They believe that this perspective is atheoretical and serves to widen the theory-practice gap. This sentiment is echoed by others (Ingersoll, 2000; Jennings & Loan, 2001; Kitson, 1999).

Over the course of development in the area of research utilization, several models for nursing have been proposed and models from other disciplines have been used and tested. These will be mentioned here and discussed in detail later in the chapter. One of the first models was developed by Stetler and Marram (1976) in an attempt to put forth criteria by which nurses could judge whether or not to use research findings within the work environment. Since then, it has evolved as the Stetler model to provide a framework for utilization at both the practitioner and organizational levels and is widely used. In her 1994 model, research utilization is defined as a process of adoption of original research findings either by the organization, leading to institutional policies, or by an individual, leading to practice changes (Stetler, 1994). The 2001 model incorporates evidence-based practice and allows for evidence other than research for practice consideration (Stetler,

2001). Research utilization can be instrumental, adoption of a specific innovation; conceptual, applied in thinking only; or symbolic, information used to justify a position of policy (Stetler, 1994).

The diffusion of innovations model developed by Rogers (Rogers & Shoemaker, 1973) was used as a basis for the three Nursing Child Assessment Satellite Training (NCAST) projects conducted from 1975 to 1983 that were aimed at the use of communications satellites for dissemination of research findings surrounding the assessment of children (Crane, 1985b). Haller, Reynolds and Horsley (1979) used principles from Havelock and Havelock's (1973) linkage model and a model for problem solving to develop research-based nursing protocols for the Conduct and Utilization of Research in Nursing (CURN) project. The goal of this project was to turn research into useful protocols for clinical practice. The Western Interstate Commission for Higher Education (WICHE) was a government-funded program whose goal was to increase research use by nurses. This project used a combination of the Rogers Diffusion model, Havelock's linkage model and Lewin's change theory (Closs & Cheater, 1994). In this project, dyads of educators and clinicians identified clinical problems that they could take to an institution and change practice. Titler, et al. (1994) developed a model based on "triggers" or identified problems in the clinical areas. A series of steps are followed, leading to the outcome of improved clinical practice using research. Estabrooks (1999a), believing that research utilization models are underdeveloped, has constructed a model based on structural equation modeling of the determinants of research utilization. This model has yet to be tested.

Funk, Tornquist and Champagne (1995) state that even though nursing research and resultant knowledge have grown considerably, its use in practice has not. Brett (1987) conducted a study in which she examined nurses' adoption of 14 innovations based on research. While the mean for awareness of the 14 innovations was 70%, only a mean of 33% adopted the research-based interventions sometimes and 28% used them always. The range of adoption was 79% for consistent use of closed, sterile urinary drainage to 6% for clamping and release of a urinary catheter that has been in place for longer than 36 hours before removal. More recently, Rodgers (2000a) replicated Brett's 1987 study, looking at nurses' use of the same 14 researched based practices and comparing them to earlier studies. She found no significant differences in the use of research-based protocols between Brett's group of nurses (n= 216) and her own sample (n=936). Camiah (1997) conducted a qualitative study where she found that nurses tended to continue to use routine and task-oriented practice despite the presence of well-documented research findings in the areas of nursing care that she looked at. For example, one respondent was reluctant to change her practice of shaving her patients pre-operatively for fear of challenging traditional practice, though she was aware of evidence that pre-operative shaving could provide entry sites for organisms. On the other hand, some innovations have had limited success in making their way into routine practice. Dooks (2001) studied the diffusion of research in pain management and found that integrating the research on pain management was occurring only about 38% of the time. Programs to assist nurses in improvement of pain management skills were successful in changing the nurses' practice. However, due to lack of ongoing administrative support, practice changes were not always maintained. Another study by Dufault and Willey-

Lessne (1999) used Agency for Health Care Policy and Research (AHCPR) guidelines to develop collaborative clinical pathways for inpatient pain control. Patients in that study reported greater pain control and patient satisfaction than those who had previously received traditional treatment. Two months after adoption of the pathways, clinicians were creating new pathways for patients not covered by the original ones. No long-term follow-up has been reported to determine maintenance of the changes. In those cases where change was successfully maintained, the questions that should be asked are: Is this success a measure of pure research utilization, or is it due to the culture of nursing where the goal is to promote comfort for patients? Is it because the outcome of pain relief is readily observable and that reinforcement enhances the change to more effective methods?

Many causes for the continued research to practice gap are cited, but they seem to center on a few main themes that have remained the same for the last twenty years. Most agree the main causes for failure to use research findings in practice are based on individual nurse problems within the larger system. Tornquist, Funk, and Champagne (1995) discuss past and current approaches to research utilization that emphasize the shortcomings of individuals in getting research to practice. Their recommendations include education of both staff nurses and nursing students, reconnecting researchers with practitioners through conferences, and empowering staff nurses through administrative support. McSkimming (1996) discussed organizational culture as a central theme in getting nurses to use research findings and presented the challenge of understanding the culture while working with individuals within the organization. Their recommendations were similar to Tornquist, Funk and Champagne's (1995), aimed at educating and

motivating individuals. This was echoed by Le May, Alexander, and Mulhall (1998) who conducted a qualitative study of research utilization and concluded that changes in practice are unlikely to occur unless it is valued within individuals.

Bock (1990) and Closs and Cheater (1994) spoke of two subcultures within nursing, researchers and clinical nurses, each with its own language and conventions. Researchers are interested in developing new knowledge whose goal is to enhance practice, but their work is disseminated in nursing research journals, which tend to be read primarily by other researchers and academicians. Few clinical practitioners read these journals. Those nurses in clinical practice claim that they cannot understand the research language within the reports and thus, cannot interpret them or find their usefulness for practice. The clinical nurses tend to read clinical journals that publish articles based on medical rather than nursing research. In addition, there are differences between the types of conferences that each attend and even in the language that they use.

Other inferences for the cause of the research practice gap include lack of skills of nurses in interpreting research and ability to implement findings (Bock, 1990; Feldman, et al., 1993; French, 1999; Royle, Blythe, DiCenso, Bauman, & Fitzgerald, 1997), insufficient exposure to research knowledge, a lack of authority to make practice changes (Hunt, 2001) and unwillingness to change practice (French, 1999). Access to current information has been a problem, especially if the hospital library does not have a large journal collection. Since the advent of information technology and the internet, access to up-to-date databases has improved (Barnsteiner, 1996; Bower, 1994). Through the internet, nurses can access bibliographic databases such as CINAHL and MEDLINE (Anthony, 2000) or evidence-based nursing databases such as the Sarah Cole Hirsh

Institute best evidence nursing practice guidelines (Hirsh Institute, 2001). However, even these immediate access web sites require the skill of browsing the web, time to navigate through the sites for the wanted information, and they often only give information about an article or guideline rather than the article itself. The guidelines must be ordered and the information still is far from instant. Thus, it remains an obstacle to obtaining information for utilization, in terms of both time and access.

McSkimming (1996) encountered the assumption, by both administrators and staff nurses that only advanced practice nurses had the ability to engage in research or research utilization activities. The idea of a “champion”, or an individual who promotes the research utilization process either by leading the change or assisting and motivating others to do so has emerged in the past two years. Consensus seems to be that advanced practice nurses, especially clinical nurse specialists, are in the ideal position within the organization to assume the role of champion (Melnik, Stone, Fineout-Overholt, & Ackerman, 2000; Norris, 2001, Stetler, Bautista, Vernale-Hannon, & Foster, 1995).

Also recently, more emphasis is being placed on organizational factors affecting research utilization, both at the micro and macro levels (Bucknall, Manias, & Botti, 2001; Gennaro, Hodnett, & Kearney, 2001; Van Der Weide & Smits, 2001). Kitson, Harvey and McCormack (1998) developed a conceptual framework that included the context of the organization as a factor for research utilization. Since then, McCormack et al. (2002) conducted a concept analysis of the term “context” and concluded that it is but a small part of the larger organizational environment that must be considered when looking at research or evidence uptake.

Estabrooks (1999c) believes that our knowledge of research utilization remains underdeveloped and has analyzed data from her studies to explore its conceptual structure, providing a model that attempts to explain individual factors that could explain utilization behavior by nurses. Overall, this first group of papers shows an evolution of the concept of research utilization, but clear definitions of terms remain elusive. Authors and researchers have made little progress in providing information on ways to bridge the "gap".

#### Utilization studies

Papers in the second category consisted of studies done to describe or evaluate research utilization or the adoption of innovations process within the nursing profession. Most were quantitative descriptive or correlational studies, using established instruments or Likert-type scales designed by individual authors to measure different aspects of research utilization. The most frequently used instruments were the BARRIERS Scale, developed by Funk, Champagne, Wiese, and Tornquist (1991a) and the Nursing Practice Questionnaire, developed by Brett (1987). Several other instruments were used to measure job satisfaction, control over nursing practice and attitudes towards research. Several of the studies were qualitative, using interviews or long-answer written surveys to gain data.

Most of the studies that occurred in the practice arena were quantitative and looked at the process of research utilization in terms of nurses' attitudes toward using research findings in practice as well as its barriers and facilitators. As with the research

utilization informational articles, the research studies changed little in their major themes from 1972 to 2002.

Several studies used Funk, et al.'s (1991a) BARRIERS Scale to measure the barriers and facilitators to research utilization. With practicing nurses, the top barriers to implementing research findings were that research findings were not readily available or were difficult to understand if they were available, both nursing administration and the physicians were not supportive of implementing new protocols based on research and there was not enough time to read research or implement findings. Some nurses reported a lack of support from their peers as well. These findings were almost universal in all the studies done on barriers and facilitators, however, their rank order varied depending on whether staff nurses, nurse administrators or advance practice nurses were surveyed. Funk et al., (1991b) tested their scale on large numbers of both staff nurses and nursing administrators. The nursing administrators' perception of the top barrier was that nurses are unaware of research pertinent to their practice. Following that, they cited insufficient time to implement new ideas and statistical analyses that are not easily understood. The staff nurses, on the other hand cited not having enough authority to implement changes, followed by insufficient time and being unaware of research. Similarly, the facilitators of research utilization tended to differ in rank order according to practice level, though the top three facilitators were the same. These facilitators included enhancing administrative support to the nurses, providing them with education on research appraisal and implementation and improving accessibility to research reports and resources. Interestingly, the administrators did not consider giving time to read or implement research as a facilitator, though that was one of their top barriers.

Rutledge, Ropka, Greene, Nail and Mooney (1998) used the BARRIERS Scale to look at staff nurses, Clinical Nurse Specialists (CNSs) and nurse managers. While the nurse managers and CNSs perceived more barriers to research utilization than staff nurses, they were also more likely to read research outside the work setting. The staff nurses stated that they did not have time to read and did not tend to read outside the work setting. They depended on the CNSs for practice information suggesting the role of the CNS as mentor to the staff nurses.

Several studies looked at factors that contribute to a nurse's tendency to use research in practice. Estabrooks (1999b) looked at 26 factors that might influence research use and found that attitude toward research, belief-suspension and inservices attended in the last year directly contributed to research utilization behavior, but other concepts such as affiliation, research courses and cosmopolitaness only indirectly affected research use. Rodgers (2000b) conducted interviews with nurses in addition to a survey approach and found that nurses both needed and wanted to be helped in sifting through the large quantity of information available in order to find that which is relevant for their practice. Brooks and Anthony (2000) identified access to information and educational support for nurses as important factors in assisting them to incorporate clinical guidelines into practice.

The culture of an organization or its context is believed to have a big impact on the implementation of research findings. LeMay, Alexander and Mulhall (1998) found that while most nurses had a positive attitude toward research and research use, they saw it as a low priority or felt they could not go against a "culture of not questioning". Retsas (2000) concluded that one of the differences in the results of her study as opposed to

others might have been the cultural context of the medical center in which she carried out her research. The staff nurses at her facility listed limited benefits as a major barrier to research utilization. Rodgers (2000a) found that when nursing administrators promoted research utilization through communication of research findings, the nursing staff was more likely to view research positively and adopt findings for their practice. Kitson (2001) investigated a number of research and nursing units and determined that those organizations that had advocates of research who could mentor individual nurses were more successful in getting evidence into practice.

Nurses had mixed feelings about the use of research in practice. While most nurses saw the need for nursing research and generally had positive attitudes toward research, they also did not see the research being done as applicable to their day-to-day work or beyond their capabilities (Hatcher & Tranmer, 1997; Ketefian, 1975; Logsdon, Davis, Hawkins, Parker, & Pedon, 1998; Parahoo, Barr, & McCaughan, 2000).

Hundley, Milne, Leighton-Beck, Graham, and Fitzmaurice (2000) examined research utilization in two groups of nurses and midwives and found that while 87-89% of the nurses believed that use of research in practice was important, the majority felt it was too time consuming and difficult to research and implement findings.

Omery and Williams (1999) used interviews to conduct a qualitative exploration of nurses involved in research utilization. Their sample was obtained through network sampling and consisted of 19 doctorally and one master's prepared nurse from various regions of the United States. They found that the methods for implementing research findings varied and only four used any formal models to guide implementation. Models were generally considered cumbersome and time consuming, though the steps used at the

various institutions followed the steps in some of the formal models. Leadership was identified as important in the role of educating and helping staff through the critique of research and implementation process.

### Implementation studies

Papers in the last category detailed projects that have been done in specific areas of nursing using research findings to develop protocols for practice. These types of projects are increasing as nurses become more aware of research and accessibility to information increases with the advent of electronic resources at the unit level. The implementation projects were very diverse and ranged from pain management after surgery (Dufault & Willey-Lessne, 1999; Neitzel, Miller, Shepherd, & Belgrade, 1999) to control of environment in the Neonatal Intensive Care Unit (Oehler, 1996). Evaluation of the results of these projects consisted both of the process of the implementation on the part of the nurses and organization and the patient outcomes. Results were mixed in that some projects improved patient outcomes (Gerdner, 1999; Gray, Dostal, Ternullo-Retta, & Armstrong, 1998; Lundin, Sargent, & Burke, 1998) while others reported no difference in the patient outcomes (Montgomery, Hanrahan, & Kottman, 1999; Wolf, et al., 1997).

Almost universally, authors reported that while nurses encountered some barriers to the implementation process, they cited improved attitudes toward research and greater confidence in the skills of evaluating and implementing findings. Tucker and Brust (2000) found that implementing small pilot projects enhanced the chances for success. The use of expert practitioners as project "champions" also appeared to contribute to the success of new research-based implementation protocols (Seeman, Soukop, & Adams,

2000; Shively, et al., 1997). Adaptation of protocols according to unit situations also enhanced their adoption (Lund, Kuller, Lane Lott, Raines & Thomas, 2001; Van Der Weide & Smits, 2001).

Neitzel, Miller, Shepherd, and Belgrade (1999) raised the issue of clinical significance versus statistical significance in implementation of a research-based pain protocol for joint replacement patients. Their pretest-posttest design produced no statistically significant improvement in reported pain: nevertheless, they contended that the small increase in percentage of patients who reported satisfaction with pain control was evidence of improved patient outcomes.

Maintaining changes in new practice and/or protocols was an important issue in many of the implementation studies. Continued evaluation of the change and adaptation of the protocol as necessary appeared to sustain the change (Bach, 1995; Cipperley, Butcher, & Hayes, 1995; Cruz, Abdul-Hamid, & Heater, 1997; Lund, Kuller, Lane, Lott, Raines & Thomas, 2001), but there has been a tendency for practice to "creep back" to previous practice that is based on ritual (Beaudry, VandenBosch, & Anderson, 1996).

### Summary of Nursing Literature

Review of the research utilization literature has uncovered some thought-provoking findings. It appears that the central theme of the literature was and remains the fact that there is a knowledge-practice gap. Barriers and facilitators to research utilization have been consistently similar across organizational levels and even across different countries. It can be seen that while progress has been made in studies of research utilization and in numbers of implementation projects, there is still much

resistance to changing practice. Mayberry (1995) contends that a paradigm shift from research versus practice to research equals practice must be made and that incorporating clinicians into the work usually reserved for researchers and research committees is one way to do that.

While nurses may have generally positive attitudes toward research and the use of research findings, they continue to encounter far too many barriers for successful implementation. The culture of the organization must be considered when attempting to make practice changes, not just the culture of the department of nursing within the organization, but the organization as a whole and the broader perspective of the healthcare environment. What is needed now is to determine how these barriers apply within each unique context and how each organization can address them. At this point, it appears that research utilization in nursing is attempting to move forward, but without much success. As a respondent in Omery and Williams' (1999) study stated, "RU is an acclaimed value, not a lived value." (p. 54).

Nursing in the military represents a different organizational culture and findings from the civilian sector should not be generalized to military nursing practice. Only one other study has been done in a military facility or with military nurses (Schempp, Ashley, & Kutaka, 2002).

Recommendations have been made by several authors as to the direction that research utilization/knowledge utilization/evidence-based nursing practice should go. First, the terms, research utilization, knowledge utilization and evidence-based practice need to be clearly defined and differentiated to eliminate confusion and allow for consistent use. Second, because nursing practice takes place within organizations, their

infrastructure as well as their relationships with other organizations and stakeholders cannot be ignored. New models of research/knowledge utilization need to incorporate those organizational factors that influence the diffusion of new technology, protocols or ideas. This includes evaluating models in the different contexts of organizations being examined (Closs & Cheater, 1994). Third, researchers should synthesize findings and put them into formats that are easily understandable and feasible for use by practitioners (Closs & Cheater, 1994) and in media that are accessible (French, 1999; Michel & Sneed, 1995). Fourth, Buss, Halfens, Abu-Saad, and Kok (1999) advocate using models to develop implementation projects, measuring both patient outcomes and nursing behavior changes, long-term follow-up and evaluation of projects, and publication of both positive and negative aspects of implementation. "Knowledge-based practice is complex. There is no single factor to account for success, and a multi-pronged approach considering many dimensions must be incorporated" (Barnsteiner, 1996, p. 57).

### Knowledge Utilization in the Disciplines Outside of Nursing

Literature on diffusion of innovations is plentiful given the number of disciplines researching the phenomenon. Rogers (1995) reported 3890 diffusion publications from 1940 through publication of his book in 1995. Diffusion research itself could be looked at as an innovation as the numbers of studies over those years corresponded to the S-shaped curve of adoption described by Ryan and Gross (as cited in Rogers, 1995). The curve represents the cumulative number of adopters of an innovation within a system. When new innovations are introduced, the rate of adoption is slow at first until a critical mass is reached, then it accelerates to its maximum slope and then gradually slows as the

last adopters integrate the innovation. If plotted as numbers of adopters at any one time, this would resemble the normal bell-shaped curve.

Rogers included the category of "public health and medial sociology" (p. 43) in his report. This group included 277 (7%) studies on diffusion of drugs, vaccinations, family planning methods or AIDS prevention (Rogers 1995). It cannot be concluded that nursing studies were a part of those studies. It is likely that they were not. They may have been included as the category of "unknown fields" of which there were 194 studies, however, Rogers made no mention of nursing diffusion studies in his work. It appears that since the 1980s, research on diffusion of new innovations has begun to decrease, even as the number of innovations and knowledge has exploded with current technology.

Because the volume of literature of research/knowledge utilization outside the nursing realm is vast, this section will focus on the seminal work in this area and the literature of the past five years. Most of the literature focuses on the terms dissemination and diffusion of innovations rather than research or knowledge utilization. Dissemination and diffusion both refer to the same course of action as utilization, however, those terms are more process oriented whereas research utilization, knowledge utilization, and evidence-based practice are more outcome oriented.

The concept of knowledge utilization has been existent in organizational literature since the late 1960s and early 1970s. During this time several different researchers began to develop theories of innovation in organizations and how they are disseminated. Zaltman, Duncan and Holbek (1973) focused their work on innovation at the level of the organization rather than at the individual level. The three structural organizational components that they considered were complexity, formalization, and centralization.

They differentiated between innovation and organizational change in that all innovations necessitate change, but not all change involves innovations. Rogers and Shoemaker (1973) consider the diffusion of new ideas to be a "special type of communication" (p. 1). Their goal in looking at diffusion research was to provide an understanding of a complex process in order to shorten the length of time from innovation to implementation. Currently in the field of healthcare, it takes up to 20 years for research findings to make their way into practice (ARHQ, 2001; "Health Care," 2001). Using the characteristics and concepts discovered in the research on diffusion studies, they developed a model for use in diffusion of new innovations. Rogers has continued to research this area and update the concepts inherent in his model. Havelock (1973) recognized the role of the social system in the dissemination of information. He developed a linkage model that described the collaborative interaction between resources and user systems. Glaser, Abelson, and Garrison (1983), while not developing their own model for diffusion or knowledge utilization, found that researchers and academicians from many fields were writing on many of the same concepts in the area. They surveyed the existing literature, derived the common themes in the areas of the process of as well as characteristics inherent to knowledge utilization and explicated them in one concise volume. These four works laid the foundation for further work in research/knowledge utilization from an organizational perspective.

Recent work from the organizational literature does not appear to have a focus. This lack of direction may reflect confusion over terms that are undefined or defined differently. Backer and Rogers (1998) define innovation as a new idea and diffusion as a social process that consists of different people trying and talking about the new idea until

it becomes meaningful and is adopted by more and more people. Drucker (1998) speaks of the lengthy time it takes for ideas to become actual products or services. Innovation is the process of creating the products or services. Some (Chandrashekar & Sinha, 1995; Maier, 1997) have attempted to reduce diffusion of innovations to a series of mathematical formulae that identify timing and volume of adoption as significant determinants of diffusion. Zaltman, Duncan and Holbek (1973) discuss three contexts in which the term innovation is found. First, it is thought of as a creative process in which previous concepts are combined in a new way. Second, it is the process by which an existing new idea is adopted into a behavioral repertoire. Third, it is an invention that is independent of its adoption. It is the third definition upon which they and others built their models of diffusion of innovations. However, in the literature, the meaning of the term is not always clear. At times it is a concrete artifact; at others, a process.

In an article discussing dissemination and utilization in the health prevention field, Green and Johnson (1996) outlined several different disciplines' contributions to the field of innovation diffusion and the types of research they pursue. Each discipline looks at diffusion differently according to its own goals and philosophy. The business disciplines tend to look at diffusion through organizations as a whole while the health and social sciences look at individual practitioner behavior.

Despite differences, several themes have emerged from the organizational literature as important in considering innovation dissemination and implementation. These include the concept of critical mass, the role of social networks in innovation diffusion, organizational culture and climate, and the impact of organizational size in

adoption of innovation and the concept of a knowledge utilization "champion". These will be discussed individually.

Rogers (1995) discussed the concept of critical mass as that "point at which enough individuals have adopted an innovation so that the innovation's further rate of adoption becomes self-sustaining" (p. 313). Most of the writing on the concept of critical mass has been in the area of interactive innovations or telecommunications. Mahler and Rogers (1999) contend that critical mass is a social construct in that the perceived number of adopters may influence adoption more than the objective number of adopters of an innovation. In their study of the adoption of twelve new telecommunications innovations in German banks, they found that the two main reasons for non-adoption were perceived low rate of diffusion and bad information about the innovation from the supplier. The authors never explicated what was meant by bad information. Once critical mass was achieved, the rate of adoption occurred rapidly. Holland (1997), in his discussion of critical mass, referred to the impact of individual contributions to collective action. He states that critical mass is most likely to be achieved in a heterogeneous group. If individuals bring different resources and interests to the collective action, it tends to snowball and adoption of new behaviors is increased. Valente (1996) ties critical mass in to social networks within organizations. As more people in a network adopt an innovation, it increases an individual's exposure to it and he/she is more likely to adopt.

The literature supports the idea that social networks are important in the adoption of innovations. Valente (1996) postulated that adoption occurs in relation to the number of others in an individual's network who have adopted and according to whether they have a high or low personal network threshold. He defines adoption thresholds as

measured by direct communication links with others who have prior experience with the innovation. He differentiates this from collective behavior thresholds which are measured in terms of an individual's social system. For example, an individual who has a high network threshold will wait until most of the others in his personal network has adopted an innovation before adopting it himself. If that person's network consists of eight other links, it might require six of them, or 75%, to adopt an innovation before the individual in question considers adoption. However, if the individual has a large number of others in his/her network, adoption may occur with a lower percentage of other adopters in the network. Valente (1996) illustrated this point with three previous studies, one of which studied the rate at which doctors adopted the use of tetracycline for their patients. Those doctors who had larger networks were more likely to prescribe the drug in a shorter time period than those who had smaller networks. A study looking at value changes of police officers during organizational reform also supported these findings (Zhao, He, & Lovrich, 1999). Change in behavior as a result of a change in values was more likely to occur in a group setting rather than in isolation. Midgley, Morrison, and Roberts (1992) took networking one step further and attempted to create innovation specific networks in order to speed the diffusion process. They found that it was more efficacious to use existing networks; the creation of new links not only slowed down diffusion, but altered its course.

The main thrust of the organizational literature was the impact of organizational climate or culture on the diffusion of innovations. While there is general consensus about the impact that organizational culture has on innovativeness, there is disparity in the literature as to what organizational culture is and whether or not it can be defined or

measured. Neither was there differentiation between organizational culture and climate and, at times, they were used interchangeably. Detert, Schroeder, and Mauriel (2000) researched the literature and synthesized a framework for defining culture. It contained eight characteristics that they related to quality management principles for measurement. How they measured each of the characteristics was not clear. Tung, Tan, Er, Lian, and Turban (2000) used Waterman's 7-S cultural framework (as cited in Tung, Tan, Er, Lian, & Turban, 2000) to measure adoption of Lotus Notes as a means of communication in several organizations. They concluded that culture might be a major variable in the adoption of innovations.

Several articles directly related organizational culture to performance and innovation (Jones & Redman, 2000; Ledlow, Bradshaw, & Shockley, 2000; Ogbonna & Harris, 2000; Royle, Blythe, Ciliska, & Ing, 2000). Ruppel and Harrington (2000) investigated the relationships between ethical management, communication and trust to innovation and concluded that, "moral management and trust are related to organizational performance in organizations where innovations are desirable" (p. 325). On the other hand, Shortell, et al. (1999) found that organizational culture and a quality management program had little effect on several measured end-points for coronary artery bypass graft patients. They suggested that other variables such as individual relationships, skill and leadership should be explored. Templeton and Snyder (2000) view culture as the cognitive component of organizational structure and proposed that there is a cyclical relationship between culture, structure and organizational learning.

Using Hatch's (1997) definition of a culture as "a particular way of life among a people or community" (p. 204), organizational climate could be thought of as the process

of culture. Kim and Srivastava (1998) defined four characteristics of organizational climate: (a) task interdependence, (b) communication openness, (c) top management support, and (d) interdepartmental conflict. They considered organizational climate to directly affect the rate of intraorganizational diffusion of technological innovations. All except the characteristic of interdepartmental conflict increase the rate of diffusion.

Mylle (1998) defined organizational climate as "...the synthetic, collective, perception of a set of relatively stable internal aspects of the organization as experienced and described by the members of that organization" (p. 1). He described four components of organizational climate: (a) innovativeness, (b) supportiveness, (c) purposive information flow, and (d) respect for rules. Further, he developed an instrument designed to measure these four aspects of organizational climate as functions of stability, flexibility, human orientation and goal orientation. An innovative organization is flexible and oriented toward development, a supportive organization is flexible, but oriented toward its members, an organization that supports purposive information flow is stable and oriented toward the organization, and a bureaucratic organization is stable, oriented toward its members' respecting the rules.

Many studies reported findings according to size of the organization, but results seemed conflicting and it appears that variables other than size impacted innovation diffusion. In a study of evidence-based practice in Canadian hospitals, Royle, Blythe, Ciliska, and Ing (2000) found that the larger hospitals had adequate information resources, but they seemed to have more difficulty in implementation than smaller hospitals which had access to the same information. McKormick, Steckler, and McLeroy (1994) studied the adoption of tobacco prevention programs in schools and found that

smaller schools were quicker to make the decision to adopt the programs, but that the larger schools implemented their plans sooner. Mazzoleni (1997) found that smaller organizations with a less complex structure and more flexibility adopted and implemented new innovations sooner than larger organizations. From these studies, one might infer that network systems in the smaller organizations allowed them to reach critical mass sooner and that the climate allowed innovativeness.

The presence of a "champion" or "change agent", an expert within the organization to support and facilitate new practices enhanced the utilization of new knowledge. Stoller (1994) suggested that such a person could stress the positive aspects of an innovation and gain support and cooperation from those who would be impacted by or would be implementing the innovation. Backer and Rogers (1998) highlighted the importance of champions in the implementation of AIDS workplace programs in four different companies.

None of the studies in disciplines other than nursing directly measured barriers and facilitators to innovation diffusion and it appears that no scales for such have been developed as in nursing. Reasons for adoption or non-adoption are described in several articles and they are different in many aspects from those in the nursing literature. Drucker (1998) states that innovation will fail without assiduousness and resolve. Green (2000) maintains that one of the biggest obstacles to organizational change is a lack of communication and information flow about the changes.

Again, because of the varied numbers of disciplines reviewed and the differing directions of their research efforts, recommendations for future research are equally varied. Most recommendations center around model development, instruments to

empirically measure diffusion in each particular discipline, and empirical testing. Detert, Schroeder, and Mauriel (2000) suggest that objective measurement of organizational culture supported by solid theoretical frameworks needs to occur. Maier (1997) felt that more detailed corporate models and extensive empirical databases in pricing and manufacturing would add value to business.

### Military Organizational Culture

The significance of this study is based on the assumption that military culture and its organizational climate is different than that of civilian organizations. Taylor (2001) defines culture as those prevailing structures, philosophies, values, traditions and customs that have created shared expectations, beliefs and attitudes within the military organization. He differentiates this from organizational climate and defines that as the context, or environment which determines individual perceptions of the working conditions. Culture could be thought of as "how things are done" whereas climate is defined by "feelings about" the organization. Taylor points out that, while they are different in definition, they are inextricably linked and that climate is more easily measured than culture.

Taylor (2001) further maintains that while civilian culture places priority on individuality, creativity and liberty, the military culture emphasizes discipline, leadership, team unity and self-sacrifice. However, many believe that military culture is being undermined by some of the more negative aspects of civilian culture such as the decay of the family structure and the premium placed on individual accomplishment. In a large study of military culture, Taylor (2001) found these factors, in addition to more and

higher paying opportunities in what he termed the civilian job sector, and the changing role of the global military policy contributed to what he described as the decline of military culture. Because personnel in the military are perceived to be overworked and underpaid as compared with their civilian counterparts, morale has declined and the values of self-sacrifice and discipline have taken on less meaning. Wright (2001) addresses the merging of the military and civilian cultures in recent years, stating that conservative military traditions have been de-emphasized in favor of more liberal social change initiatives such as the "don't ask, don't tell" policy for gays in the military and the "consideration for others" policy. He suggested that emphasis on Army history, tradition and esprit de corps as well as revitalization of spousal involvement in military culture would help to create pride in military service and enhance retention of junior officers. Keithly (2001) discussed culture from the standpoint of leadership. He pointed out that leadership is not uniform across military units and that the selection of leaders based purely on a promotion system can stifle effectiveness. He also discussed the role of leaders in wartime scenarios versus peacetime or during humanitarian deployment, stating that when there are long periods of peace, those values which define the military culture are de-emphasized, resulting in a less effective fighting force.

Literature written since the terrorist events of September 11, 2001 have addressed the need for a transformation of military culture from rigid and structured to an atmosphere of innovativeness, entrepreneurialship and risk-taking (Wolfowitz, 2002) and the ability to adapt quickly to changing world environments (Woodward, 2002).

## Theoretical Models for Knowledge Utilization

### Nursing Models

Several models have been used or developed for the process of research utilization since its early days in the 1970s. They have been used to guide the process of research dissemination in an effort to narrow the research-practice gap. Most of the models were derived from and contain principles inherent in organizational models used by other disciplines. Of the research utilization studies reviewed, only twenty contained identified theoretical or conceptual frameworks based on prior research. While Rogers' Diffusion of Innovations model was the most often used framework, several studies used the Stetler-Marram model or an adaptation of it, other studies used various other frameworks relating to efficacy or control of nursing practice, and some studies cited no framework. Those that did not identify specific frameworks did extensive literature reviews of prior research utilization work and mentioned the research of Funk, et al., Stetler, Brett, and Rogers. Many of the researchers developed their own survey tools or questionnaires based on the work of the above. The use of such a wide variety and range of models and frameworks suggests that research utilization is a complex concept and is difficult to define in the nursing realm. Estabrooks (1999c) would agree, stating that as it has been defined and used in past research, little consideration is given to its structure and function. This section will describe models used and developed by nurses in studies or for theoretical application. It will be followed by a discussion of models developed outside the nursing realm, from which nursing models derived many of their ideas.

The Stetler-Marram model was developed in 1976 to provide clinical nurses with a set of criteria that would assist them with making judgments as to whether certain

research findings would be useful for adoption into their practice (Stetler & Marram, 1976). This three step process included validating the study's strength for application, comparatively evaluating the environment for feasibility and fit of applying it to practice in a particular setting, and making a decision to apply the research findings. Stetler and Marram differentiated between active application, where actual changes in practice occurred and cognitive application, where the research is used as information to enhance theoretical understanding of the nursing process.

Stetler continued to research the area of knowledge utilization, which resulted in a refinement of the earlier model that broadened its focus to include the organization as well as the individual in the process of research utilization (Stetler, 1994). This model contains six steps, the original three plus the additional steps of preparation, translation/application, and evaluation. The preparation step involves looking at the clinical problem and specifying a need to use research findings to change practice. The translation/application phase requires the nurse to synthesize research findings into practical application and to detail a plan for implementation. The evaluation phase follows the action research modus operandi in that there is evaluation and adaptation of the change if necessary. Stetler has iterated that implementation of research findings is enhanced through the use of clinical nurse specialists who are acting as "champions" and role models (Stetler, Bautista, Vernale-Hannon, & Foster, 1995; Stetler & Dimaggio, 1991; Stetler, et al., 1998). Her most current revision of the model (Stetler, 2001) incorporates other sources of evidence than research and focuses on the synthesis of research findings for possible use in practice.

After surveying the literature on research utilization, Estabrooks (1999c) concluded that consideration at the conceptual level in the area was lacking and warranted. Her goal was to develop a model of research utilization built on theory rather than data and anecdotal evidence. First, she developed a concept map from which to systematically view the field of research utilization based on scientific, historical and philosophical foundations. She then analyzed available studies and mapped five areas that contributed to the foundations of research utilization. These included policy studies, studies of the determinants of research utilization, intervention studies, synthesis studies, and outcome studies. In most of the five areas, there were few studies and those that did exist were inconsistent in their use of models for the research utilization process or lacked clarity and direction.

Using this map as a foundation, Estabrooks (1999b) developed a survey questionnaire centered on theoretical conceptualizations that were available within the literature. It was designed to measure sources of knowledge, different ways in which nurses utilized it, and some professional and organizational attributes that affect research utilization. Based on analysis of that data from her survey (n=600) and using structural equation modeling, she developed a basic model of research utilization derived from the three concepts of direct, indirect, and persuasive use of research. These closely resemble Stetler and Marram's (1976) active and cognitive utilization, though Estabrooks' (1999b) persuasive component includes persuading others of the value of using research. A revision of the first model added determinants from her survey, which were found to directly affect research utilization; these included attitude toward research, belief suspension, and numbers of inservices attended. She further concluded that several other

determinants she measured only indirectly affected research utilization. What is interesting about her findings is that most of the barriers and facilitators of research utilization that had been continuously described in the literature such as time, access to knowledge, support and experience were not significant in her study and, thus, were not included in her model.

In addition to models of research utilization in nursing, a number of projects have been initiated or carried out in an attempt to assist nurses in implementing research findings or in dissemination of evidence for nursing practice. A large scale nursing research utilization project was carried out by the Western Interstate Commission for Higher Education (WICHE) with the goal of linking nursing research with practice (Kreuger, 1978). This was a series of workshops given to nurse educators and nurse administrators who were paired with staff nurses in their agencies and given the task of identifying areas for change, gathering research in that area and devising a plan to implement and evaluate the change. The theoretical framework for the workshops was a combination of the problem-solving process, Rogers' Diffusion of Innovations Model (Rogers & Shoemaker, 1971), and a modified research, development and diffusion approach. Also assumed to be underlying the changes made was Lewin's Model of Social Change (Hatch, 1997). Feedback from the project was positive, however, it focused mainly around improved communication between participants rather than on the success of implementing research findings. The only report found in the literature on the conduct of this project did not discuss the success of the program in terms of increased use of research by clinical nurses (Kreuger, 1978).

The Conduct and Utilization of Research in Nursing (CURN) project sponsored by the Michigan Nurses Association set about to provide a method to help nurses transform research into practice. Horsley and Crane (1983) viewed nursing research and research utilization as interdependent. First nursing problems are identified, solutions are researched and tested; next, those solutions are put into practice to benefit patients. They developed a set of activities by which nurses could utilize research-based protocols that they developed and published. The activities were designed to convert a protocol into nursing actions, specific to the organization using them. Every detail of the utilization process was outlined for nurses, with checklists provided to assist in following the plan. Evaluation of the new practice was an important part of the process and included suggestions for maintaining the change if it proved to be efficacious. The CURN group published ten research-based nursing protocols, which included structured pre-operative teaching, intravenous catheter change regimen, and pain reduction (Horsley & Crane, 1983).

The Nursing Child Assessment Satellite Training (NCAST) project, out of the University of Washington in Seattle, was designed to establish the feasibility of disseminating nursing research-based information on infant assessment procedures to nurses via satellite communications. Four communication modes: (a) duplex, or two-way communication mode; (b) simplex, or one-way communication mode; (c) videotape mode; and (d) conventional mode were used to disseminate research findings to nurses at various sites around the country. No report on the success or failure of the project was provided in the article. It only provided suggestions for nurses to perform a similar project (King, Barnard, & Hoehn, 1981).

On the heels of the CURN Project, Goode, Lovett, Hayes, and Butcher (1987) from Horn Memorial Hospital in Iowa developed a model for research utilization using the systems theory model containing the concepts of input, throughput, and output that they defined and clarified according to their organizational situation. The model also contained a feedback loop to allow for ongoing evaluation. They tested the model on three initial projects and reported success with implementation of research findings in terms of increased patient satisfaction and quality of care, though they had no measures for this success. However, this project did result in the making of a videotape of the process of research utilization that is still currently available.

The Sarah Cole Hirsh Institute for best nursing practice based on evidence, located at Case Western Reserve University is currently performing systematic reviews in order to build a collection of best nursing practices that are based on research findings. Current reviews are available by order by contacting the institute (Hirsh Institute, 2001).

Several other models have been developed for use by individual researchers and have not been tested beyond their individual studies. Rosswurm and Larrabee (1999) have developed a six-stage model to use as guidance to change toward evidence-based practice. The steps inherent within this model closely resemble Stetler's (1994) refined model for research utilization. The steps include assessing a need for change, linking the need with current interventions and outcomes, synthesizing best evidence, planning the change, implementing and evaluating it. They also add a step for integrating and maintaining the practice change, which was not included in Stetler's model. This last step is the only one that incorporates the organization into the process.

Dufault and Willey-Lessne (1999) believed that the multidisciplinary nature of patient care called for a multidisciplinary or collaborative model for research utilization. Their model is based on innovation literature that includes three factors necessary for successful implementation. The factors are the availability of knowledge, clinician competency to use the knowledge, and a supportive infrastructure.

### Organizational Models

Rogers' diffusion of innovations model has been and continues to be used extensively in the diffusion and innovation literature. The competing values framework for organizational transformation developed by Quinn and Rohrbaugh (1983) has been used as a framework for organizational change. It closely resembles Mylles' (1998) model for organizational climate from which he developed the Organizational Climate Index. In the general organizational literature, Lewin's model of change appears to be the most often used framework.

Rogers' model breaks down diffusion of innovations to pragmatic concepts that can be applicable to nursing. It is designed to be used in any organizational setting, including healthcare. Its concepts are abstract only inasmuch as they allow for interpretation for the environment in which they are used, yet they are concrete enough for empirical study. Rogers' theoretical model of diffusion of innovations is a behavioral model that describes the process through which an individual or group moves from learning of an innovation to adoption and confirmation of the innovation as part of new practice (Rogers, 1995). He defines diffusion as a process that occurs over time and describes the path of adoption of new knowledge through communication channels

between and among groups and individuals. In the visual depiction of the model, time is implied. I have added it and emphasized the other major concepts inherent in the process for clarification as shown in Figure 3.

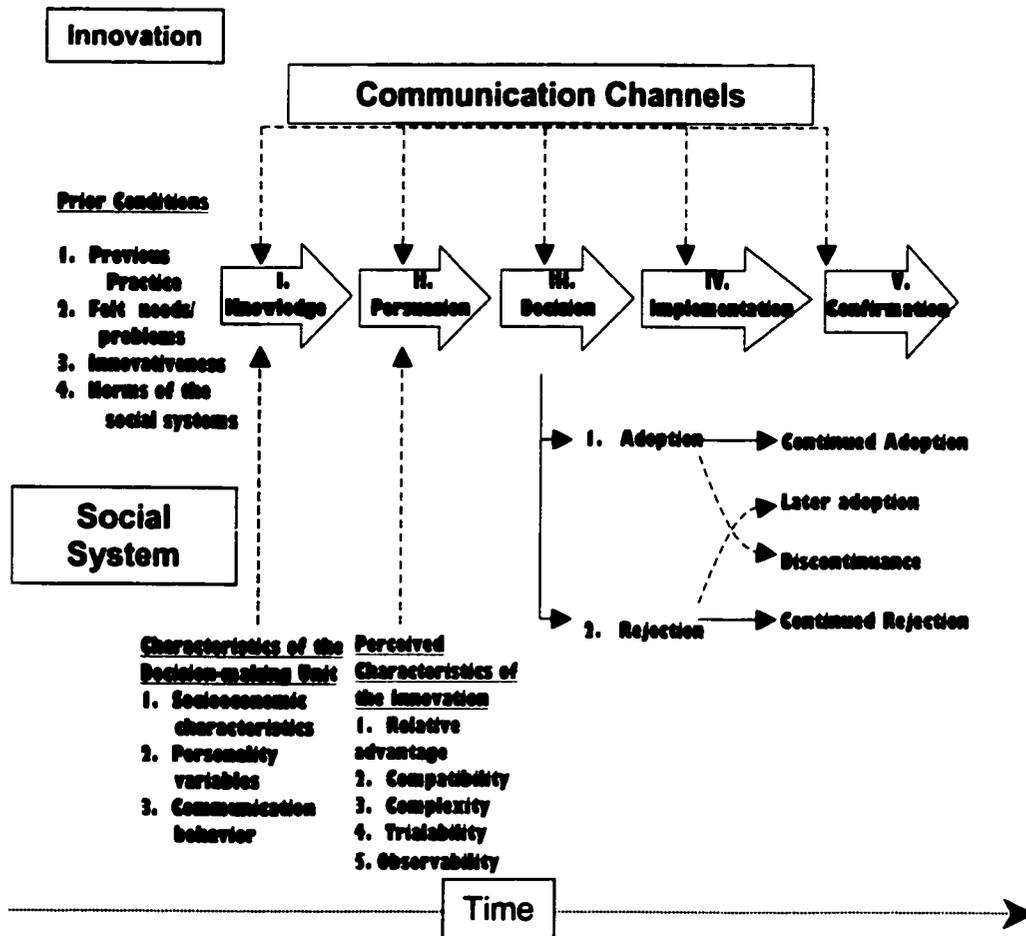


Figure 3. Stages in the Innovation Decision Process with Concepts Highlighted

Originally, diffusion of innovations was described at the turn of the 20<sup>th</sup> century from an anthropological viewpoint. Both the British and the German diffusionists held that social change resulted from the introduction of innovation from one culture or facet

of society to another (Rogers, 1995). These anthropologists used an ethnographic approach to the study of innovation diffusion in that they often immersed themselves into the culture of the society they wished to study. This was time consuming and of limited generalizability. Sociologists entered the picture in the United States and began a series of quantitative studies to determine influences that led to adoption of innovations in an attempt to understand social change. Studies of innovation diffusion proliferated, focusing mostly on rural sociology and agricultural innovations, until the 1980's when research in this area declined dramatically.

Philosophically, both the development of the diffusion of innovations model and diffusion research closely follow the S-shaped curve of Kuhn's conception of scientific revolutions in which old paradigms can no longer explain a certain phenomenon or current practices are not satisfactory. When this is the case, new paradigms are sought, first by a few interested in the innovation, then by more who seek solutions to the problem until the last hold-outs have gradually converted to the new paradigm (Kuhn, 1996). Rogers includes a phenomenological perspective on diffusion in that adoption appears to be influenced by the meaning of the innovation to the adopter. While Rogers never mentions meaning as a motivation to adopt an innovation, he implies it by spending a great deal of time discussing development of a favorable attitude toward the innovation at the persuasion stage. Rogers' model is more pragmatic than phenomenological in its approach to diffusion of innovations. Progress through the stages is aimed more at action and behavior changes than at discovering and explaining the meaning of the innovation. This could be considered a flaw of the model given the high rate of diffusion failure.

Meaning, in the linguistic sense of the structure of language is not consciously considered in Rogers' theory, but is implicit in the interpretation of innovations.

Rogers (1995) defines four main concepts in his model. They are innovation, communication channels, time, and a social system. Innovation is defined as an idea of practice that a user or group perceives as new. The idea does not have to be new in the time sense, but new to the individual or group. The five most important attributes that impact rate of adoption of innovations are relative advantage, compatibility, complexity, observability, and trialability. The relative advantage of an innovation is seen as the extent to which it is better than current practice. Compatibility is the congruence with existing needs and values. The simpler and more observable an innovation is, the more likely it is to be adopted. If an innovation can be implemented on a trial basis, it is likely to be adopted more quickly once a successful trial is over.

Communication channels refer to the process by which information gets from one individual or group to another. Here, Rogers differentiates between mass media channels and interpersonal channels. Mass media channels are those sources that offer the chance for one or two individuals to reach many, through use of technology such as television and the internet, or printed media such as newspapers or journals. The interpersonal channels link personnel in a face-to-face exchange of ideas. This would include both formal and informal communication between individuals. He contends that interpersonal channels are more effective in persuading others to embrace new ideas.

The third concept in Rogers' model is that of time. It has three components: (a) the process or stages of the innovation adoption itself, (b) the earliness or lateness of the innovation's adoption, and (c) the rate of adoption of an innovation within a system.

These all occur simultaneously, but at differing rates according to variables present within the adoption situation.

The fourth concept identified in Rogers' model is the social system. This is defined as those within a unit who are involved in joint problem solving and are moving toward a common goal. Diffusion within a social system is affected by its structure, the norms present within the structure, and change agents. Other factors influenced by the social system include the types of innovation and their consequences.

According to Hardy (1974) there can be some confusion as to the meanings of concepts within a theory. They are defined within the framework of the theory used and may take on different meanings according to the context in which they are used. The concepts in Rogers' model were designed for use across organizations and appear to be clear and easily understandable for use within the context of the healthcare system of which nursing is a part. The only concept that may cause confusion is that of social systems. Nurses have their own social system within the larger system of the organization, be it a hospital or other agency. Both impact the diffusion of innovations.

The Rogers Diffusion Model appears to have been developed from a very pragmatic, positivist philosophical perspective, closely following Kuhn's description of scientific revolutions. Anthropologists added an ethnographic slant to the model in their studies of innovation diffusion within various cultures. Generalizability in these studies is limited, though the principles of innovation diffusion are widely useful. The concepts within the model are applicable for the nursing environment. However, nursing has its own unique social system and an interpretive look should be taken at that system to adapt Rogers' model to enhance suitability for nursing. A phenomenological look at research

utilization in nursing or an ethnographic study of nursing culture within the healthcare organization would add depth to his model and more utility for nursing.

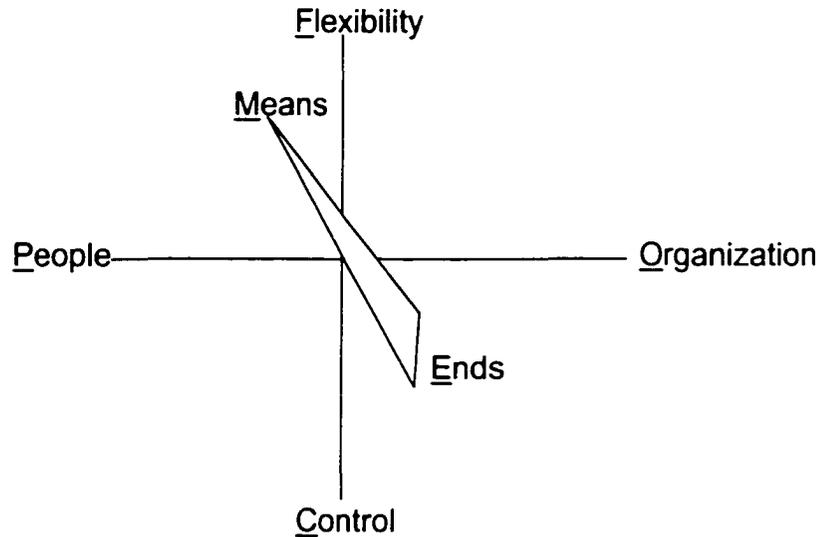
Sarter's (1987) discussion of the philosophy of evolutionary idealism in theory development with regard to the patient could equally apply to nursing knowledge and its application. Her premise is that idealism is the way in which the mind perceives reality, whether subjectively or objectively, and that humans are continually evolving in their consciousness. She used this concept in the light of nurses helping patients toward higher consciousness; the same could be said of the nurse with regard to the evolution of her/his knowledge and how it is utilized. Because nurses, until recently, have focused primarily on the scientific, empirical method of research, philosophical avenues have either been neglected or only examined superficially (Fry, 1992; Ruddy, 1998). As philosophic inquiry evolves, so too will nursing theory. However, a caution here is in order that theories do not become so "ideal" as to lose practical value for nursing.

Rogers' model has been and continues to be used extensively across multiple disciplines, including nursing. However, many nursing studies specify no framework in looking at research utilization (Kenny, 2000). Rogers' explanation of his model is such that it can be applied to almost any setting. It is simple and concise; it is easy to compare innovation diffusion with knowledge utilization. The variables contained within it can and should be considered when attempting to make changes in practice based on new information. However, despite its utility in describing diffusion of innovations, it needs to be expanded to encompass the unique contributions and social system of nursing.

The competing values model was developed by Quinn and Rohrbaugh (1983) on the premise that organizational culture must be managed effectively for the organization

to be effective. The three competing values that they describe in their model are: (a) flexibility versus control, (b) people versus organization, and (c) means versus ends. They contend that a flexible organization tends to be more creative and innovative and that control promotes stability and order. These values are placed as continua on three axes. The people/organization values are located on the horizontal axis, flexibility/control values are on the vertical axis, and means/end are located on the axis perpendicular to both the horizontal and vertical. This creates eight different cells representing effectiveness criteria, depicted in Figure 4.

By using a questionnaire developed by Quinn and Rohrbaugh (1983) and plotting where an organization lies in this three-dimensional representation a picture of the organizational value preferences and effectiveness emerges.




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**THE EIGHT CELLS DEFINITIONS OF THE EIGHT CRITERIA**

OEC	<i>Productivity/efficiency.</i> Volume of output, the ratio of output over input.
OCM	<i>Planning and goal setting.</i> The amount of emphasis on the planning, objective setting, and evaluation process.
OFE	<i>Resource acquisition.</i> The capacity to capture assets and develop external support.
OFM	<i>Flexibility/readiness.</i> The ability to adapt to shifts in external conditions and demands.
PCE	<i>Stability/control.</i> Smoothness of internal conditions, continuity, equilibrium.
PCM	<i>Information management/communication.</i> Sufficiency of information flows, adequacy of internal orchestration.
PFE	<i>Value of human resources training.</i> The enhancement and maintenance of overall staff capacity.
PFM	<i>Cohesion/morale.</i> The level of communality and commitment among the staff members.

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Figure 4. A Three-Dimensional Model of Organizational Effectiveness<sup>1</sup>

<sup>1</sup>From "A Spatial Model of Effectiveness Criteria: Towards a Competing Values Approach to Organizational Analysis," by R. E. Quinn, and J. Rorhbaugh, 1983, *Management Science*, 29, p. 367, Copyright 1993 by the Institute for Operations Research and the

This model is strikingly similar to the model used by Mylle (1998) in the development of his Organizational Climate Index for military units. His model is only two-dimensional and includes people/organization on the horizontal axis and flexibility/stability on the vertical axis as seen in Figure 5.

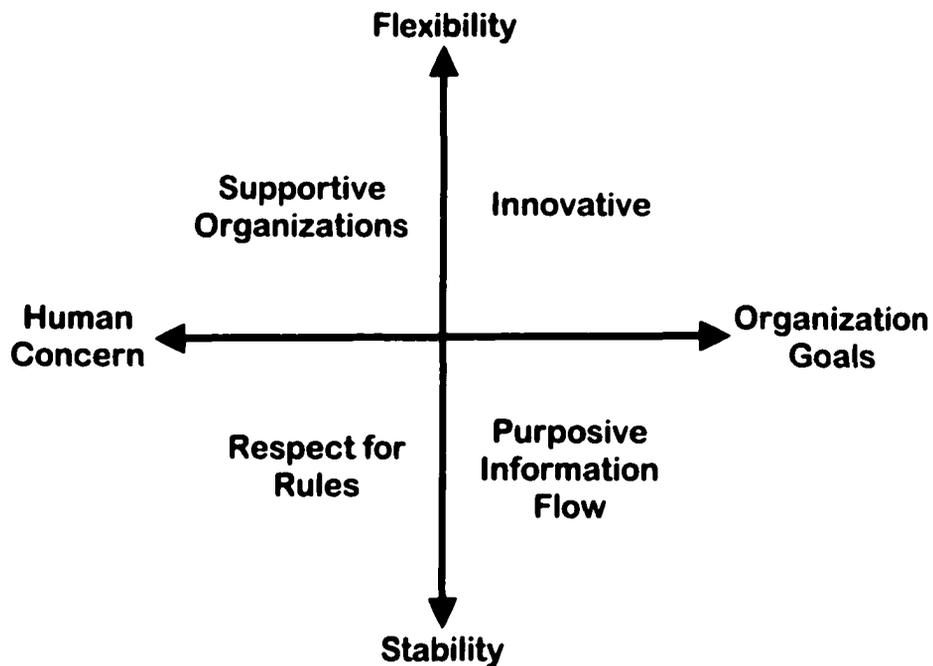


Figure 5. Mylle's Model of Organizational Climate

In each of the resultant quadrants are the components of the organizational climate that are measured in the index. Plotting scores in each of these areas on additional diagonal axes gives a graphic representation of the climate of the organization in terms of these areas.

## Utility of Rogers' Model for Nursing Science

"A new theory is always announced together with applications to some concrete range of natural phenomena; without them it would not even be a candidate for acceptance" (Kuhn, 1996, p. 46). The goal of Rogers' model is to explain the process of innovation diffusion through a system, from first learning of the innovation to implementation and evaluation of its success or failure. The goal of knowledge utilization in nursing is to close the theory-practice gap by assisting nurses in the process of evaluating knowledge for its suitability in their situation through developing a plan to put the knowledge into practice and, finally, evaluating it for appropriateness and patient outcome. Using Rogers' model, the process of diffusion and its concepts can be used as a template for utilization of new knowledge in nursing.

Rogers (1995) asserts that his model is a conceptual paradigm that has application across many disciplines. The diffusion process is especially appealing in organizations where utilization of research knowledge is warranted for practice. The current healthcare paradigm calls for the use of evidence-based knowledge as the foundation for practice. Any research findings or evidence can be regarded as innovative as long as they are different or new. Rogers does not discuss innovations as always entailing major shifts in thinking or practice. They can also be small incremental changes in the way things are done.

Rogers' model can be closely compared to the Stetler model for research utilization in nursing which uses many of the same concepts, applied to the nursing environment (Stetler et al, 1995) as discussed previously. The concepts of innovation, time, communication channels and social system in Rogers' model mesh well with the

nursing environment. As nursing scholars are continually adding to the nursing knowledge base, efforts to disseminate the new information (innovations) to the level of the practicing nurse must be made. Time, as Rogers conceives it, is appropriately suited to the nursing environment. Dissemination and adoption of new clinical practices take time, not only time to plan, implement, and evaluate a change, but time for individuals or groups to buy into the change. Most departments of nursing contain communication channels, both formal and informal. Nursing newsletters, library resources, inter- and intranet connections, and sometimes, intrahospital television channels provide the mass media methods of disseminating information. Staff/supervisor and peer communication provide both formal and informal face-to-face communication channels.

If any of Rogers' concepts is open to interpretation for application in nursing, it is the concept of the social system. Rogers' conception of the social system is meant intentionally to pertain to any organization. He does not explicate its nature within the visual depiction of his model and only defines it very broadly in his explanations. It has not been defined clearly in nursing either, usually referring to the unit of analysis in nursing studies. In past research utilization studies in nursing, the social system has referred to the nurse himself/herself, to nursing units to the department of nursing, to schools of nursing, to nursing students, or to entire organizations. The organization as part of the social system has been mentioned generally as only a minor aspect contributing to utilization or non-utilization of knowledge within the nursing realm. Because nurses exist within the larger organization, attention must be paid to both the nurses' social system and the climate of the overall organization in the holistic view of diffusion of innovations. Nursing has a unique social structure within the healthcare

organization, both by virtue of its contributions and its knowledge base. For example, Stetler et al. (1998) discusses the unique role of advanced practice nurses in acting as change agents to disseminate and implement research into practice.

In moving through the process of diffusion, Rogers includes a stage of persuasion where a group or individual receives the innovation favorably and understands its benefits, but does not yet use it or change their behavior. He speaks of a "KAP-gap" (KAP refers to knowledge, attitude, practice) in which individuals come to know of the innovation, but seem to remain attached to current practice (Rogers, 1995). The nursing literature has been describing a theory-practice gap that appears not to have changed for the last 27 years (Charles, 2000; Feldman, et al., 1993; Krueger, 1978; Stetler & Marram, 1976). It is at this stage where a study of the climate of the organization could help in identifying factors that would contribute to moving individuals along from the persuasion stage to the decision stage.

Research on diffusion or research utilization in nursing has shown that this process has met with varying success and been influenced by various factors (Carroll et al., 1997; Kajermo, Nordstrom, Krusebrant, & Bjorvell, 2000; Omery & Williams, 1999; Retsas, 2000; Shaffer, 1996). Many studies have shown that the variables of time, organizational support, and personal attitudes toward research are consistent barriers to utilizing research in practice. Variables inherent in Rogers' model include the attributes of the innovation, personal attitudes towards innovation, and organizational factors such as organizational structure, size, openness and innovativeness of the organization, networks within the organization, and leader characteristics (Rogers, 1995). It seems that the

nursing studies could be expanded to include more of these organizational factors in order to enhance the uptake of research innovations by nurses.

### Linking the Two Bodies of Literature Together

It is clear that the nursing literature on research/knowledge utilization differs from the literature in other fields. Nursing studies have focused mainly on the individual within the organization. Other disciplines focus on the organization as a whole and within a larger environment. Over and over, nursing has described the same sets of barriers and facilitators to research utilization, but has made little progress toward finding ways to overcome the barriers and enhance the facilitators. Solutions appear to seek ways in which to assist the individual nurse in implementing practice change rather than to find ways to change the organizational system to allow nurses to implement change that will ultimately benefit the organization as a whole.

Organizational literature consistently discusses the importance of the social network and critical mass in the success of information dissemination and innovation diffusion. Only one nursing study mentioned the concept of critical mass in reference to diffusion and implementation of research findings in practice (Hundley, et al., 2000). Social networks in nursing studies were primarily discussed as communication between staff nurses and clinical nurse specialists as facilitators of the research utilization process (Rutledge, et al., 1998; Stetler, et al., 1995). Kitson (1999) describes the additional aspect of social networks as contacts outside the organization, but within the larger context of the social/political environment.

The nursing literature is replete with models describing the process of research utilization and guidelines to implement research findings. Disciplines outside nursing consider Rogers' model to be synonymous with diffusion of innovations and appear to have made no attempt to describe or define the process within the context of their own area of interest. However, in the management and organizational theory literature, very few references were made to Rogers. Diffusion of innovations was considered a part of organizational change rather than a distinct entity. Organizational literature has developed many models to describe the change process.

What is similar between the nursing literature and that of other disciplines is the concept of a "champion" or an individual designated to facilitate implementation of innovations or new practices. Again, in the nursing literature, this individual is usually a clinical nurse specialist, so designated based on education and expertise (Rutledge, et al., 1998; Stetler, et al., 1995). In other disciplines, often the "champion" was an outside consultant, or a designated "opinion leader" whose main task was to facilitate change. This did not always work.

While organizational culture and climate appears to be significant in the literature of other disciplines in looking at organizational innovativeness, the nursing literature is only beginning to recognize the importance of the context within which nursing practices for utilization of research and practice change. Kitson (1999) argues that change within an organization should be viewed from an historical, cultural and political perspective and that successful implementation of findings is dependent on the nature of the evidence, the unique context of each organizational system, and the mechanism used to facilitate the change.

## CHAPTER III

### METHODS

#### Introduction

This study utilized a descriptive correlational design in order to examine the relationship between organizational and professional factors that contribute to research utilization of registered nurses in US Army Medical Treatment Facilities (MTFs). Research utilization has been extensively studied in the civilian nursing population, but has had limited examination in nurses working within the military healthcare system. A descriptive design was chosen for the purpose of providing information about research utilization as it currently occurs in the sample population. This study also examined factors of organizational climate and their influence on research utilization as perceived by the sample nurses. It is hoped that the results will lay a foundation for further, in-depth study of the phenomenon and enable interventions to be designed in order to enhance the use of research findings and improve patient outcomes. Descriptive designs are theory based and because there is no manipulation of the variables; description cannot be used for the purpose of testing theory, only strengthening it (Brink & Wood, 1998). In this chapter, methods, sample, measures, IRB approval, and proposed data collection and analysis is discussed.

#### Setting

The US Army Medical Department (AMEDD) across the United States provides multiple services for thousands of beneficiaries. At any time, approximately

1,764 patient beds are occupied in its hospital facilities (Army Medical Department, 2001). Beneficiaries include active duty army personnel, their families, retired military and their families. The AMEDD is subdivided into regions, each under a different command. The North Atlantic Regional Medical Command covers 21 states in the northeast and mid-Atlantic area and consists of 10 MTFs, ranging from small community clinics to large medical centers (Army Medical Department, 2001). Three hospitals of differing size in the North Atlantic Regional Medical Command (NARMC) served as representative sites for administering the two survey instruments. The nursing research department for the NARMC served as the liaison for gaining access to the required sample of participants.

### Sample

A convenience sample of all practicing registered nurses at a large regional army medical center (Site A) (n=506), a medium-sized army medical center (Site B) (n=266), and a small army community hospital (Site C) (n=88), both military and civilian, were eligible and recruited to participate in this study. In addition, the Forces Command (FORSCOM) registered nurses from a combat support hospital that is located on the same post as the medium-sized army medical center (n=subsumed within that estimate) were invited to participate due to the fact that they are also part of the clinical working staff there. These hospitals were chosen to represent different sized facilities in order to examine the impact of hospital size on research utilization. An estimated 860 nurses, 419 military and 441 civilian, were eligible to complete the surveys. It was not possible to determine the exact number of nurses eligible for several reasons. Registered nurse

populations, by the very nature of the military, are transient, with significant numbers of losses and gains every month. In addition, during the time of participant accrual, the combat support hospital was deployed to an overseas mission, taking several of their military nurses. Due to the fact that those military RNs do not officially belong to the Department of Nursing at the medical center where they are located, it was difficult to determine exactly how many were present for the study. Because of the low rate of return from military nurses at that location, it was surmised that some of the targeted nurses from the combat support hospital were not present during the study period.

### Power Analysis

Because multiple different statistical analyses were performed on the data, a power analysis was done for the test that would require the largest sample for the power needed. This would also ensure adequate power for all statistical analyses. For paired t-tests to determine differences between civilian and military nurses' use of research findings in their practice, a sample size of approximately 63 nurses per group (civilian/military) for a total of 126 nurses was needed for this study to obtain a power of .80 with  $\alpha$  of .05 and a medium effect size of .50, using expected means and standard deviations from prior research using the factors from the surveys to be used in this study. A return rate of 36.4%, or 313 surveys was realized. Of those, 23 surveys were returned either blank or with significant missing data and were not usable, giving a total usable sample of 290 surveys, or 33.7% of the population. The sample consisted of 160 military and 130 civilian RNs, more than the required for the calculated power.

### Protection of Human Subjects

Because this study was an exploratory study and did not test interventions, the mailed survey posed no risk to participants. However, because a list of nurses' names was generated for the study, it required an expedited review under the criteria outlined in Appendices B-4 and H-10 of Army Regulation 40-38 (Department of the Army, 1989). Institutional Review Board (IRB) approvals were obtained for each site before the data collection process began and renewed at the annual anniversary date. In addition, approval for the study was obtained through institutional review at the University of Massachusetts, Amherst. Although anonymity was not possible, participants' confidentiality was maintained by coding the surveys with a number, giving participants instructions not to place any identifying information on the survey or return envelope and by reporting only aggregate data. No consent forms were used as consent to participate was implied on return of the survey and this was explained in the introductory letter (Appendix A). Data were stored in a locked file cabinet and in a password protected computer database. The list of nurses names was destroyed. Information distributed to study participants as a part of their survey packet can be found in Appendices A-C.

### Measures

The survey instruments used in this study included an adapted (with permission) Research Utilization Survey developed by Estabrooks (1997) and the Organization Climate Index for Military Units (short form) (Mylle, 1998). These data collection instruments were put into a format visually appealing to the participants.

1. **Research Utilization Survey.** (Appendix B). This survey was shortened from 90 items looking at 25 factors that contribute to the use of research findings by nurses. Because only three of the factors studied by Estabrooks (1999b) were found to directly contribute to research utilization, those three factors were included in this shortened form. In addition, factors that were found to be significant by other investigators (Funk, et al., 1991b) in previous studies were also included. This left an 8-page, 41-item survey looking at the variables of attitude toward research, resources and support, time, types of research utilization, sources of knowledge and belief suspension. Reliability and validity measures for each portion of this tool are described below.

2. **Demographic data.** (Appendix B) The first 16 items of the research utilization survey were designed to obtain general demographic data of the nurses participating in the study.

3. **Organization Climate Index for Military Units.** (Appendix C) The short (39-item) version of this tool developed by Mylle (1998) was used to measure the innovativeness, supportiveness, respect for rules, and purposive information flow of military units in the Belgian Army. The survey was originally written in Dutch and translated by the author for use in this study. No norms have been established for this instrument as of yet and the results of the surveys done in the Belgian Army cannot be generalized to this population.

### Reliability and Validity of the Instruments

Measurement reliability for internal consistency was calculated for each of the subscales of the research utilization survey by Estabrooks (1997) and the coefficient

alpha found to range from .77 for the Attitude Toward Research subscale to .91 for the Trust subscale. For a newly developed instrument, an alpha of .70 is considered acceptable (Burns & Grove, 1997). A Cronbach's alpha was calculated for this population and will be discussed in the results section.

Content validity for the Research Utilization Survey was determined by Estabrooks using a three-pronged approach. First, the survey questionnaire was developed based on a thorough review of the literature in order to capture the concepts inherent in the current conceptualization of research utilization. Abbreviated forms of well-known psychometric scales were used to measure those concepts. Second, Estabrooks used experts in the area of research utilization to review the questionnaire and revisions were made as suggested. Third, a pilot study was performed using post baccalaureate and master's students. Estabrooks was available to answer questions and discuss problem areas with the participants (Estabrooks, 1997).

Construct validity is somewhat more difficult to determine, particularly in looking at research utilization because definitions of the term have been unclear. In addition, this instrument has previously been used only once to measure research utilization of Canadian nurses. Estabrooks (1997) used structural equation modeling, which is a method of determining validity of relationships between latent constructs in order to test a theory (Burns & Grove, 1997). Using a factor model to demonstrate that the underlying concept of "real research utilization" is influenced by direct, indirect and persuasive research utilization, she believed that it can be measured using simple questions. All of the explained variances in her model, with the exception of Research Utilization #1 (the first question, which was 53%) were in excess of 70%, indicating good construct validity.

Norms have been established for the Organization Climate Index in terms of deviations from the means, but only for the Belgian Army and Navy. According to the author (Mylle, personal communication, 2000) these norms cannot be generalized to other military populations. Because no previous reliability measurements were given, a Cronbach's alpha was also calculated for this sample.

#### Data Collection Procedures

For conducting survey research, Dillman (2000) suggests five contacts with the study participants that begin with information letters sent to participants just prior to commencement of data collection, followed by a questionnaire mailing, a postcard reminder/thank you, a replacement mailing and a second reminder/ thank you. Because initial contact was made at a departmental level rather than the individual participant level, an adaptation of this method was used.

Chief Nurses at each of the above facilities were initially contacted regarding the study and provided letters of support to the investigator. Since the Privacy Act precludes direct home-mailing access to the nurses working at the MTFs, individual survey packets were sent in bulk to the Chief, Department of Nursing at each of the selected facilities to be handed out to the nurses through departmental distribution routes. Because the investigator wanted to provide personalized distribution of the surveys, names of the nurses working at the facilities as well as their work units were obtained through the Department of Nursing. The packet that each RN received contained a letter describing the study and an invitation to voluntarily participate, the two survey instruments (which were to take an estimated 30 - 45 minutes to complete) and a postage-paid return mailing

envelope. In addition, a cover letter to the chief nurse outlining the study, the packet contents and distribution of the packets were included as a reminder of prior discussions. Detailed data collection procedures at both the pilot site and main study sites follow.

### Pilot Study

The small army community hospital was selected as a Pilot Site to test the survey procedure and to determine if any problems existed with the survey. After gaining support from the Chief Nurse, a site visit was made to explain the study and answer any questions. In October, 2001, once IRB approval was given, a letter requesting the names of the nurses and flyers announcing the study were sent to the chief nurse. The names of 88 nurses were received as potential study participants. Beginning three weeks later, the first surveys were mailed, followed at two week intervals by a second survey mailing, then reminder letters and finally, thank you notes. Because only two weeks had elapsed between the first and second mailings of the surveys, giving insufficient time for participants to return them, the second survey mailing included all participants. This was an inadvertent error in the sequence of mailing as recommended by Dillman (2000). After discussion with the dissertation committee chair and with the Chief, Department of Nursing Research at the large medical center, the sequence of mailings was corrected to reflect conformity with Dillman's method.

The outside of each packet was labeled with nurses' names and their work units to be distributed to them at their respective units. The name labels served two purposes, first for personalization of the surveys and second, for follow-up with a reminder and second survey packet to initial non-respondents. Each survey was numbered with a five-

digit number. The first digit corresponded with the hospital site and the next four digits served as a link with the name list. As surveys were returned, the names corresponding to the last four digits of the numbers were crossed off the list. Second surveys and/or reminders were not sent to survey responders. Thank you letters were sent to all nurses regardless of their participation in the study.

From the pilot site, 38 surveys were returned for a return rate of 43.2%. Initial scanning of the data revealed that two of the demographic questions appeared to cause some confusion in the answers. For the question, "In the past twelve months, how many continuing education courses have you attended?" approximately 25% of the respondents were stating the number of continuing education credits earned rather than the number of courses attended. In an effort to maintain similitude of the survey to its original form, the wording of the question was not changed, but the word "courses" was placed in a bold font and underlined. For the question, "What is your highest completed level of non-nursing post secondary education?" approximately 33% left the question blank. Since it could not be determined whether those individuals had no non-nursing post secondary education or simply chose to leave the question blank, another option of "none" was added to the choices.

Internal reliability (Cronbach's alpha) analyses of the scales measured for professional factors ranged from .70 for the attitudes toward research scale to .88 for the components of the trust scale. For organizational factors internal reliability measures ranged from .54 for the respect for rules subscale to .88 for the support scale.

## Study Sites

Support letters for the study were received from the Chiefs, Department of Nursing, at each of the medical centers prior to seeking IRB approval. Once approval was obtained, a site visit was made to each site for the purpose of detailing the study and providing the chief nurses opportunity to ask questions of the investigator and clarify procedures. The study aims, purpose and procedures were discussed as well as time frames for the study and IRB approval and compliance. At this time a request was made for a list of nurses' names and work units. Data collection was scheduled to begin January 2002. The list from the medium-sized medical center was obtained in late December 2001 and data collection commenced as scheduled. Due to compartmentalization of the Department of Nursing at the large medical center, the initial list from the large medical center was not complete or accurate. It required more time to get as accurate a list as possible. Data collection at that site did not begin until February 2002. Approximately two weeks prior to the start of data collection at each site, another information letter and announcement flyers were sent to the chief nurses for dissemination to nurses. Two weeks after the information letter was sent, the survey packets were sent in bulk to the office of the Chief Nurse for delivery through normal distribution routes to all members of the department of nursing. Two weeks following the first survey mailing, reminder letters were sent to any non-respondents. Again, because of insufficient time between mailings, the reminder letters were sent to all nurses. A second survey was mailed two weeks later to non-respondents. Thank you letters were sent to all nurses two weeks following the last survey mailing. At this time, the name list was destroyed, eliminating any links between the surveys and the respondents and

ensuring confidentiality of responses. As surveys were returned, they were stored in a locked file cabinet until the name list was destroyed. No returned survey was examined or data entered into the database until the links were eliminated. As of mid-May 2002, surveys were still being returned from both medical centers. No surveys returned after June 1, 2002 were used in the analysis.

### Data Management

After the links between nurses' names and survey numbers were destroyed, data were entered into SPSS. The database contained 290 cases and 178 input variables. Due to the large volume of data input and the chance for input error, a print-out of all data was made and 100% double-checked against the surveys for accuracy. A 0.08% error rate was discovered and all errors corrected. An Excel database was created for the variables requiring written answers, such as Nursing Journals Read or Professional Organizations Belonged To. The data were also transformed into an SAS database for imputation procedures.

In quantitative survey research missing values are common, especially in large surveys. Accurate analysis is dependent on complete data sets and software programs will exclude cases with missing data (listwise deletion). This can compromise analytic power and can also cause a non-response bias (Kneipp & McIntosh, 2001; Patrician, 2002). Before deciding how to handle missing data, it must be determined if they are missing completely at random (MCAR) or missing at random (MAR). Data are MCAR if there is no relationship between the value of the missing variable and other variables in the dataset; they are MAR if the probability of missing variables is unrelated to the value of

that variable or to other variables (Allison, 2000). If the data are MCAR, listwise deletion will provide valid inferences. However, while MAR data are ignorable, methods for correction can assist with the problems of analysis with missing data. There are several methods to handle missing data aside from listwise deletion. Single imputation, where the mean of the existing values of a dataset is substituted for the missing value can be used if only a few values are missing. However, as the number of missing values rises, using single imputation narrows variability in the data set. In short, multiple imputation is a model that proposes several different possible values for the missing value, then analyzes and estimates it based on complete data set. Multiple imputation substitutes model-based imputations for missing data by estimating a linear regression to predict one variable from other relevant variables by using cases with no missing variables. It then combines regression coefficients to compute predicted values for the missing variables. It repeats this process up to five times for each missing value, then analyzes the data by estimating logistic regression coefficients and standard errors for each imputed data set. These estimates are then combined into one estimate and standard error. Allison (2002) cautions that multiple imputation is not particularly valuable in reproducing exact results and that listwise deletion may be superior in certain cases.

Missing values on variables ranged from 0% to 85.17%. Those variables with large missing values were due to the “other” option in the answer. Most participants left these blank. The mean of missing values on all variables, excluding those described above was 2.56% with a median of 1.72%. Only the missing values on variables directly related to research utilization, professional and organizational factors were imputed. The mean of the missing values on these variables was 1.96% with a median of 1.72%.

Demographic and categorical variables were not imputed. The entire dataset was transferred from SPSS into SAS and multiple imputation procedures using “proc” commands in SAS were performed. The complete dataset was then transferred back into SPSS for analysis. To compare raw data with the imputed data, side-by-side analyses for each research question were carried out.

### Data Analysis

The entered data were first examined for measures of central tendency, means, standard deviations, skewness and kurtosis. Outliers were noted as they affect the regression analysis. These were checked to determine if they were errors or actual extreme values. The only variable where outliers existed was the number of continuing education courses attended in the last year. Even with the correction of the question as previously outlined, individuals continued to answer with the number of continuing education credits earned, sometimes reporting as many as 100. A detailed discussion of this phenomenon will be given in the results section.

The data were further examined using different statistical tests to determine both the presence and strength of relationships between variables and among groups. Correlation was used to determine correlations between variables for entry into multiple regression models and to look at the effects of the variables of attitudes toward research, belief suspension, trust, perceived organizational support and innovativeness on the dependent variables of research utilization.

Because the data were ordinal and not normally distributed on the research utilization variables, the Mann Whitney U test was used to examine group differences

when differentiating between the nurse administrators, advanced practice nurses and staff nurses on the independent variables of (a) types of research utilization. (b) attitudes toward research, (c) belief suspension, (d) sources of knowledge. (e) autonomy. (f) the perceived organizational factors, and (g) various professional variables. ANOVA was used to compare research utilization variables among the different sized hospital facilities.

Specifically, each research question was answered using the following statistical procedures:

1. To what extent do registered nurses in US Army medical treatment facilities use research findings in their clinical practice?

The variables intended to answer this question are overall research utilization, direct research utilization, indirect research utilization, and persuasive research utilization. Since the aim of this question was simply to describe nurses' use of research, descriptive statistics of interval research utilization scales were used. Means and standard deviations were calculated for these variables as they reflected the practices of the sample.

2. What professional and organizational factors enhance or hinder research utilization by registered nurses in US Army medical treatment facilities?

This question seeks the effect of multiple independent variables, both professional and organizational, of education, rank/grade, gender, experience, position, inservices attended, continuing education, cosmopolitaness, attitudes toward research, trust, belief, access to knowledge, sources of knowledge, decision to use research, time, support of others, presence of a research champion, organizational innovativeness, respect for rules,

supportiveness, and purposive information flow on research utilization. First, Pearson's  $r$  correlations were done on all the variables of research utilization as well as professional and organizational factors to determine if correlations existed. Any variables that correlated significantly ( $p < .05$ ) were then entered into a stepwise multiple regression analysis to determine the effect of the independent professional and organizational factors on the dependent variables of research utilization. A stepwise regression is appropriate when there are many independent variables in order to test all possible combinations to find those with the most predictive power for nurses to use research findings in their practice.

3. To what extent does organizational climate affect the professional factors of belief, attitude toward research, trust, cosmopolitanism and support in research utilization by registered nurses in US Army medical treatment facilities?

Correlations were done between the professional factors as outlined in the question and organizational factors of respecting rules, supportiveness, innovation and purposive information flow.

4. Are there differences in the ways research findings are used between nurse administrators, advanced practice nurses and staff nurses?

The different variables of research utilization were examined descriptively for each of these three groups of nurses.

5. Are there differences in professional and organizational factors that enhance or hinder research utilization as perceived by nurse administrators, advanced practice nurses and staff nurses?

6. Are there differences in professional and organizational factors that enhance or hinder research utilization as perceived by civilian nurses and military nurses practicing in US Army medical treatment facilities?

These two questions look at professional and organizational factors affecting research utilization as perceived by nurses in different positions and by military and civilian nurses. Analyses for both will be the same. The data on these factors are ordinal scales, that is, the numbers represent a hierarchy of levels rather than quantifiable degrees of difference. In addition, a Kolmogorov-Smirnov test of normality revealed that the data on each of the types of research utilization are not normally distributed. A Mann Whitney U which is non-parametric and does not require a normal distribution is the appropriate statistical procedure to determine differences in the means between and within the different groups of nurses. Regression of factors, separate for each group was also done.

7. Are there differences in research utilization among nurses in different sized military hospitals (large medical center, small medical center, community hospital)?

In examining overall research utilization by hospital size, a one-way ANOVA was used to test differences between nurses at different sized hospitals. Because there were three groups, post hoc tests were done to detect differences between groups.

The Research Utilization survey was adapted from Estabrooks (1997) study and contains many of the same variables she examined. While her study yielded a sample of 600 nurses across Alberta, Canada, the results of this study were compared with hers on many variables.

Following completion of data analysis, a report will be written and sent to the chief nurses for their information. The written report will contain only aggregate results. No individual or facility will be identified in the report.

### Summary

It is anticipated that this study will yield results that can be useful in several areas. The intent of the study was to find which professional and organizational factors may be significant in predicting research utilization in registered nurses in military treatment facilities. Based on these findings, further specific exploratory studies can be carried out with which to design interventions that will decrease nurses' apparent apprehension toward research and encourage its use in clinical practice.

## CHAPTER IV

### STUDY FINDINGS

#### Introduction

This chapter examines the data obtained from a survey designed to describe nurses' current use of research findings in their practice and to describe both professional and organizational factors which influence research utilization. First, a description of the sample will be presented, followed by the reliability scales of the subscales contained within both the professional and organizational factors. The research questions will be answered individually, other findings reported and a summary of the analysis given.

#### Characteristics of the Sample

The sample consisted of 290 registered nurses from a population of approximately 860 at three US Army hospitals. Surveys were sent to each of the 860 eligible nurses at the three sites. Three hundred thirteen (36.4%) surveys were returned. Of those, nine were eliminated from the study because they were returned blank and a further 15 cases were eliminated because they contained substantial (>25%) missing data leaving 290 usable (35.3%) surveys. Table 1 shows the breakdown of numbers and percentages of surveys sent versus those returned for each hospital site. The response rates from the military nurses at each site ranged from 4.2 – 15.6% higher than that of the civilian nurses and 5.5% higher overall. The percentage of usable surveys from military nurses was 8.7% higher than those from the civilian nurses.

Table 1. Breakdown of Surveys Sent and Returned, Total and From Each Site

	<b>Site A Community Hospital</b>	<b>Site B Large Medical Center</b>	<b>Site C Small Medical Center</b>	<b>Total</b>
<b>Population</b>				
<b>Military</b>	35	272	112	419
<b>Civilian</b>	53	234	154	441
	88	506	266	860
<b>Sample</b>				
<b>Military</b>	18 (51.4%)	108 (39.7%)	39 (34.8%)	164 (39.1%)
<b>Civilian</b>	20 (37.7%)	83 (35.5%)	45 (29.2%)	148 (33.6%)
	38 (43.2%)	191 (37.7%)	84 (31.6%)	313 (36.4%)
<b>Usable surveys</b>				
<b>Military</b>	18 (51.4%)	105 (38.6%)	37 (33.0%)	160 (38.2%)
<b>Civilian</b>	17 (32.1%)	71 (30.3%)	42 (27.3%)	130 (29.5%)
	35 (39.8%)	176 (34.7%)	79 (29.7%)	290 (33.7%)

Ranks in the civilian portion of the sample range from a wage grade of GS-7 to GS-13. The grade does not necessarily correspond to role or responsibility, but more to longevity and type of nursing job. In addition, grade is not part of the civilian RN title and could not be determined from the list of names provided by the chief nurses. Therefore, it was impossible to determine if the civilians in the sample were representative of the population. On the other hand, the numbers of nurses of each military rank in the total population was known and could be compared with the ranks of the survey respondents to determine representativeness of the sample. Table 2 compares the percentages of each rank of military nurses of the study population with those of the sample. Self-selection bias is evident in that a greater proportion of higher ranking military nurses responded to the survey than did the lieutenants who comprise a larger portion of the population.

Table 2. Military Survey Responses by Rank

	POPULATION	PERCENT	SAMPLE	PERCENT
2 <sup>nd</sup> Lieutenant	91	21.72%	20	12.50%
1 <sup>st</sup> Lieutenant	73	17.42%	24	15.00%
Captain	106	25.30%	46	28.75%
Major	74	17.66%	34	21.25%
Lieutenant Colonel	60	14.32%	29	18.13%
Colonel	15	3.58%	7	4.38%
<b>TOTAL</b>	<b>419</b>	<b>100.00%</b>	<b>160</b>	<b>100.00%</b>

A breakdown of the sample, as shown in Table 3, reveals that of the 290 RNs, 160 were military and 130 were civilian. Males comprised 20.8% of the sample. This is over three times the proportion of 5.7% reported by Faludi as quoted in Medzilla (2002). Of the military nurses in the sample, 30.2% were male.

Though 56 nurses in the sample reported being advanced practice nurses, only 29 met the criteria for advanced practice as defined by the US Army. The Army Nurse Corps defines an Advanced Practice Nurse (APN) as, “a clinical expert who has a graduate degree....and clinical nursing experience in an area of clinical practice....The following groups are included....Nurse Practitioner, Clinical Nurse Specialist, Certified Nurse Midwife, Certified Registered Nurse Anesthetist, and Community Health Nurse” (Army Nurse Corps Professional Development and Readiness Guide, 2000, p. 4-19). Nineteen of those nurses who stated being APNs did not have graduate degrees. Several of these nurses did have specialty certification in areas such as critical care, occupational health or community health. Eight nurses had graduate degrees, but were not practicing in the areas defined by the Army Nurse Corps.

It is evident that there was some confusion as to the meaning of the terms upper, middle, and lower management. Perception of level of management differed from nurse

to nurse with no apparent patterns. Some nurses in “unit head-nurse” positions considered themselves lower management, while others saw themselves as upper management. Second lieutenants who had charge nurse responsibilities stated answers that ranged from lower to middle management, while nurses responsible for nursing sections answers ranged from middle to upper management. Differences in use of research findings between levels of management were analyzed, however it will be difficult to make valid inferences due to the uncertainty over the terms.

Because the baccalaureate degree is required for entrance into the Army Nurse Corps, all 160 of the military nurses had at least that level of education. Promotion to the upper ranks generally requires a master’s degree. Although most have a master’s in nursing, it doesn’t necessarily have to be in that field and can be in areas such as healthcare administration, business administration or informatics. In this sample, the proportion of RNs having at least a baccalaureate in nursing (85.2%) is much higher than the 59.1% which was reported by the American Nurses Association (2001) in their internet staffing survey (n=6294).

The numbers of years worked in nursing, when broken down into groups similar to the American Nurses Association Survey (2001), is slightly less in the study sample. This is due to the military nurses, whose mean of years worked in nursing is 11.64 years as opposed to 20.63 years for the civilian nurses. Similarly the mean years worked at the hospitals is 2.17 for the military nurses versus 7.80 for the civilian nurses. Generally, military nurses are reassigned every three years.

Table 3. Demographics of Study Sample

Variable	Characteristic	Values	
Classification of RN	Civilian	n = 130	44.8 %
	Military	n = 160	55.2 %
Gender	Male	n = 60	20.7 %
	Female	n = 229	79.0 %
	Missing	n = 1	.3 %
Advanced Practice Position*	No	n = 261	90.0 %
	Yes	n = 29	10.0 %
Management Position	Upper	n = 20	6.9 %
	Middle	n = 57	19.7 %
	Lower	n = 25	8.6 %
	None	n = 179	61.7 %
	Missing	n = 9	3.1 %
Basic Nursing Education	Associate Degree	n = 41	14.1 %
	Diploma	n = 29	10.0 %
	Baccalaureate Degree	n = 219	75.5 %
	Missing	n = 1	.3 %
Highest Nursing Education	Associate Degree	n = 27	9.3 %
	Diploma	n = 14	4.8 %
	Baccalaureate Degree	n = 165	56.9 %
	Master's Degree	n = 78	26.9 %
	Doctorate	n = 4	1.4 %
	Missing/Other	n = 2	.6 %
Years Worked in Nursing	Mean Overall	15.7	
	Military	11.64	
	Civilian	20.63	
	Range	0 – 48.6 years	
Years Worked at Hospital Site	Mean Overall	4.7	
	Military	2.17	
	Civilian	7.80	
	Range	0 – 33.7 years	

Note. \* As defined by the Army Nurse Corps

### Data Analysis

Data from the surveys were entered into a computer database using SPSS Version 11.0 for Windows and the verbal answers, an Excel spreadsheet. Data were analyzed according to the level of data obtained and the statistical test required for examination of the research questions. Details of analysis of each question was given in chapter 3.

Though analysis was carried out on both raw data and the imputed data, the imputed data was chosen to report results for two reasons. First, side by side analysis of means of the imputed variables showed that there were no significant differences between them. An example of this comparison is shown in Table 4.

Table 4. Comparison of Means of Selected Variables, Raw versus Imputed Data

	<b>Raw Data</b>	<b>Imputed Data</b>
Overall Research Utilization	Mean = 4.49 n = 267	Mean = 4.52 n = 278
Direct Research Utilization	Mean = 4.16 n = 270	Mean = 4.18 n = 275
Indirect Research Utilization	Mean = 4.67 n = 267	Mean = 4.66 n = 274
Persuasive Research Utilization	Mean = 3.63 n = 264	Mean = 3.63 n = 278
Attitudes Toward Research	Mean = 24.57 n = 283	Mean = 24.55 n = 290
Perceived Support	Mean = 20.27 n = 193	Mean = 20.29 n = 182
Importance of Access to Research	Mean = 3.82 n = 253	Mean = 3.78 n = 290
Innovativeness of Organization	Mean = 2.40 n = 261	Mean = 2.40 n = 290
Purposive Information Flow	Mean = 2.39 n = 276	Mean = 2.40 n = 290

Second, when performing regression on multiple variables, the computer program will delete incomplete cases as it proceeds. Because the data was Missing At Random (MAR) and cases were deleted at each step of the regression, using the imputed data allowed more cases to be included in the regressions and, thus, giving more power to the analyses. For example, in the regression of professional and organizational factors on the research utilization dependent variables, in the raw data, listwise deletion of cases resulted in 75-80 cases being analyzed while the same regression done on the imputed data resulted in analysis of 151-158 cases.

## Reliability of Scales

### Research Utilization Survey

When developing the Research Utilization Survey, Estabrooks (1997) tested the internal consistency of each of the subscales within it once data were available from her dataset. The alpha reliability coefficient ranged from 0.74 for the problem solving ability scale to 0.87 for the belief scale. These were judged sufficient for use in this study. Because of the length of the Research Utilization Survey and the addition of the Organizational Climate Index for this study, the Research Utilization Survey was shortened and adapted with permission of the author for use in this military setting. Only those scales which were significant enough to fit into Estabrooks' conceptual model of research utilization were included. These were the Attitude Toward Research, Trust, Belief, Importance for Decision-making and Support scales.

The Attitude Toward Research scale was comprised of six questions asking respondents to "circle the one number that best describes your beliefs about research" about the items:

- a. Research is needed to improve nurse practice continually
- b. Research findings are too complex to use in practice
- c. I would change my practice as a result of research findings
- d. Research is not applicable to my practice
- e. Research helps to build a scientific base for nursing
- f. It takes too much effort to apply research to practice

Options were labeled as: 1=strongly disagree, 2=disagree, 3= uncertain, 4=agree, 5=agree strongly. Coding for items b, d and f were reversed as they were negative items. Responses were summed to create one value for the variable ATTUDDTOT with a range of 6-30, with the higher number representing more favorable attitudes toward research. The alpha reliability coefficient for the 290 cases comprising the sample was 0.75.

The Trust Scale measured the level of faith that research is useful in practice. It consisted of three responses to the question:

- How much faith do you have that nurse researchers will produce research:
- a. that is relevant to you?
  - b. That is easily used by you
  - c. that can be safely used in your practice?

Options were graded on a scale where 1 represented “none” and 5 represented “a great deal”. Again, the scores were summed to create the variable TRUSTTOT and ranged from 3-15. Higher scores suggested more trust. In the study sample, the alpha reliability coefficient for this scale was 0.88.

Belief, in the context of this study embodies the feeling that research findings are or are not similar to the values of the nurse. Rogers (1995) discusses the issues of compatibility with an individual’s belief system and its effect on the adoption of innovations. The 6-item scale was actually composed of two 3-item subscales each representing two different aspects of compatibility with beliefs. The first set of questions dealt with intent to implement research findings using the following questions:

- How willing are you to implement research when it contradicts something you:
- a. learned prior to nursing school
  - b. learned in nursing school
  - c. learned in your place of work

Responses were presented on a scale of 1 to 5, where 1=very unwilling and 5=very willing. Scores were summed to range from 3-15 and represented by the variable, INTENTOT. The second set of questions exemplified willingness to act on research findings:

How often do you actually implement research when it contradicts something you:

- a. learned prior to nursing school
- b. learned in nursing school
- c. learned in your place of work

Responses were presented on a scale of 1 to 5, where 1=never and 5=very often. Summed scores for this sub-scale ranged from 3-15 and were represented by the variable, ACTIOTOT. The two sub-scales were then added to create the variable BELEFTOT, representing a total belief score which ranged from 6-30. The alpha reliability coefficient for BELEFTOT for this sample was 0.87.

The scale dealing with importance of certain aspects of research for decision-making for use in clinical practice was a 9-item scale which asked the following information:

How important are the following in your decision to use or not to use particular research findings in your practice?

- a. The research matches my personal values
- b. The research meets a clinical need
- c. The research is easy to understand
- d. The research is relatively easy to incorporate into my practice
- e. The results of implementing the research are visible to me
- f. The particular research makes me feel like a better nurse
- g. The particular research practice makes my job as a nurse easier
- h. The research is relevant to my particular practice situation
- i. Others who have tried the research are positive about it

Options were represented by a scale ranging from 1 to 5, where 1=not at all important and 5=very important. The individual aspects of this scale correspond with many of the characteristics that affect innovation use in organizations (Rogers, 1995). In particular, statement (i) deals with the concept of critical mass which is found in much of the organizational literature. The individual item scores were added to form the variable IMPTOT with a range from 9 to 45 and an alpha reliability coefficient of 0.86.

Supportiveness specific to research utilization in nursing was measured by asking how the nurses felt supported by members of different groups, using the question:

Indicate the degree to which the following people are supportive of your using research in your practice:

- a. Other nurses in your area
- b. Your immediate supervisor
- c. Administration (nursing)
- d. Administration (general)
- e. Physicians
- f. Other health professionals
- g. Other (Specify: \_\_\_\_\_)

The scale consisted of seven items, of which six were specific and the seventh gave the respondent opportunity to list other area(s) of support. The seventh option was not considered in the summed total of the items because it was left blank by 80.34% of the time and only specified by 5 participants. Options were on a scale from 1 to 5 with 1=not at all supportive and 5=very supportive. Participants were also given the option to answer “do not know”. Items were summed and the total score ranging from 6-30 and represented by the variable SUPTTOT. Because of the “do not know” option which was not included in the score, the total number of cases with SUPTTOT scores was 200. Numbers of “do not know” answers on each item ranged from 26 for statement (b) to 67 for statement (d). The alpha reliability coefficient for this scale was 0.93.

Access to research findings was measured using the question:

How much access do you have to do the following in your work place?

- a. Medical library w/ research journals
- b. Unit library
- c. Library computers
- d. Electronic mail
- e. Internet research resources

Options ranged on a scale of 1 to 5, where 1=very little, 3=some and 5=a great deal. Participants were also given the option of “not available” for each item. These “not available” responses ranged from 1 for internet research resources to 35 for unit library. The item score, excepting the “not available” responses were totaled to form the variable ACCESTOT with scores ranging from 5-25. Because access to resources is an important factor in research utilization, the ACCESTOT variable was entered into the regression, however, the number of “not available” responses, especially at the unit level becomes important in implementing research into practice.

#### Organizational Climate Index for Military Units

The Organizational Climate Index for Military Units contains four integrated subscales to measure how individuals perceive different aspects of the military organization. Of the 39-item index, there are 8 items to measure how information is communicated through-out the organization or purposive information flow. Eleven items measure innovativeness, or how individuals are or are not encouraged to employ initiative in trying new advances. Ten items measure supportiveness or how human concerns are important within the organization. The final ten items measure respect for the rules of the organization, contributing to conformity and continuity. No published reliability coefficients could be found for the subscales of the Organizational Climate Index for Military Units. Mylle (1998) used the “average profit organization” as a standard against which to compare subgroups of the military organization. Norm scores were derived with standardized scores of 10 and a standard deviation of 3 on each subscale. Then, scores of subgroups were computed on each subscale and compared

against the standard. The comparisons of sub groups within the study sample will be presented later in this chapter. Alpha reliability coefficients were calculated for each of the four subscales on the data from the pilot site and found to be acceptable with the exception of the Respect for Rules subscale which was 0.54. However, because it was a vital part of the survey it was kept as presented. After all data was returned, the overall alpha coefficient for that subscale was found to be 0.72, within acceptable range. Table 5 depicts the alpha reliability coefficient for both the pilot site and the overall score, encompassing all data.

Table 5. Reliability Coefficients for Organizational Climate Index for Military Units for Study Sample

	<b>Cronbach's alpha for Pilot Site</b>	<b>Overall <math>\alpha</math> Coefficient</b>
Purposive Information Flow (GOALORTO)	$\alpha = 0.80$	$\alpha = 0.83$
Supportiveness (RELATETO)	$\alpha = 0.89$	$\alpha = 0.89$
Respect for Rules (RESRULTO)	$\alpha = 0.54$	$\alpha = 0.72$
Innovativeness (INNOVTOT)	$\alpha = 0.86$	$\alpha = 0.85$

### Analysis of Research Questions

#### Question 1

The first research question asked, "To what extent do registered nurses in US Army medical treatment facilities use research findings in their clinical practice?" To answer this question, many aspects of the Research Utilization survey must be considered. First, characteristics of research utilization will be discussed, and then nurses'

stated use of the different types of research utilization will be delineated. The Research Utilization Survey is designed to give information about the types of utilization, then elicit responses according to the information given. For example, the question, "Overall, in the past year, how often have you used research in some aspect of your nursing practice?" is asked three times, in the same way, throughout the survey. Estabrooks (1997) designed her survey in this way, actually asking the overall research utilization question four times. She purposively located the questions after further information on different types of research utilization (direct, indirect, persuasive) which implied that they influenced overall utilization and that overall utilization scores would be revised as the participant went through the survey. The fourth question, which Estabrooks used as her final question was omitted from this survey due to the length of the survey and the addition of the Organizational Climate Index.

Overall, nurses are positive about the use of research for their practice. Most nurses believe that incorporating research for clinical use would positively affect it. When asked if using research in their practice would improve patient care and outcomes, 69.6% of nurses agreed that it would, while 21.4% were neutral on the issue and only 8.0% believed that it would not improve patient care. When asked if they would use research if they could, 59.7% responded that they definitely would use it. Another 34.1% would consider using research, 2.8% did not know and only 3.1% said they would not use research in their practice.

All of the questions asked about research utilization, whether overall, direct, indirect or persuasive provided possible responses ranging from 1 to 8, where 1=never, 2=on 1 or 2 shifts, 5=about half the shifts, 7=nearly every shift and 8=do not

know. Cases containing “do not know” answers were not included in the mean research utilization scores, but were kept separate for information purposes. Because a score of 5 represented “about half the shifts” the mean scores tended to be skewed to the left. A Kolmogorov-Smirnov test of normality showed that the mean scores did not follow a normal distribution pattern. Figures 6-11 illustrate the distribution of the scores for each measure.

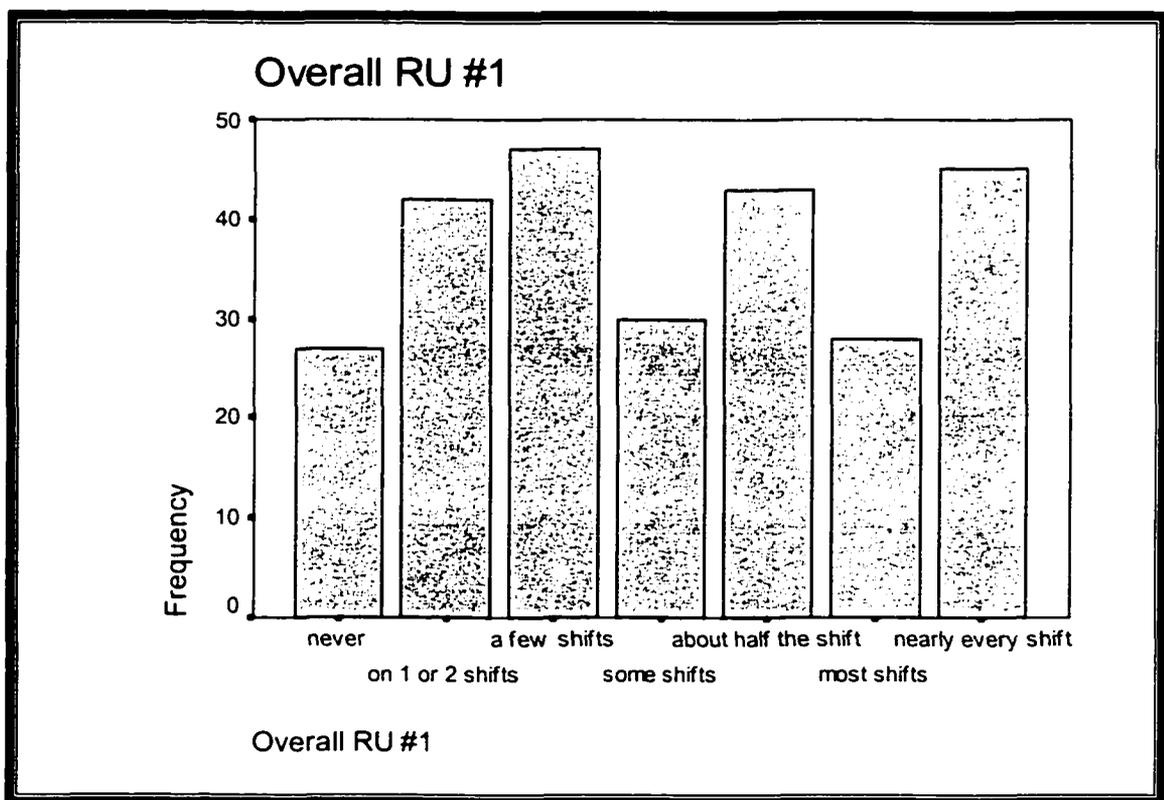


Figure 6. Distribution of Overall Research Utilization #1 Scores

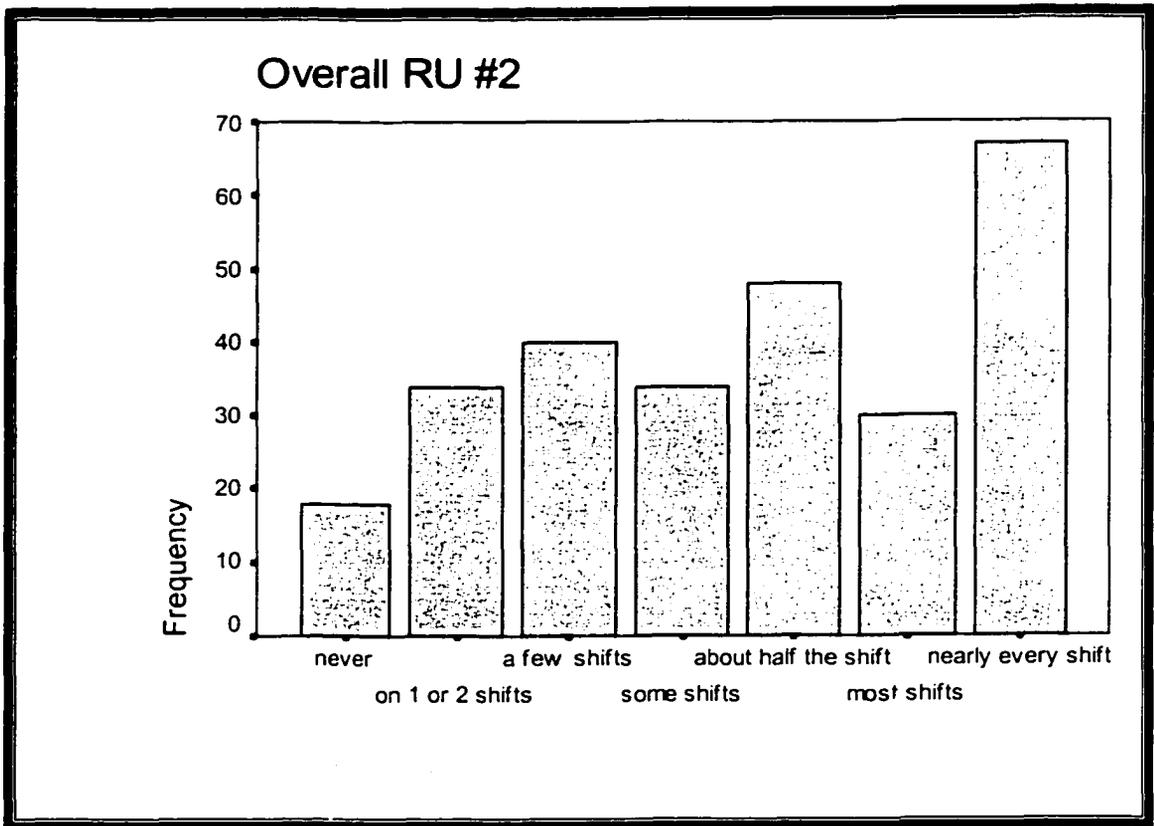


Figure 7. Distribution of Overall Research Utilization #2 Scores

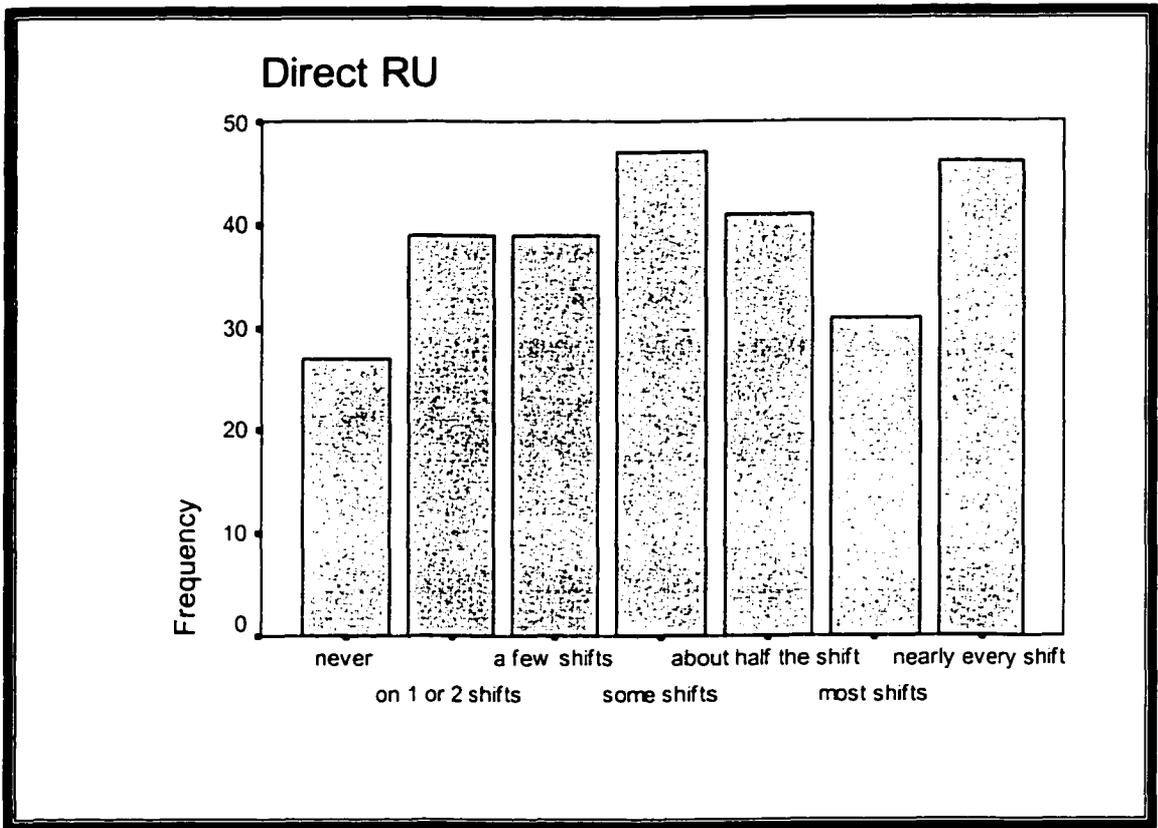


Figure 8. Distribution of Direct Research Utilization Scores

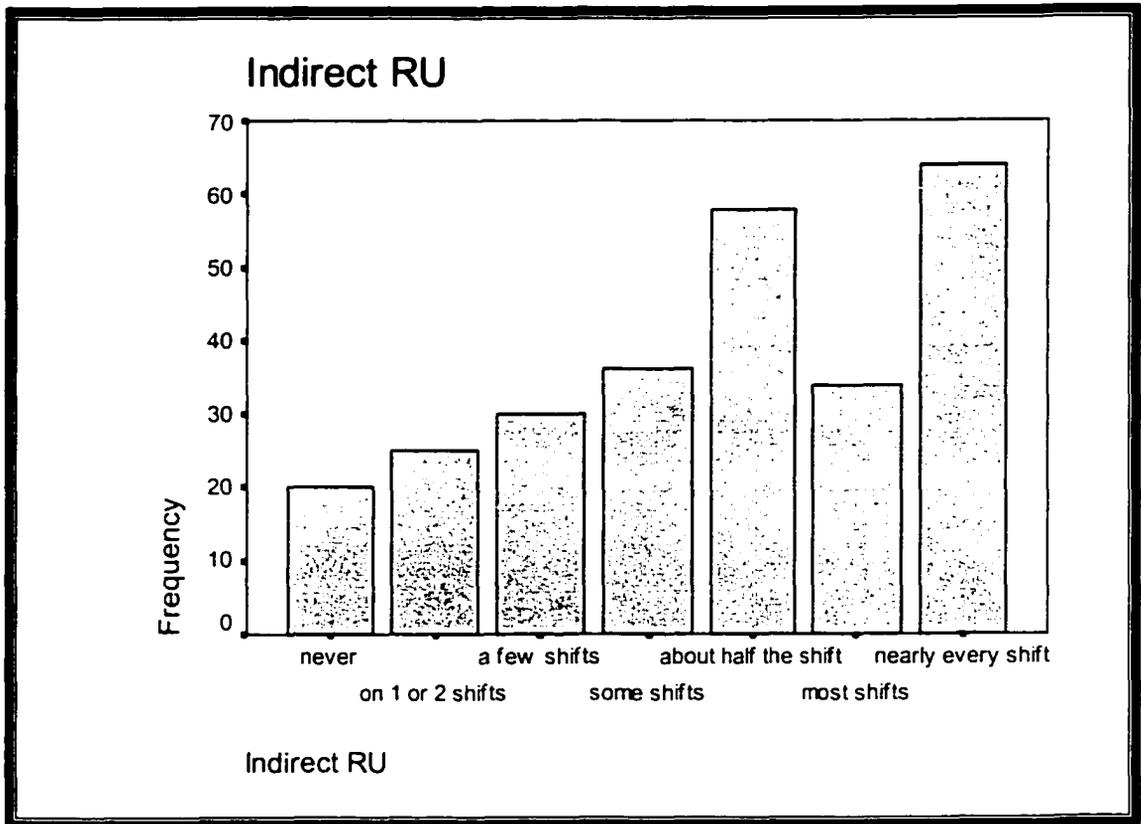


Figure 9. Distribution of Indirect Research Utilization Scores

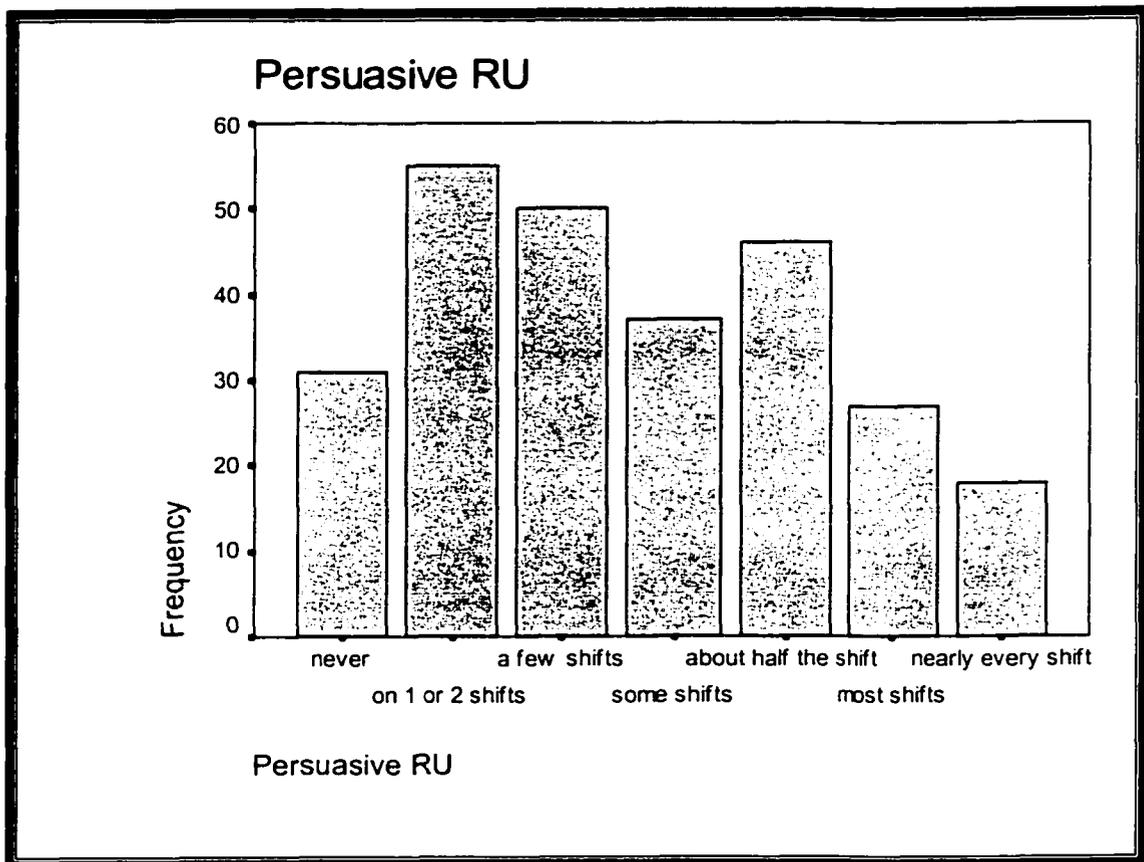


Figure 10. Distribution of Persuasive Research Utilization Scores

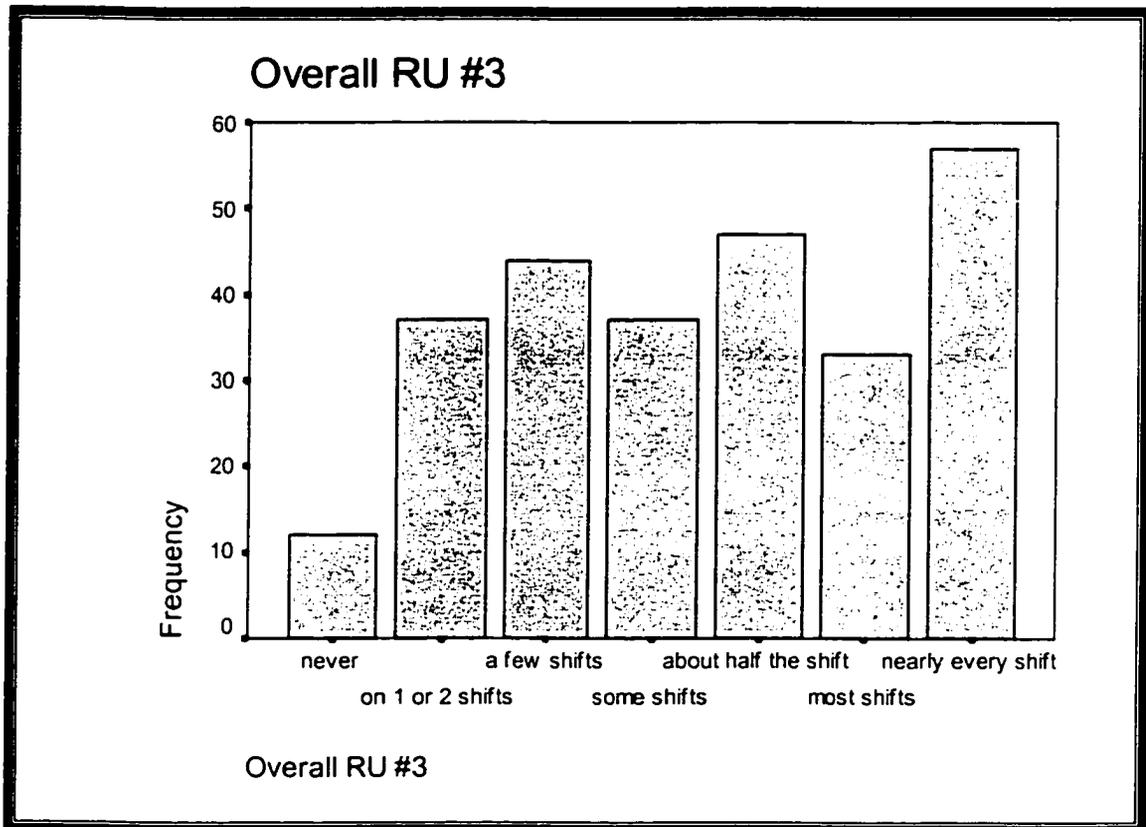


Figure 11. Distribution of Overall Research Utilization #3 Scores

Table 6 illustrates mean scores on each of the research utilization questions as well as number of “do not know” responses. Based on the mean research utilization scores, nurses use research in their practice slightly less than half the time.

Table 6. Mean Research Utilization Scores and Frequency of “Do Not Know” Answers

	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>“Do Not Know”</b>
<b>Overall RU #1</b>	269	4.10	1.95	21
<b>Overall RU #2</b>	281	4.55	1.93	9
<b>Direct RU</b>	275	4.18	1.93	15
<b>Indirect RU</b>	274	4.66	1.88	16
<b>Persuasive RU</b>	278	3.63	1.74	12
<b>Overall RU #3</b>	278	4.52	1.85	12

Research used indirectly, as defined, “the use of research findings to change your thinking or opinions about how you approach certain patient care situations”, is used more frequently than either direct or persuasive. Research is used persuasively far less frequently than that used either directly or indirectly.

Between the first time the overall research utilization question was asked and the second time, respondents were given several items that could be considered research utilization and asked if **they** considered them to be. Their responses are outlined in Table 7. It is clear that they believe that actually changing their own practice is research utilization, however when it comes to persuading others to change practice, they tend not to believe that this is also research utilization. This supports the finding that persuasive research utilization is the least used mode when compared to direct or indirect. It is also evident that having more information about what might constitute research utilization can influence the answers on the second overall research utilization question, which was asked after responding to those items. The mean for the second overall research utilization question was higher and the number of “do not know” answers decreased.

Table 7. Nurses' Responses to Items Presented as Forms of Research Utilization

	Yes (%)	No (%)
Changing an aspect of your own nursing practice	89.7	8.6
Changing a practice or routine on your "unit" or in your work area	86.6	12.4
Trying a new procedure, technique, or other nursing intervention	87.6	11.0
Changing a nursing procedure, technique, or other nursing intervention	88.3	9.3
Changing a nursing policy, technique, or other nursing intervention	87.6	10.7
Changing your beliefs about a particular approach or procedure	81.4	16.6
Educating or informing the patient or client	83.1	15.5
Educating or informing another nurse	85.2	13.1
Educating or informing another health professional	84.5	14.1
Educating or informing a member of the public	76.6	21.7
Persuading another nurse to make a change	73.1	25.2
Persuading another health professional to make a change	73.8	24.5
Persuading a client to make a change	74.5	23.8
Persuading a member of the public to make a change	70.7	27.2

One question in the survey dealt with the authority to make changes based on research. In many past surveys, nurses have avoided making changes because they believed they did not have the authority to make them (Hunt 2001). In this study, the majority of nurses rarely or never avoided making changes based on perception of lack of authority, however this was not uniform across all nurses in the study. Military nurses were much less likely to avoid making changes (71.2%) than their civilian counterparts (50.8%). In addition, nurses were more likely to modify an innovation to fit their situation than to avoid using it (70.4% at least some of the time).

## Question 2

The second research question asked, “What professional and organizational factors enhance or hinder research utilization by registered nurses in US Army medical treatment facilities?” To answer this question, correlations were first done on all variables to determine what relationships existed between them and the four research utilization variables of Direct RU, Indirect RU, Persuasive RU and Overall RU #3. Although the overall RU question was asked three times in the survey, only Overall RU#3 will be reported as it was the last question asked and was most influenced by the other information presented in the survey. Table 8 delineates significant correlations between the research utilization variables and others examined. Any variable that is not represented in the table did not correlate significantly with the four research utilization variables. It is interesting to note that there appears to be an inverse relationship between years worked at the hospital and all the research utilization variables. This is also true of the relationship between years worked in nursing and research utilization, though those correlations are not significant.

Table 8. Significant Correlations Between RU Variables and All Other Variables

	Direct RU	Indirect RU	Persuasive RU	Overall RU #3
<b>Highest Nursing Education</b>			r = .122 p = .042	r = .151 p = .012
<b>Number of Nursing Journals Read</b>	r = .194 p = .002		r = .211 p = .001	r = .138 p = .025
<b>Number of Non-Nursing Journals Read</b>	r = .262 p = .001	r = .161 p = .036	r = .260 p = .001	r = .322 p = .000
<b>Years worked in Nursing</b>		r = -.160 p = .008		
<b>Years Worked in the Hospital</b>		r = -.189 p = .002	r = -.159 p = .008	r = -.150 p = .013
<b>Advanced Practice</b>	r = .190 p = .002	r = .180 p = .003		r = .262 p = .000
<b>Management Position</b>			r = .139 p = .021	
<b>Interest or Organizational Groups Belonged To</b>	r = .166 p = .006	r = .130 p = .031		r = .211 p = .000
<b>Attitude Toward Research</b>	r = .342 p = .000	r = .202 p = .001	r = .321 p = .000	r = .376 p = .000
<b>Trust</b>	r = .288 p = .000		r = .306 p = .000	r = .268 p = .000
<b>Belief</b>	r = .360 p = .000	r = .297 p = .000	r = .336 p = .000	r = .361 p = .000
<b>Characteristics Important for Decision Making</b>	r = .140 p = .020	r = .258 p = .000	r = .255 p = .000	r = .230 p = .000
<b>Access to Research Findings</b>	r = .218 p = .001	r = .148 p = .023	r = .155 p = .016	r = .196 p = .002
<b>Sources of Nursing Knowledge</b>			r = .130 p = .031	
<b>Importance of Access to Findings</b>	r = .134 p = .026	r = .131 p = .030	r = .271 p = .000	r = .152 p = .011
<b>Time to Read and/or Implement</b>	r = .175 p = .004		r = .200 p = .001	r = .145 p = .015
<b>Support</b>	r = .311 p = .000		r = .230 p = .001	r = .204 p = .004
<b>Presence of a Research Champion</b>	r = .250 p = .001		r = .158 p = .039	r = .175 p = .023
<b>Organizational Innovativeness</b>	r = .276 p = .000		r = .252 p = .000	r = .278 p = .000
<b>Organizational Respect for Rules</b>				
<b>Organizational Purposive Information Flow</b>	r = .122 p = .043		r = .129 p = .031	
<b>Organizational Supportiveness</b>	r = .136 p = .024		r = .134 p = .025	

Note. Blank cells indicate no significant correlations

Once significant relationships were determined between the research utilization variables and professional and organizational factors, those variables were entered into a stepwise regression to determine the nature of the relationships of the other variables on each type of research utilization. Variables were entered into the regression models at a probability level of  $\leq 0.05$  and removed from the model at a probability level of  $\geq 0.10$ . Because they were dichotomous variables, advanced practice, management position and the presence of a research champion were not entered into the models. The standardized residuals of the regressed variables followed a normal distribution and variances across groups were equal. For the purposes of these study findings, only the regression models that explain the best relationships between the professional and organizational factors with research utilization are reported. The regression models and their respective significance are presented in Table 9.

Because of the number of predictor variables for research utilization that were entered into the regression, collinearity is a problem. For example, the organizational variables of purposive information flow and organizational support are highly correlated ( $r = 0.730$ ,  $p < 0.001$ ), making it difficult to determine which variable would help to explain research utilization by nurses. Collinearity diagnostic tests run on the variables entered into each stepwise regression of research utilization indicated possible collinearity problems with this sample through the presence of Eigenvalues approaching zero and collinearity condition indices of  $>15$ , but  $<25$ . This would be important if the purpose of this study were to estimate contributions of individual predictors, however, collinearity "...does not affect the ability of a regression equation to predict the

response...” (Dallal, 2001, p. 1). In this case, only those variables contributing to research utilization were sought.

The variable of belief was significant in all the research utilization regression models, indicating that the more willing nurses are to change their practice, even if it contradicts past practice, the more likely they are to use research findings in their practice. Organizational innovativeness was present in all of the models except Indirect Research Utilization. Mylles (1998) describes an innovative organization as one that is diverse, supports change and adaptation, encourages individual initiative and competition. If nurses perceive that the organization to which they belong has those characteristics, they are more likely to utilize research to change their practice.

Table 9. Effect of Professional and Organizational Factors on Research Utilization

<b>Research Utilization Variable</b>	<b>Variables Entered into the Stepwise Regression</b>	<b>Adjusted R<sup>2</sup></b>
<b>Direct Research Utilization</b>	Belief	R <sup>2</sup> = 0.435
	Attitudes Toward Research	
	Access to Research Findings	
	Organizational Supportiveness	
	Number of Nursing Journals Read	
<b>Indirect Research Utilization</b>	Belief	R <sup>2</sup> = 0.150
	Research Characteristics Important for Decision Making	
<b>Persuasive Research Utilization</b>	Importance of Access to Research	R <sup>2</sup> = 0.267
	Access to Research Findings	
	Trust	
	Research Characteristics Important for Decision Making	
<b>Overall Research Utilization #3</b>	Belief	R <sup>2</sup> = 0.377
	Organizational Innovativeness	
	Interest or Organizational Groups	
	Organizational Respect for Rules	

### Question 3

The third research question asked, “To what extent does organizational climate affect the professional factors of belief, attitudes toward research, trust, cosmopolitanism, and support in research utilization by registered nurses in US Army medical treatment facilities?” Cosmopolitanism is the degree to which individuals’ networks are located outside their organizational system. For this study, cosmopolitanism is measured by the number of professional organizations to which the nurses belong and is represented by the variable, INTORGGP. Correlations were carried out between the organizational

factors and the professional factors to determine if relationships existed between them. Then partial correlations were performed between the organizational factors and each of the professional factors, controlling for the other professional factors. Table 10 outlines the correlations between the organizational and professional factors. Significant relationships appear in bold. It can be seen that there is no significant relationship between cosmopolitanism and the organizational factors. Because there are significant relationships between cosmopolitanism and indirect, direct and overall research utilization, it can be inferred that that relationship is independent of the organizational factors and that nurses who are more cosmopolite are more likely to engage in research utilization regardless of the climate of their organization. All of the other professional factors (attitude towards research, trust, and belief) correlate significantly ( $p < 0.05$ ) with organizational innovativeness, purposive information flow and organizational support. There is no significant relationship between these professional factors and organizational respect for rules. This could be expected with a military institution where conformity and standardization is the norm. Support correlated significantly with all aspects of organizational climate, including respect for rules.

Table 10. Correlations Between Organizational and Professional Factors

	<b>Organizational Innovativeness (INNOVTOT)</b>	<b>Organizational Purposive Information Flow (GOALORTO)</b>	<b>Organizational Supportiveness (RELATETO)</b>	<b>Organizational Respect for Rules (RESRULTO)</b>
<b>Cosmopolitaness (INTORGGP)</b>	r = .042 p = .477	r = -.017 p = .771	r = -.022 p = .712	r = -.042 p = .477
<b>Attitudes Toward Research (ATTUDTOT)</b>	<b>r = .318</b> <b>p = .000</b>	<b>r = .114</b> <b>p = .053</b>	<b>r = .216</b> <b>p = .000</b>	r = .080 p = .175
<b>Trust (TRUSTTOT)</b>	<b>r = .252</b> <b>p = .000</b>	<b>r = .173</b> <b>p = .003</b>	<b>r = .243</b> <b>p = .000</b>	r = .034 p = .561
<b>Belief (BELEFTOT)</b>	<b>r = .233</b> <b>p = .000</b>	<b>r = .094</b> <b>p = .109</b>	<b>r = .169</b> <b>p = .004</b>	r = .078 p = .185
<b>Support (SUPPTTOT)</b>	<b>r = .490</b> <b>p = .000</b>	<b>r = .395</b> <b>p = .000</b>	<b>r = .408</b> <b>p = .000</b>	<b>r = .165</b> <b>p = .019</b>

Note. Cells appearing in bold indicate significant relationships

Partial correlations are detailed in Table 11. When the other professional factors were held constant, the relationships changed. It can be seen that the only significant relationships now were trust with organizational supportiveness and support with all organizational factors. It appeared that it was the influence of the other professional factors, particularly SUPPTTOT that contributed to significant relationships with the organizational factors.

Table 11. Partial Correlations of Organizational Factors with Professional Factors, Controlling for Professional Factors

	Organizational Innovativeness (INNOVTOT)	Organizational Purposive Information Flow (GOALORTO)	Organizational Supportiveness (RELATETO)	Organizational Respect for Rules (RESRULTO)
<b>Cosmopolitanism (INTORGGP)*</b>	r = -.0980 p = .227	r = -.1087 p = .180	r = -.1105 p = .173	r = -.1260 p = .120
<b>Attitudes Toward Research (ATTUDTOT)**</b>	r = .0890 p = .272	r = -.1042 p = .199	r = -.0783 p = .334	r = .0431 p = .596
<b>Trust (TRUSTTOT)***</b>	r = .0546 p = .502	r = .1345 p = .096	<b>r = .1913</b> <b>p = .019</b>	r = .0023 p = .977
<b>Belief (BELEFTOT)****</b>	r = .0148 p = .855	r = -.0928 p = .252	r = -.0622 p = .443	r = .0003 p = .997
<b>Support (SUPTTOT)*****</b>	<b>r = .4305</b> <b>p = .000</b>	<b>r = .4232</b> <b>p = .000</b>	<b>r = .3802</b> <b>p = .000</b>	<b>r = .1586</b> <b>p = .049</b>

Note. Cells appearing in bold indicate significant relationships

\* Controlling for ATTUDTOT, TRUSTTOT, BELEFTOT, SUPTTOT

\*\* Controlling for INTORGGP, TRUSTTOT, BELEFTOT, SUPTTOT

\*\*\* Controlling for INTORGGP, ATTUDTOT, BELEFTOT, SUPTTOT

\*\*\*\* Controlling for INTORGGP, ATTUDTOT, TRUSTTOT, SUPTTOT

\*\*\*\*\* Controlling for INTORGGP, ATTUDTOT, TRUSTTOT, BELEFTOT

#### Question 4

The fourth research question asked, “Are there differences in the ways research findings are used between nurse administrators, advanced practice nurses and staff nurses?” The four variables of Overall Research Utilization #3, Direct Research Utilization, Indirect Research Utilization and Persuasive Research utilization were examined descriptively for each of the groups to determine their use of research for practice.

In the study sample, there were 110 nurses who reported being in a management role in some capacity and 179 staff nurses. Figure 12 depicts the mean research utilization scores between the two groups. The staff nurses tended to use research

indirectly more than the nurse managers, however, the group differences were not significant in that case. The groups were further broken down by management level and an ANOVA was done. In the area of persuasive research utilization, there were significant differences between the groups. A Scheffé post-hoc test determined that there were differences in persuasive research utilization between the middle managers and staff nurses, but no differences between the other groups.

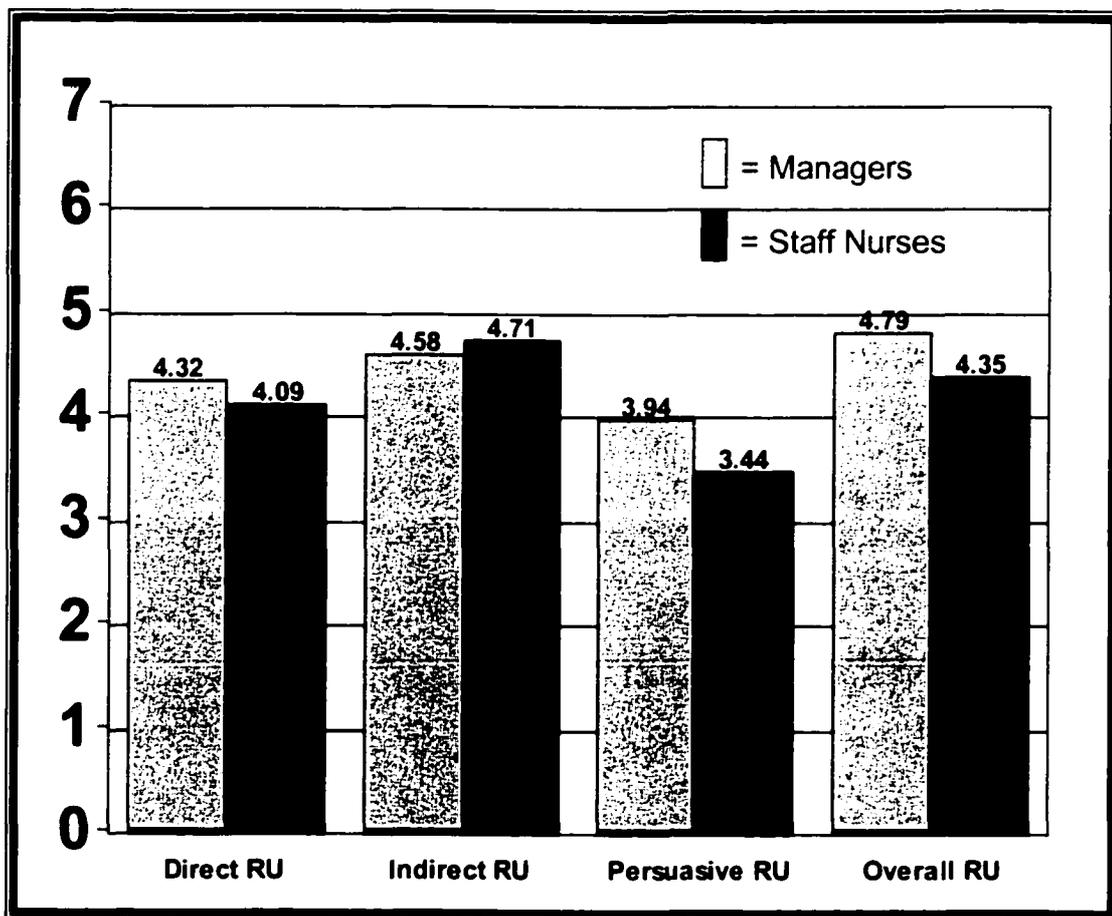


Figure 12. Comparison of Research Utilization Between Managers and Staff Nurses

There were 29 advanced practice nurses (APNs) and 261 non-APNs in the sample. Figure 13 shows the means of the research utilization variables comparing APNs

and non-APNs. The APNs used research in all manners more than the non-APNs, however an ANOVA revealed that the differences were not significant for persuasive research utilization. Testing homogeneity of variances for the groups also revealed that there were differences in the variances between the groups on the variable of Overall Research Utilization. Because interpretation of the ANOVA in such cases can be questioned, the more robust Welch and Brown-Forsythe Equality of Means statistics were applied in this case. These tests also showed that the APNs do differ significantly from the Non-APNs on the variable of Overall Research Utilization

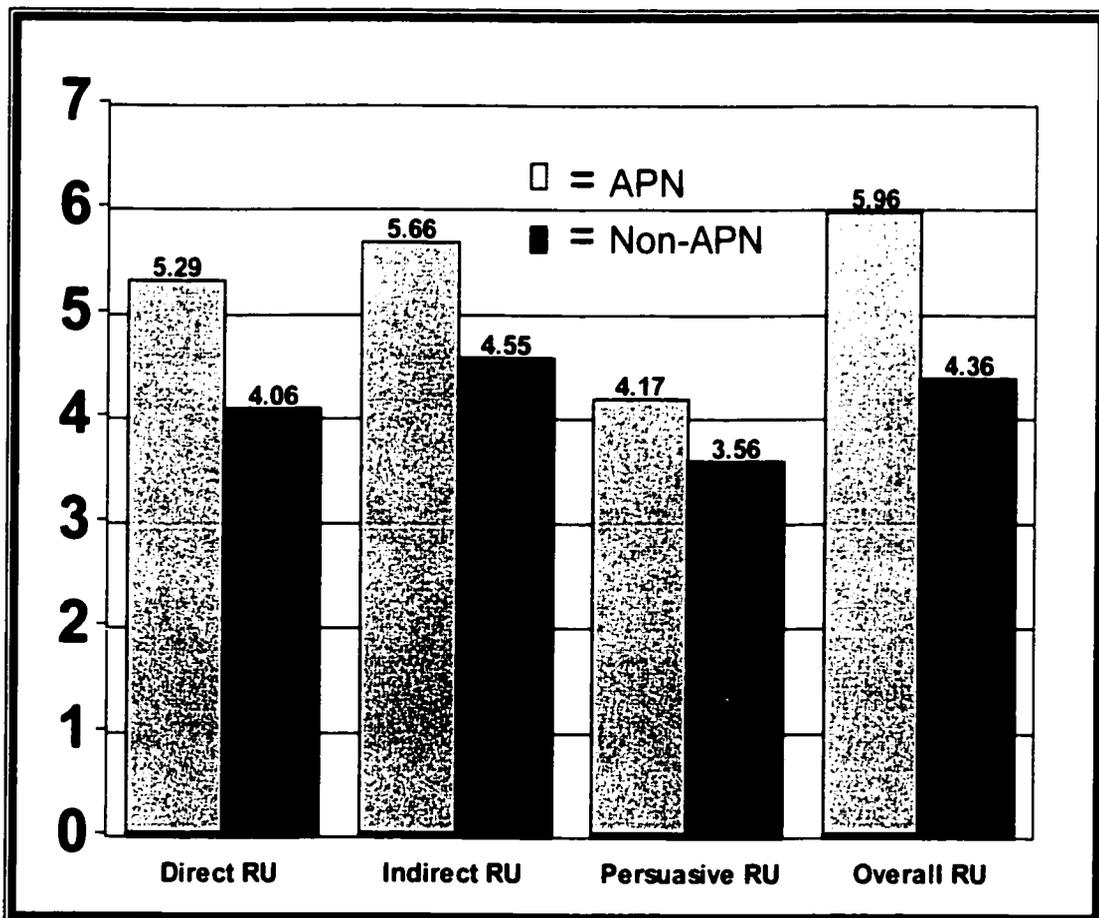


Figure 13. Comparison of Research Utilization Between APNs and Non-APNs

## Question 5

The fifth question asked, "Are there differences in professional and organizational factors that enhance or hinder research utilization as perceived by nurse administrators, advanced practice nurses and staff nurses?" The data was split by groups (Management vs. Staff nurses and APNs vs. Non-APNs), then the professional and organizational factors were regressed on the research utilization variables as in question 2. Because the variable measurements were primarily ordinal, a Mann Whitney U was performed to compare the groups. A Mann Whitney U is analogous to the t-test and is not sensitive to normality. A significance level of  $<.05$  indicates group differences. Table 12 represents differences between nurses in management positions and staff nurses on the professional and organizational factors thought to influence research utilization. In this study, nurses in management positions and staff nurses differed on several variables. On the variables of access to research and time to read or implement research, managers stated having more access to research findings on all levels which include unit level libraries, facility libraries, unit level internet access and e-mail. Upper and middle level nurse managers also reported having more time available for accessing, reading and implementing research findings. Lower nurse managers, on the other hand, reported less time for research related activities than even the staff nurses. Table 13 shows the means for these groups on the variables of time and access.

Also significant for differences were the perception of organizational innovativeness and organizational respect for rules. Upper level managers tended to view the organization as more innovative (Mean = 2.52, range 1-4). The lower nurses were on the management scale, the less they perceived the organization as being innovative. The

mean on this variable was 2.46 for middle managers, 2.42 for lower managers and 2.37 for staff nurses. The opposite was true for organizational respect for rules. Lower managers and staff nurses (Mean = 2.73 and 2.70) perceived the organization as more structured, necessitating the need for conformity than did middle and upper managers (Mean = 2.57 and 2.46).

Table 12. Group Differences Between Nurses in Management Positions and Staff Nurses on Professional and Organizational Factors Affecting Research Utilization

<b>Management versus Staff Nurses</b>				
	<b>Mann-Whitney U</b>	<b>Wilcoxon W</b>	<b>Z</b>	<b>Asymptotic Sig. (2-tailed)</b>
Attitudes Toward Research	9046.5	26156.5	-1.163	.245
Trust	8896	25006	-1.407	.159
Belief	9198	25308	-.942	.346
Research Characteristics Important for Decision Making	8989	25099	-1.244	.214
Access to Research	6027	16612	-2.521	<b>.012*</b>
Sources of Practice Knowledge	9635.5	25566.5	-.096	.923
Importance of Access to Research	9737.5	15842.5	-.161	.872
Time to Read or Implement Research	8237	24347	-2.340	<b>.019*</b>
Support	4106.5	10776.5	-1.934	.053
Organizational Innovativeness	8385	24495	-2.121	<b>.034*</b>
Organizational Purposive Information Flow	9613.5	25723.5	-.337	.736
Organizational Respect for Rules	8013.5	14118.5	-2.663	<b>.008*</b>
Organizational Supportiveness	9533	15638	-.453	.651

Note. Cells appearing in bold indicate significant differences

Table 13. Means of Time to Read and Implement Research by Management Position

Management Position		N	Minimum	Maximum	Mean	Std. Deviation
Upper	TIMETOT	19	5.00	25.00	12.80	4.29
	Valid N (listwise)	19				
Middle	TIMETOT	53	5.00	25.00	12.79	4.14
	Valid N (listwise)	53				
Lower	TIMETOT	18	8.00	15.00	10.47	2.25
	Valid N (listwise)	18				
Staff Nurse	TIMETOT	169	5.00	25.00	11.11	3.39
	Valid N (listwise)	169				

Regression of the professional and organizational factors of these two groups revealed that nurses in management held that belief systems were more important in influencing use of research findings than did staff nurses. They were more likely to change practice, even if it contradicted prior learning and practice. Even though staff nurses had lower perceptions of organizational innovativeness than did nurse managers, it was a significant influencing factor for both direct and overall research utilization. There was a relationship between nurse managers' use of research findings and the number of years worked in the hospital on the variables of indirect and overall research utilization. As reported earlier, the correlations between research utilization and years worked in both nursing and the hospital were negative. As nurses move up in managerial responsibilities, they tend to move away from patient care. Though managers would not directly implement research in their practice, they could have an impact on influencing policy changes or assisting staff nurses to change practice using research findings. Table 14 shows the comparison of the regression of professional and organizational factors my managers and staff nurses.

Table 14. Comparison of Professional and Organizational Factors Affecting Research Utilization Between Nurses in Management Positions and Staff Nurses

RU Variable	Variables Entered into the Stepwise Regression with Adjusted R <sup>2</sup>		Variables Entered into the Stepwise Regression with Adjusted R <sup>2</sup>	
	Management		Staff Nurses	
<b>Direct RU</b>	Attitude Toward Research	R <sup>2</sup> = 0.456	Belief	R <sup>2</sup> = 0.533
	Belief		Access to Research Findings	
			Organization Innovativeness	
			Interest or Organizational Groups Belonged To	
<b>Indirect RU</b>	Belief	R <sup>2</sup> = 0.256		
	Years Worked in Hospital			
<b>Persuasive RU</b>	Importance of Access to Research	R <sup>2</sup> = 0.204	Trust	R <sup>2</sup> = 0.255
			Research Charact. Important for Decision Making	
			Access to Research Findings	
<b>Overall RU #3</b>	Belief	R <sup>2</sup> = 0.335	Attitudes Toward Research	R <sup>2</sup> = 0.410
	Research Charact. Important for Decision Making		Organization Innovativeness	
	Years Worked in Hospital		Number of Non-Nursing Health Rel. Journals Read	

Nurses practicing as APNs differed significantly from Non-APN nurses only on the variable of Attitudes Toward Research. Table 15 depicts group comparisons on the professional and organizational factors affecting research utilization for APNs and Non-APNs. Table 16 shows the mean scores for these groups on the variable of Attitudes

Toward Research. While the means differ somewhat, it is interesting to note that the minimum scores on the scale for each group vary widely. The range of possible scores is 6 – 30. The minimum for Non-APNs is 14 while the minimum for APNs is 22. APNs appear to feel much more positively toward research and its use than Non-APNs.

Table 15. Group Differences Between APNs and Non-APNs on Professional and Organizational Factors Affecting Research Utilization

<b>APNs versus Non-APNs</b>				
	<b>Mann-Whitney U</b>	<b>Wilcoxon W</b>	<b>Z</b>	<b>Asymptotic Sig. (2-tailed)</b>
Attitudes Toward Research	2795.5	36986.5	-2.320	<b>.020*</b>
Trust	3421	37612	-.868	.386
Belief	3022.5	37213.5	-1.786	.074
Research Characteristics Important for Decision Making	3660	37851	-.291	.771
Access to Research	2159.5	26249.5	-1.738	.082
Sources of Practice Knowledge	3230	3665	-1.237	.216
Importance of Access to Research	3442.5	3877.5	-.824	.410
Time to Read or Implement Research	3206	37397	-1.355	.175
Support	1628.5	1799.5	-.041	.968
Organizational Innovativeness	3179.5	37370.5	-1.415	.157
Organizational Purposive Information Flow	3726.5	4161.5	-.136	.892
Organizational Respect for Rules	3082	3517	-1.645	.100
Organizational Supportiveness	3417.5	3852.5	-.858	.391

*Note.* Cells appearing in bold indicate significant differences

Table 16. Means of Attitudes Toward Research of APNs and Non-APNs

<b>Advanced Practice</b>		<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
<b>NO</b>	ATTUDTOT	261	14.00	30.00	24.3921	3.2577
	Valid N (listwise)					
<b>YES</b>	ATTUDTOT	29	22.00	30.00	25.9310	2.6040
	Valid N (listwise)	29				

When professional and organizational factors were regressed on the research utilization variables, respect for rules appeared to be highly correlated with both direct and indirect research utilization for the APNs. It must be noted that, in general, APNs are not in management positions. The vast majority are practicing in their area of specialty and are not responsible for direct supervision of staff. Given this, and the fact that it is often the APNs who are expected to carry out and implement research projects, it is not surprising that perceptions of organizational structure would be a concern for this group. For persuasive research utilization, it was important for the APNs to have access to findings. Years worked in the hospital was a consistent factor influencing research utilization for non-APNs. Again, the relationship between years worked and research use was negative. Table 17 shows comparison of regression of professional and organizational factors of APNs and Non-APNs.

Table 17. Comparison of Professional and Organizational Factors Affecting Research Utilization Between APNs and Non-APNs

RU Variable	Variables Entered into the Stepwise Regression with Adjusted R <sup>2</sup>		Variables Entered into the Stepwise Regression with Adjusted R <sup>2</sup>	
	APNs		Non-APNs	
<b>Direct RU</b>	Organizational Respect for Rules	R <sup>2</sup> = 0.630	Belief	R <sup>2</sup> = 0.462
			Attitudes Toward Research	
			Access to Research Findings	
			Organizational Supportiveness	
<b>Indirect RU</b>	Organizational Respect for Rules	R <sup>2</sup> = 0.624	Research Charact. Important for Decision Making	R <sup>2</sup> = 0.237
	Attitudes Toward Research		Years Worked in the Hospital	
			Belief	
			Highest Nursing Education	
<b>Persuasive RU</b>	Importance of Access to Research	r <sup>2</sup> = 0.379	Attitudes Toward Research	R <sup>2</sup> = 0.230
			Importance of Access to Research	
			Years Worked in the Hospital	
<b>Overall RU #3</b>			Belief	R <sup>2</sup> = 0.427
			Organizational Innovativeness	
			Number of Non-Nursing Health Rel. Journals Read	
			Research Charact. Important for Decision Making	
			Years Worked in the Hospital	

## Question 6

The sixth research question asked, “Are there differences in professional and organizational factors that enhance or hinder research utilization as perceived by civilian nurses and military nurses practicing in US Army medical treatment facilities?” This question was answered in the same manner as question 5, except that the groups were split into military and civilian nurses.

The military and the civilians differed on the variables of attitudes toward research, trust, access to research findings and support. When broken down into the specific components of each scale it was shown that civilian nurses have a greater perception that research findings are too complex to use in practice, that they are not applicable and the civilian nurses are less willing to change their practice. The civilian nurses also stated having less access to research findings, though both military and civilian nurses work together on the same units. Table 18 shows differences between military and civilian as groups on professional and organizational factors. Table 19 shows mean scores on the professional factors of attitudes toward research, trust, access to research findings and support.

The military nurses perceived more support on all levels than their civilian counterparts. Table 20 depicts the mean support scores, showing the differences between the two groups. All the nurses perceived more support from the head nurse level than from the other levels.

Table 18. Comparison of Professional and Organizational Factors Affecting Research Utilization Between Military and Civilian Nurses

<b>Military versus Civilian</b>				
	<b>Mann-Whitney U</b>	<b>Wilcoxon W</b>	<b>Z</b>	<b>Asymptotic Sig. (2-tailed)</b>
Attitudes Toward Research	8162	16677	-3.166	<b>.002*</b>
Trust	8488.5	17003.5	-2.752	<b>.006*</b>
Belief	9250	17765	-1.626	.104
Research Characteristics Important for Decision Making	9435	22315	-1.362	.173
Access to Research	5264.5	11369.5	-4.105	<b>.000*</b>
Sources of Practice Knowledge	9544.5	22264.5	-1.013	.311
Importance of Access to Research	9064.5	21944.5	-1.942	.052
Time to Read or Implement Research	9386	17901	-1.433	.152
Support	3438	7443	-3.698	<b>.000*</b>
Organizational Innovativeness	9336	17851	-1.502	.133
Organizational Purposive Information Flow	10340.5	18855.5	-.084	.933
Organizational Respect for Rules	9323	22203	-1.521	.128
Organizational Supportiveness	10176.5	18691.5	-.315	.753

Note. Cells appearing in bold indicate significant differences

Table 19. Means of Military versus Civilian Nurses on Attitudes Toward Research, Trust, Access to Research Findings and Support

Status	Variables	N	Minimum	Maximum	Mean	Std. Deviation
Military	Attitudes Toward Research	160	17.00	30.00	25.14	2.75
	Trust	160	3.00	15.00	10.89	2.45
	Access to Research Findings	136	5.00	25.00	20.50	4.06
	Support	111	6.00	30.00	21.78	5.67
Civilian	Attitudes Toward Research	130	14.00	30.00	23.82	3.61
	Trust	130	3.00	15.00	10.08	2.68
	Access to Research Findings	115	5.00	25.00	17.63	5.60
	Support	89	6.00	30.00	18.43	6.36

Table 20. Comparison of Means of Perceived Support by Military and Civilian Nurses

Aspect of Support		N	Range	Mean	Std. Deviation
Support from Peers	Military	133	1 - 5	3.5940	1.1351
	Civilian	101	1 - 5	3.1584	1.2785
Support from Head Nurses	Military	145	1 - 5	4.0897	1.1721
	Civilian	111	1 - 5	3.3784	1.3488
Support from Nursing Administration	Military	132	1 - 5	3.7955	1.1508
	Civilian	95	1 - 5	3.0737	1.2568
Support from General Administration	Military	123	1 - 5	3.4634	1.1473
	Civilian	92	1 - 5	2.8261	1.2280
Support from Physicians	Military	132	1 - 5	3.6288	1.1352
	Civilian	101	1 - 5	3.0000	1.2649
Support from Other Health Professionals	Military	122	1 - 5	3.4754	1.0540
	Civilian	95	1 - 5	2.9263	1.2050

Regression of professional and organizational factors on the research utilization variables revealed that for the civilian nurses, the factors of belief, attitudes toward research and access to research findings helped to explain 52.9% of research utilization activity, while for the military nurses, the factors of number of non-nursing health related journals read, belief and characteristics of research important for decision-making

explained just 38.2% of research utilization. Access to research findings was found consistently in the regressions for the civilian nurses. For the military nurses, years worked either in nursing or in the hospital and numbers of journals, either nursing or non-nursing were consistent predictors for research utilization. Number of years worked in the hospital is an interesting finding considering that the mean number of years that military nurses had years in the study facilities was 4.7 as opposed to 7.8 years for the civilian nurses. Only the factors of belief and importance of access to research findings were common to the two groups. Table 21 represents the regression of professional and organizational factors on research utilization for military and civilian nurses.

Table 21. Comparison of Professional and Organizational Factors Affecting Research Utilization Between Military and Civilian Nurses

RU Variable	Variables Entered into the Stepwise Regression with Adjusted R <sup>2</sup>		Variables Entered into the Stepwise Regression with Adjusted R <sup>2</sup>	
	Military		Civilian	
<b>Direct RU</b>	Belief	R <sup>2</sup> = 0.431	Belief	R <sup>2</sup> = 0.668
	Access to Research Findings		Attitudes Toward Research	
	Number of Nursing Journals Read		Resources of Practice Knowledge	
	Years Worked in Nursing		Number of Non-Nursing Health Rel. Journals Read	
			Importance of Access to Research	
<b>Indirect RU</b>	Research Charact. Important for Decision Making	R <sup>2</sup> = 0.212	Importance of Access to Research	R <sup>2</sup> = 0.168
	Years Worked in the Hospital			
	Number of Nursing Journals Read			
<b>Persuasive RU</b>	Importance of Access to Research	R <sup>2</sup> = 0.289	Support	R <sup>2</sup> = 0.384
	Research Charact. Important for Decision Making		Attitudes Toward Research	
	Years Worked in the Hospital			
<b>Overall RU #3</b>	Number of Non-Nursing Health Rel. Journals Read	R <sup>2</sup> = 0.382	Belief	R <sup>2</sup> = 0.529
	Belief		Attitudes Toward Research	
	Research Charact. Important for Decision Making		Importance of Access to Research	

### Question 7

The seventh and final research question asked, “Are there differences in research utilization among nurses in different sized military hospitals (large medical center, small medical center, community hospital)?” For this question ANOVA was performed on the variables of research utilization for the three different sized hospitals. Table 22 shows that there were no differences in research utilization between the three groups. Because there were no differences with the ANOVA, no post hoc tests were not necessary. Again, because the data were ordinal, a Kruskal Wallis Test was also performed and revealed no differences between the hospitals. Though there were no differences between the three hospitals in this study, no inferences can be made because with the unit of analysis being the hospital size, there is only one subject per group.

Table 22. Differences in Research Utilization Among Different Sized Hospitals

<b>ANOVA</b>						
<b>Differences in Research Utilization among Different Sized Hospitals</b>						
		Sum of Squares	df	Mean Square	F	Sig.
<u>RUD07</u>	Between Groups	3.634	2	1.817	.488	.614
	Within Groups	1012.798	272	3.724		
	Total	1016.433	274			
<u>RUI10</u>	Between Groups	.004	2	.002	.001	.999
	Within Groups	963.819	271	3.557		
	Total	963.824	273			
<u>RUP12</u>	Between Groups	7.762	2	3.881	1.279	.280
	Within Groups	834.745	275	3.035		
	Total	842.507	277			
<u>RUO13</u>	Between Groups	.611	2	.306	.089	.915
	Within Groups	946.296	275	3.441		
	Total	946.907	277			

### Other Findings

The professional factors of numbers of nursing journals, numbers of non-nursing health related journals and interest or organizational groups belonged to were numerically analyzed to answer the research questions, however, perhaps the most telling information in these areas is the written answers the nurses gave to these survey questions. While accessing information is important to the nurses who participated in this study, the types of information they are accessing and reading provides insight into where interventions to assist nurses in utilizing research can be made. Two hundred eighty-nine nurses responded to the question to specify the nursing journals they had read in the last year and how often they had read them. Eighty seven different nursing journals were listed. The mean number of different journals read by responders was 1.74. More interesting is the type of journals being read. Table 23 lists the top ten journals listed by the nurses in the study. The top three are general nursing journals, followed by specialty journals.

Table 23. Top Ten Nursing Journals Read by Nurses in Study Sample

<b>Journal</b>	<b>Number of Times Listed</b>
American Journal of Nursing	75
Nursing	56
RN	56
AORN Journal	30
Critical Care Nurse	30
Nursing Spectrum	28
Journal of Nursing Scholarship	18
JOGGN	16
Journal of Emergency Nursing	15
Lifelines	15

Non-Nursing Health related journals were reported to be read much less frequently. One hundred eighty seven nurses responded to this question, listing 163

different journals and magazines. Responses ranged from JAMA to Diver Dan (health related). Many fitness magazines appeared in this list. Table 24 lists the journals for this variable.

Table 24. Top Ten Non-Nursing Journals Read by Nurses in Study Sample

<b>Journal</b>	<b>Number of Times Listed</b>
JAMA	20
Prevention	8
Internet	7
American Journal of Critical Care	5
Women's Health	5
Anesthesia & Analgesia	4
Military Medicine	4
Health	4
American Journal of Public Health	3
Time	3

When the nurses were asked to name the one source from which they get research findings, most responded that they got information from journals, general or specialty. However, the second most frequent answer given was the Internet. Because internet access is possible from most nursing units, nurses are increasingly turning to this medium for information. Table 25 lists the top ten sources of information for the nurses in this study. There were 38 different types of sources of information, including patients and family members.

Table 25. Top Ten Sources of Research Information by Nurses in Study Sample

Source of Research Information	Number of Times Listed
Journals – Not Specified	56
Internet	51
Nursing Journals – Specialty	39
Nursing Journals – General	33
Other Health Related Journals – General	14
Other Healthcare Professionals – Nurses	11
Nursing Research Journals	11
Other Healthcare Professionals – Physicians	10
Inservices	10
Other Health Related Journals – Specialty	8

Membership in interest groups was measured quantitatively as the factor of cosmopolitanness. Two hundred seven nurses belonged to 106 different groups. The mean number of groups belonged to for responders was 1.57. The top five groups comprised 37% of the total responses. Table 26 lists the top ten organizations belonged to by the study nurses.

Table 26. Top Ten Interest Groups Belonged to by Nurses in Study Sample

Interest Group	Number of Times Listed
Sigma Theta Tau	44
American Nurses Association	30
American Association of Critical Care Nurses	23
Association of PeriOperative Registered Nurses	20
Association of Women’s Health, Obstetric and Neonatal Nurses	18
Emergency Nurses Association	14
American Association of Occupational Health Nurses	10
American Association of Nurse Anesthetists	8
Army Nurse Corps Association	8
Oncology Nursing Society	8

The variable of Continuing Education courses attended in the past year could not be used in the analysis because of apparent confusion over what was being asked, even after the word “courses” was highlighted for the respondents. In the pilot study, approximately 29% answered the question with ten or more courses attended. Overall, 18.3% stated having attended ten or more courses, with some answering over 100. It must be assumed that those nurses were stating the number of continuing education credits earned rather than courses attended. In addition, US Army hospitals offer continuing education via correspondence, the internet and intrahospital television. From the wording of this question, there was no way to tell what type of continuing education courses and/or credits the nurses were obtaining. For further study, this question must be made explicit as to its meaning.

#### Findings of the Organizational Climate Index

Because no norms have been established despite wide use of the organizational climate survey, results from this sample could not be compared with results from other studies. However, the survey yielded some interesting results when comparing groups within the study sample. This was done by calculating a derived score for each scale with a mean of 10 and standard deviation of 3 using the following formula:

$$\frac{\{[(\text{Mean of the group}) - (\text{mean of the norm group})] \times 3\} + 10}{\text{SD of the norm group}}$$

Using the means of the groups of management level, APN, Military, Civilian, Gender and Hospital site, scores were calculated for each of the four scales of innovativeness, purposive information flow, supportiveness and respect for rules. These were compared

with each other and against the group norm which is a score of 10 with a standard deviation of 3. It must be pointed out that the four subscales within the Organizational Climate Index represent individuals' perceptions regarding those aspects of the organization and that higher or lower scores are not necessarily good or bad. For example, a lower score on the respect for rules scale does not mean that an individual does not respect rules. It means that the individual perceives that the organization may not be as structured as others perceive it, or that structure is not as important to that individual. Table 27 outlines the scores by the different groups.

Table 27. Derived Scores from the Organizational Climate Index for Sub-Groups within the Study Sample

	<b>Innovativeness</b>	<b>Purposive Information Flow</b>	<b>Respect for Rules</b>	<b>Supportiveness</b>
<b>Norms for Sample</b>	10.000	10.000	10.000	10.000
<b>Military</b>	10.175	9.965	9.835	10.022
<b>Civilian</b>	9.799	10.040	10.187	9.973
<b>Large Medical Center</b>	10.288	9.981	10.096	9.725
<b>Small Medical Center</b>	9.920	10.299	10.283	10.716
<b>Community Hospital</b>	8.767	9.457	8.924	9.804
<b>Non-APN</b>	9.909	10.015	10.087	10.046
<b>APN</b>	10.829	9.863	9.195	9.580
<b>Upper Management</b>	10.927	9.763	8.396	9.788
<b>Middle Management</b>	10.476	10.187	9.326	9.930
<b>Lower Management</b>	10.101	10.251	10.508	10.023
<b>Staff Nurses</b>	9.762	9.931	10.315	10.042
<b>Male</b>	9.990	10.274	10.439	10.375
<b>Female</b>	10.002	9.195	9.887	9.903

Figures 14-18 graphically depict the comparisons. It can be seen that while military and civilian nurses are similar on supportiveness and purposive information flow scores, the military scored higher on innovativeness and lower on respect for rules while the civilian nurses scored higher on respect for rules and lower on innovativeness. For the different hospital sites, the community hospital scored lower on all organizational aspects, particularly innovativeness and respect for rules. The APNs scored higher on innovativeness and lower on respect for rules than did the non-APNs. Males scored higher on all organizational aspects except innovativeness, where they scored equally with the females. Perhaps most interesting was the comparison of levels of management. While all groups scored similarly on the aspects of supportiveness and purposive information flow, the higher nurses went into management, the higher they scored on innovativeness and the lower they scored on respect for rules.

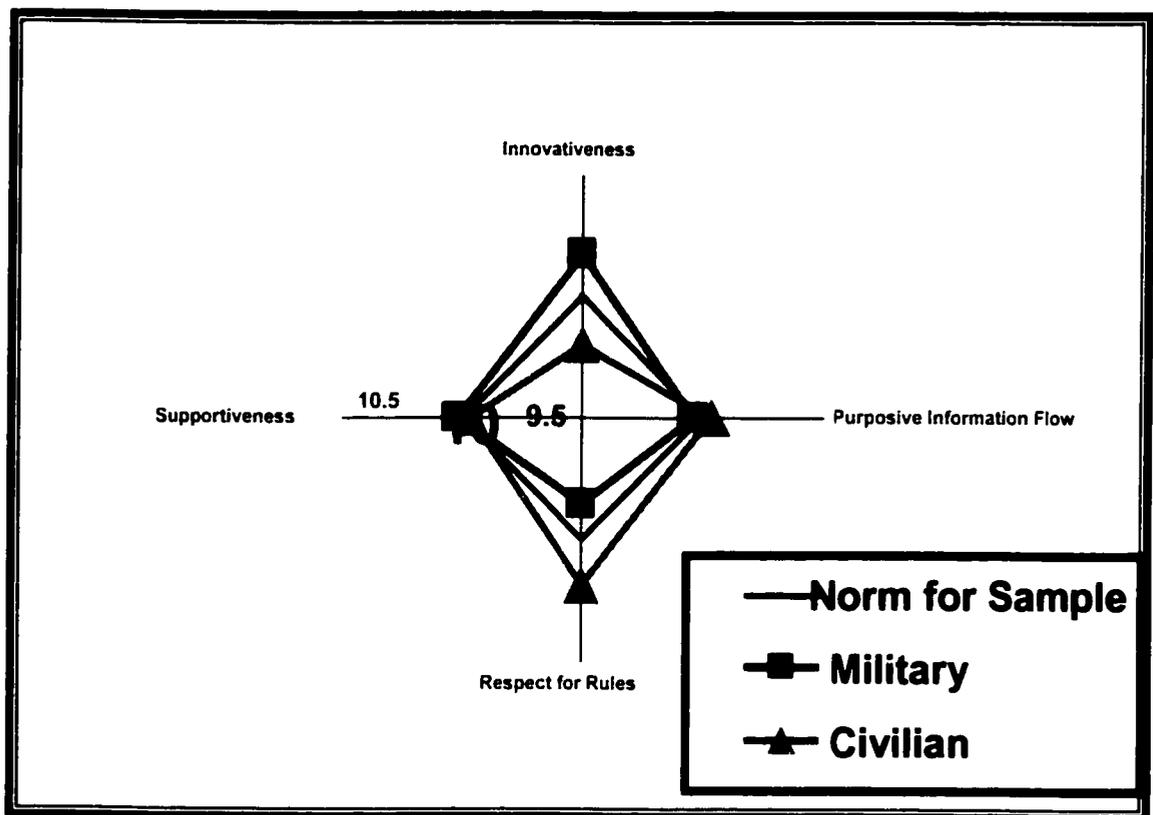


Figure 14. Comparison of Organizational Index Scores of Military and Civilian Nurses

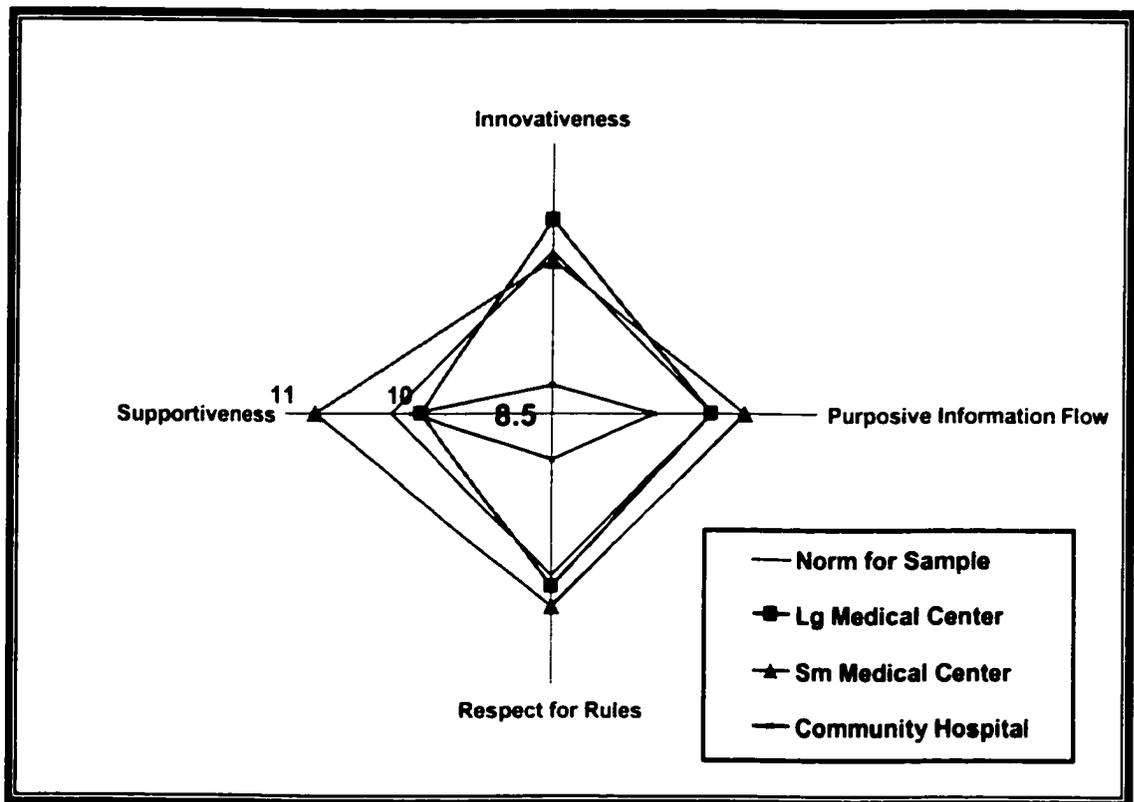


Figure 15. Comparison of Organizational Index Scores of Hospital Sites

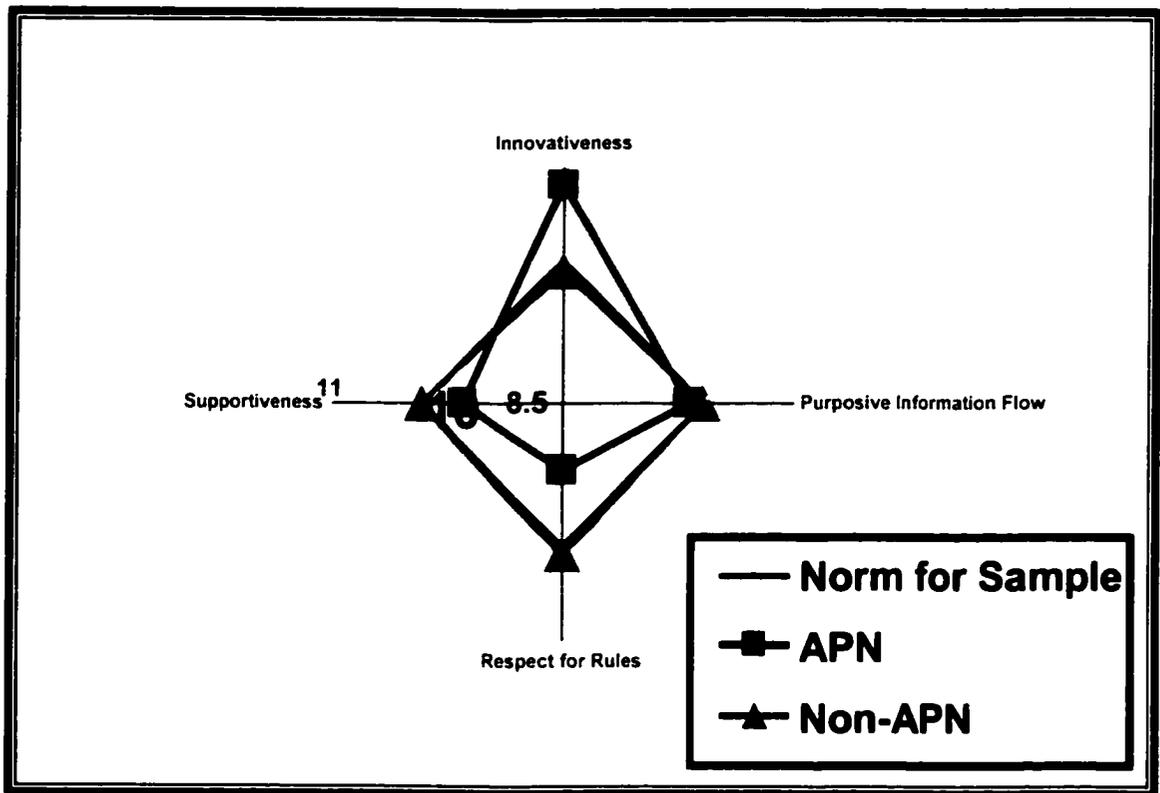


Figure 16. Comparison of Organizational Index Scores of APNs and Non-APNs

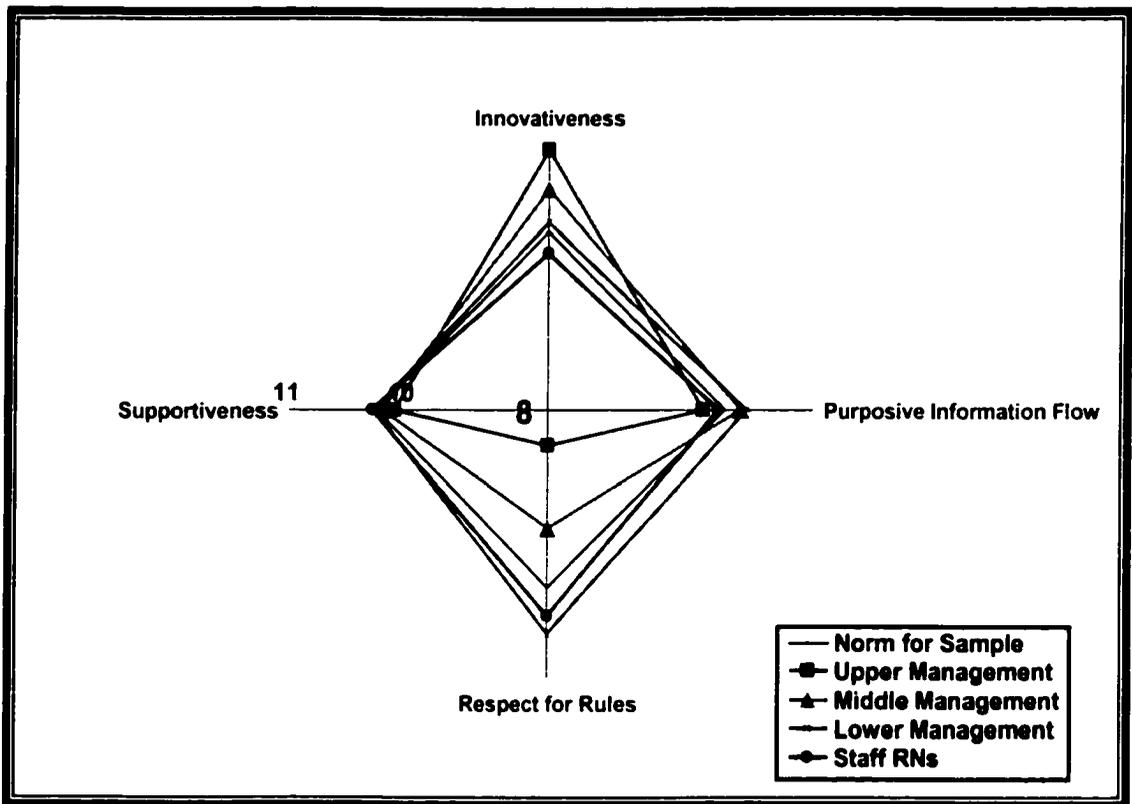


Figure 17. Comparison of Organizational Index Scores of Managers and Staff Nurses

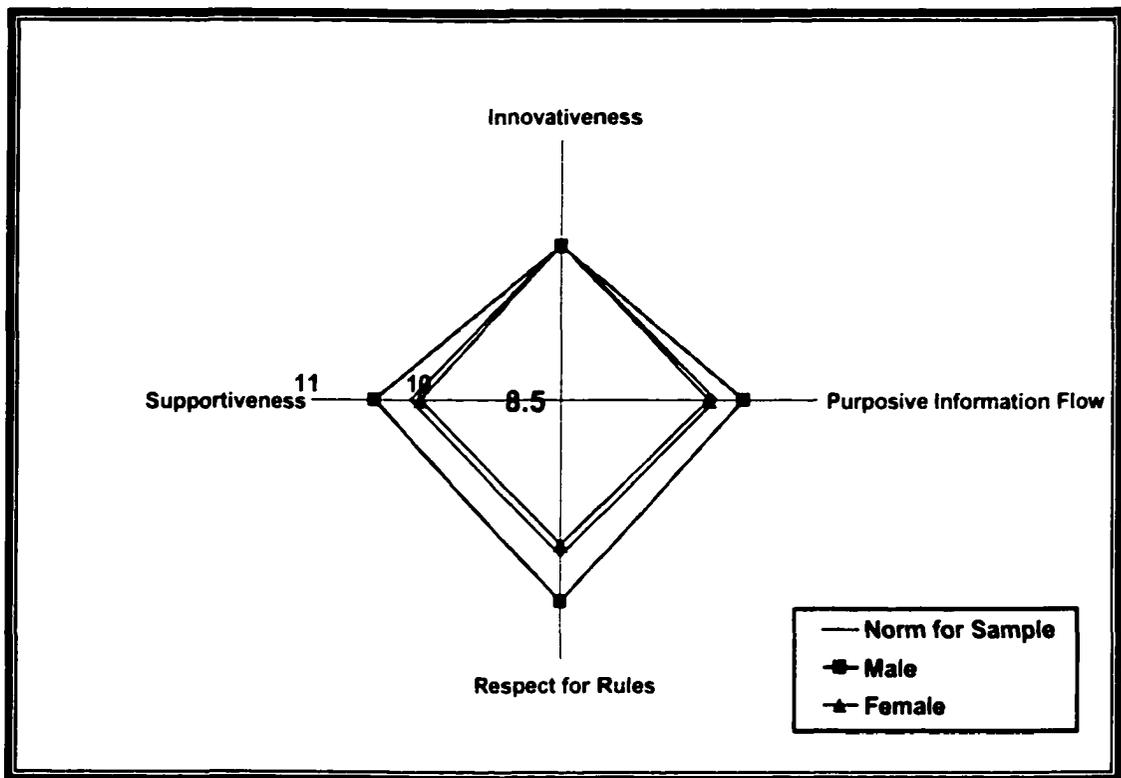


Figure 18. Comparison of Organizational Index Scores of Male and Female Nurses

### Summary

Data were analyzed using both parametric and non-parametric tests. Comparisons of different subgroups of nurses within the sample were made. In addition to answering the research questions, additional findings were discussed. Interpretation of the findings, along with implications and recommendations will be made in Chapter 5.

## CHAPTER V

### DISCUSSION

The purpose of this study was to describe the use of research findings in the practice of nurses at three US Army medical treatment facilities. Major findings of the study included the widening use of electronic databases for obtaining nursing and/or medical knowledge, description of the major written sources of information, the large role that support plays in the implementation of research findings for practice and differences in perception of organizational factors by various nursing groups within the sample. These and other findings along with their implications will be discussed below.

#### Summary of the Findings

Overall, the nurses who participated in the study believed that using research findings in their practice could positively affect patient outcomes. Most believed that using research was applicable to practice and had the potential to increase the quality of patient care. A large majority stated that if they could, they would implement new research based practices. Of those who did state that they used research in their practice, a larger proportion said that they either partially implemented findings or modified them to fit their needs. Rogers (1995) describes this phenomenon as “re-invention” and iterates that it may actually increase adoption of new practices within an organization. He cites many examples of this and states that it occurs about half the time.

Significant in the findings were the number of “do not know” answers to several questions including all the questions on types of research utilization, support by other

nurses and administration within the hospital and the question on whether or not they knew of a champion for research in their facility. As for the types of research utilization, generally one of twenty nurses did not know enough about research utilization to know whether or not they used it. As they were given more information about research utilization and its types, the “do not know” responses dropped from 7.24% to 4.14%. Taken as a whole, the “do not know” responses for the three types of research utilization (indirect, direct, and persuasive) as well as overall research utilization ranged from 4.1% to 5.5%.

In the area of support, between 9% and 23.1 % did not know if particular groups of people within the organization were supportive of their using research in their practice. For example, 67 (23.1%) nurses did not know if general administration supported them in using research and 55 (19%) did not know if they had the support of nursing administration. The area where nurses were most sure of support was from their head nurse where only 9% did not know. Implications from this may be that both nursing and hospital administrators could improve in the area of communicating their support for nurses’ reading and implementing research findings all the way down the chain of command.

The number of nurses who did not know if there was someone in their organization who “championed” research-based practice was significant at 38.6%. Within the three hospitals only 37.9 % knew of a research champion. Those that responded that there was no champion within their facility were 22.1 %. It is possible that nurses in the sample were confused over the term “research champion” or did not know whether it meant a champion on their unit or within the facility.

There were differences in the ways nurses used research in their practice. The mean for indirect research utilization was the highest of the three types at 4.66. The mean for direct research utilization was 4.18, and for persuasive was 3.63. In a military hospital, it is not surprising that nurses were less inclined to try to persuade others to use research, particularly those nurses of lower rank and the civilian nurses, whose means were lower than those of higher rank.

Because indirect research utilization, defined in the questionnaire as “the use of research findings to change your thinking or opinions about how to approach certain patient care or client situations”, does not require change in policy or protocol, nurses were more likely to use it than the other types. Those nurses of lower rank used indirect research utilization more than nurses of higher rank. Again, this is not surprising in a military hospital where conformity is perceived as important by those not in authority positions.

The major sources of nursing knowledge included general nursing journals and the use of the Internet either by e-mail or health-related web sites. Specialty nursing journals also played a significant role as a basis for practice. The three general nursing journals, AJN, Nursing and RN were read by 19.3% to 25.9% of the nurses in the sample whereas research journals such as Journal of Nursing Scholarship and Nursing Research were read by 6.3 % and 3.1 % respectively. The survey for this study did not ask the nurses reasons for why they chose one nursing journal over another.

With the advent of internet accessibility at the nursing unit level, it is used increasingly by nurses as a source of information. In addition, e-mail is used to pass along information. These are listed by 18.6 % as the primary source of research findings.

No specific examples were given in the survey, however one US Army hospital, which was not part of this study, used internet e-mails and chat forums to discuss online ethical issues and medical personnel throughout the facility participated with information and opinions. This media could be used in the same way to impart information such as nursing research studies for systematic reviews.

Support at both the individual and organizational levels played an important part in the use of research findings within this sample. The military nurses perceived more support on all levels than did the civilian nurses. Their use of research in practice was also higher than their civilian counterparts. They also had higher perceived support in the organizational climate index. Though support did not appear in any but one regression, it correlated significantly with all the organizational factors within the organization climate index, even when the other professional factors were controlled for. It also correlated with all types of research utilization except for indirect.

An interesting correlation was that between overall research utilization and the numbers of years worked, both in nursing and in the hospital organizations. The longer nurses worked, either in nursing or in the hospital, the less likely they were to utilize research findings. Also inversely correlated were years in nursing and the hospital and attitudes toward research. This raises several questions. As the number of years that nurses work increase, do they tend to solidify their practice and become less open to new ways of doing things? Is this the reason why tradition and ritual continues to dominate nursing practice and contribute to the knowledge-practice gap?

There was only some correlation between the organizational factors and the professional factors in each of the three hospitals. Because each of the three could be

considered to have its own organizational climate it would be expected that perception of organizational factors would be different for each. This was most clearly shown in Figure 14 of Chapter 4. It can be seen that perception of organizational support is greater in the small medical center as opposed to the large medical center and the community hospital. Innovativeness is slightly higher in the large medical center than in the other hospitals. These results can only apply to these hospitals at this time for several reasons and interpretation should be made with caution. Because of the different sample sizes from each of the hospitals, it is difficult to make comparisons. In addition, it is the higher ranking military nurses and administrators who set the climate of the organization and these individuals change on the average of every two to three years, therefore organizational climate would change every two to three years as would staff nurses' perceptions of it.

#### Comparison with the Literature

When comparing the results of this study with the existing literature, many similarities are noted. Funk et al. (1991a) found that the setting was consistently ranked as a significant barrier to research utilization. In particular, nurses did not (a) believe they had enough authority to implement new practices, (b) not have enough time to implement research and (c) administrators were not supportive of their efforts. Carroll et al. (1997) used Funk's BARRIERS Scale and also found that the organization was the most problematic for implementation of research findings, however, the top barrier in her study was that the nurse was not aware of research. In the United Kingdom, Dunn, Crichton, Roe, Seers and Williams (1998) found that time, lack of authority, and lack of skill to understand and implement research findings were the top barriers. The results of this

study were similar to the civilian studies in that environmental factors were the most significant barriers to research utilization. These included access to research findings, particularly at the unit level, lack of support by nurse and hospital administrators, and lack of time to read and implement findings. Interestingly, the nurses in this study perceived more support from their head nurses than they did from any other administrative level.

Some studies cited lack of authority to make changes (LeMay, Alexander, & Mulhall, 1998; Lewis, Prowant, Cooper, & Bonner, 1998). Authority to implement research was not measured in the survey, however, some participants wrote side comments as to how they had no authority to do so. In the measurement of organizational respect for rules, the civilian nurses perceived the organization as more structured and less innovative than did the military nurses.

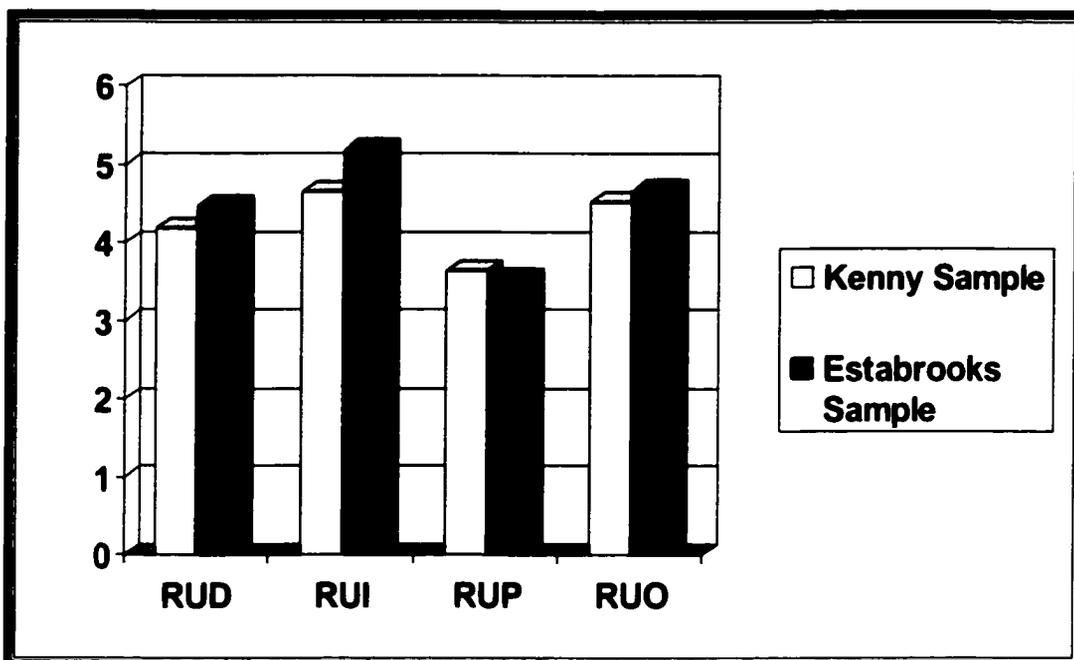
In one other study using Funk's BARRIERS Scale in a military medical center, preliminary results indicate that the barriers to research utilization in that facility are similar to the results of Funk's study in that the setting appears to provide the largest barriers (C. Schempp, personal communication, April 30, 2002).

Because this study used the Research Utilization Survey developed by Estabrooks, comparison with her sample of nurses is warranted. However, the comparisons should be interpreted with caution because of differences in the samples, primarily in the area of education and gender. In Estabrooks' (1997) sample, 70.8% listed the diploma as their highest level of education, while the sample for this study contained 85.5% of nurses who had at least a baccalaureate degree. Over 25% of the nurses in this were Master's prepared or higher, while Estabrooks reported 3.2% at that level.

Using structural equation modeling, Estabrooks (1997) reported that the variables of attitudes toward research, belief suspension, and number of inservices attended directly affected research utilization among the nurses in her sample. Other variables, she stated, indirectly affect research utilization. Although this study did not use structural equation modeling to explain the phenomenon of research utilization, regression of variables on overall research utilization showed that belief suspension, organizational innovativeness, cosmopolitaness and organizational respect for rules partially explained research utilization behavior in nurses ( $R^2 = 0.377$ ). There was a significant correlation between research utilization and attitudes toward research ( $r = 0.376$ ,  $p < 0.001$ ), however, it did not enter the regression model for overall research utilization, though it did for direct research utilization. There were no significant correlations between the number of inservices attended and any type of research utilization.

Especially perplexing in the comparison of results with Estabrooks' sample is the mean level of research utilization. Though the educational level for this sample was higher, and the assumption that a higher level of education would predict a higher level of research utilization, the mean for this sample was slightly lower in all types of research utilization except persuasive. Table 28 illustrates these differences.

Table 28. Comparison of Mean Research Utilization Scores Between Estabrooks' Study and This Study



Both the organizational literature and the nursing literature indicate the importance of a “champion” in getting research or new innovations into practice. The number of nurses (38.6%) in this study who did not know whether or not there was a designated individual to assist them with implementation of research findings is significant. With the current emphasis on evidence-based practice, especially in the military, it is important first, that champions be designated within the organization and second, that they communicate their availability to assist in projects.

Those nursing studies that did address where nurses got research information reported that nursing journals were the most common source of that information. Barta (1995) found that nursing journals were followed by educational activities and nursing texts. Hundley et al. (2000) suggested that electronic resources could and should be used more frequently for research information, however, they noted that this medium required

that nurse be taught the skills for efficient use of the Internet. This study found that nursing journals, both general and specialty, were the primary source of information. This was followed by use of electronic media, though it was reported by only 18.6% of the sample.

Many studies found that the setting or environment played the largest role in barriers to research utilization, yet implications continue to be aimed at interventions for individual nurses. This study also found that the environment contributed significantly to nurses' use of research findings. Implications to enhance nurses' comfort with research and its use will concentrate on those environmental factors.

#### Implications for Nursing Practice

This study revealed that there was less perceived support of nurse and hospital administrators than of nursing peers and head nurses for implementing research findings into practice. To improve research utilization, nurse administrators could enhance research activities and research utilization by helping to provide an environment supportive of such activities. For example, unsolicited comments on some of the returned surveys indicated that nurses were expected to engage in projects or read research on their own time and they wished that work time could be allotted for that. Two hours a week for research activities and/or implementation projects would enhance research utilization and may improve patient care outcomes. Rutledge and Donaldson (1995) suggest the use of research journals clubs to analyze and critique nursing research articles. Research journal clubs are common in military hospitals for reviewing and discussing research articles, however they do not often go beyond discussion. Based on

hospital patient care needs, these clubs could be encouraged to participate in and make available systematic reviews and/or provide implementation assistance.

Nurse administrators could increase the perception of support for research activities through their own participation or through the use of “research champions”. The APNs, particularly the Clinical Nurse Specialists could be used for this purpose. They could disseminate crucial information in the form of articles or research posters placed on the wards; or they could assist staff nurses in the identification and implementation of research findings.

This study also showed differences of perceptions of access to research findings, particularly at the unit level where 12.1% of the nurses stated that a unit library was not available and 21.4% said that there was very little available. The cost to maintain current journals at the unit level would be prohibitive, however, relevant research could be brought to the nurses by the “champions”, via the nursing education department or through the hospital intranet. Enhanced e-mail and the use of on-line forums would be an excellent resource for nurses on the unit, since most of them avail themselves of that medium.

#### Strengths and Limitations of the Study

A major strength of this study is the use of an organization climate index to look at organizational factors that influence research utilization. Study of organizational factors in this field has been limited and is only beginning to be looked at. The organizational climate index used in the study was a shortened version of a survey designed for Belgian military forces, though it appeared to be reliable within the structure

of the military healthcare system. Because innovativeness and adoption of new practices can be dependent on organizational structure and culture, its study is important when looking at research-based or evidence-based practice. One of the initiatives of the U.S. military is to improve and encourage innovativeness (Wolfowitz, 2002). Attention to the culture of the organization is vital to the adoption of new practice. Though looking at organizational differences was a limitation of this study because of the  $n = 1$  for the organizations, it also showed that there are differences among different sized organizations and the climates within them.

This study assumes differences in culture between civilian and military hospitals. Differences between the military as an organization and its civilian counterparts have been documented, however, none of the papers specifically addressed healthcare, which has its own unique culture. It is possible that the professional healthcare culture could overshadow differences between military and civilian culture subsumed within it and this study would not differ from studies in civilian facilities.

Because of the nature of military rank structure, participation in the study could have been construed by staff nurses as coercive, though measures were included to ensure confidentiality of participation, or non-participation. Because the survey packets were given out through normal distribution routes in individual's mailboxes, the perception of superior "encouragement" should have been lessened.

Only three military facilities were used, all from one geographic region. In addition, self-selection bias is inherent in survey research. The findings of this study should be interpreted with caution as the sample was not representative of the population. There was a larger percentage of higher ranking military answering the questionnaire

than present in the population of the three hospital sites. Though the findings of the study are similar to the findings in Schempp, Ashley and Kutaka's (2002) study of research utilization at another large U.S. Army medical center, results from this study have limited generalizability beyond the sample studied. In addition, some of the groups in the study contained only a few members, for example APNs with  $n = 29$ . Though their use of research differed considerably from the Non-APNs ( $n = 261$ ), the two groups cannot accurately be compared. Further study is needed using a larger group of APNs to compare to the general population. Only the differences between the military and civilian nurses could be considered valid due to similar group size.

Nurses in the military hospital environment tend to have a higher educational level than the general civilian population however educational level was not a predictor for research utilization in this sample. An interesting finding of this study is that the mean level of research utilization of this sample is slightly lower than Estabrooks' sample of Canadian nurses even though their educational level is higher. This warrants further investigation and comparison with Estabrook's sample.

Confusion over some of the terms used in the survey, particularly the level of management and research champion prevents an accurate description of research utilization and its facilitators and barriers of the nurses within the sample. These areas should be explored more fully and with more specific definitions of the terms.

The differences in research utilization between the different sized hospitals also cannot accurately be interpreted because the hospital itself is the unit of analysis. If hospital size were to be studied as a factor in research utilization, all the hospitals within the U.S. Army Healthcare system would have to be surveyed.

This study looked at many professional and organizational variables. The correlations and regression  $R^2$  did not explain large amounts of the variances between the variables and research utilization. It is difficult to explain and predict how much each variable contributes directly to research utilization due to possible covariance between the variables and research utilization.

### Summary and Recommendations

This study described research utilization of a specific group of nurses working in three US Army medical treatment facilities. To get a broader and more generalizable perspective of research utilization within the military healthcare system this study would have to be expanded to include more facilities. It would be possible to include all military healthcare facilities as well as combat support hospitals and other Forces Command (FORSCOM) facilities. Further descriptive studies would serve as a step-off point for studies of implementation projects within the AMEDD. They could also provide information as to the best ways to implement research-based projects, both for fixed medical facilities as well as for deployment situations.

## APPENDIX A

### STUDY INTRODUCTION LETTER

MCCS-GHR-SD

1 November 2001

MEMORANDUM FOR: Nursing Staff, [REDACTED] Community Hospital

SUBJECT: Research Utilization Study

1. We are conducting a study to identify the manner in which nurses do or do not use research findings in their clinical practice and the factors that hinder research utilization. Because practice based on research has been shown to improve patient care outcomes, we are interested in looking at what nurses consider to be the barriers and/or facilitators to research-based practice. This issue has been studied in civilian hospitals, but has not been looked at in military facilities. This study is the doctoral dissertation of LTC Deborah Kenny, Army Nurse Corps, a doctoral candidate at the University of Massachusetts working with LTC Laura Brosch, AN, Chief of Nursing Research at Walter Reed Army Medical Center.
2. Your name as a potential participant in this study was obtained through the Department of Nursing. Your participation is completely voluntary and no one other than the study investigators will know whether or not you decide to answer the survey. If you choose to participate in this study, we ask you to complete the two questionnaires in this packet and return them to us in the envelope that is provided to you. There is no compensation for completing this survey. It should take you about 35-45 minutes to complete the questionnaires. You will note that there is a number at the top of the survey and answer sheet. This is included to enable us to track the mailings involved in the study. Confidentiality will be strictly maintained and no one in your facility will know of your decision to complete or not to complete the survey. Your consent to participate in this study is implied by your returning the questionnaires.
3. We are studying nurses at three different military hospitals. When the data are analyzed, the results will be reported in the aggregate and no site or individual will be identifiable in the dissertation or in any published papers or presentations.
4. Thank you in advance for your time and thoughtful answers to this survey. We hope that the results of this study will help in determining what type of help to give to nurses in using research findings to plan and implement their patient care. If you have any questions or concerns regarding this study please contact either the Principal Investigator at Walter Reed Army Medical Center, LTC Laura Brosch, AN, [REDACTED], or LTC Deborah Kenny, AN, [REDACTED], or e-mail her at [REDACTED].

LAURA R. BROSCH  
LTC/AN  
Principal Investigator

DEBORAH J. KENNY  
LTC/AN  
Doctoral Candidate, University of Massachusetts

APPENDIX B

RESEARCH UTILIZATION SURVEY\*

SECTION I: Demographic Data

1. What is your basic nursing education?

Associate Degree \_\_\_\_\_  
Diploma \_\_\_\_\_  
Baccalaureate Degree \_\_\_\_\_

2. What is your highest completed level of formal nursing education?

Associate Degree \_\_\_\_\_ Master's Degree \_\_\_\_\_  
Diploma \_\_\_\_\_ Doctorate \_\_\_\_\_  
Baccalaureate Degree \_\_\_\_\_ Other Specify: \_\_\_\_\_

3. For Military only: Have you attended a nursing specialty (ASI producing) course?

Course Name: \_\_\_\_\_

4. What is your highest completed level of non-nursing post-secondary education?

Associate Degree \_\_\_\_\_ Doctorate \_\_\_\_\_  
Baccalaureate Degree \_\_\_\_\_ Other Specify: \_\_\_\_\_  
Master's Degree \_\_\_\_\_ None \_\_\_\_\_

5. Are you:

Military \_\_\_\_\_  
Civilian \_\_\_\_\_

6. What is your rank/grade? \_\_\_\_\_

7. What is your gender? Male \_\_\_\_\_  
Female \_\_\_\_\_

8. What is your primary clinical area (where you work the most hours)? **Check one only.**

___ general medical	___ pediatric critical care unit
___ general surgical	___ adult critical care unit
___ pediatrics	___ neonatal critical care unit
___ maternal/newborn	___ same day surgery
___ psychiatric/mental health	___ outpatient clinic
___ oncology	___ community/public health
___ operating room	___ several clinical areas (float)
___ recovery room	___ hemodialysis
___ orthopedics	___ other (specify: _____)
___ emergency room	

\*Adapted with verbal permission from Research Utilization in Nursing: An Alberta Survey of Practising Nurses, 1996, Carole A. Estabrooks, University of Alberta, Canada.

9. Excluding your basic nursing training, how many years have you worked as a nurse?  
 Number of years \_\_\_\_\_ months \_\_\_\_\_
10. How many years have you worked at this hospital?  
 Number of years \_\_\_\_\_ months \_\_\_\_\_
11. Are you practicing as an advanced practice nurse? YES \_\_\_\_\_ NO \_\_\_\_\_  
 Please specify type \_\_\_\_\_
12. Are you currently in a management position? YES \_\_\_\_\_ NO \_\_\_\_\_  
 Specify: Upper \_\_\_\_\_ Middle \_\_\_\_\_ Lower \_\_\_\_\_
13. In the past twelve months, how many continuing education **courses** have you attended?  
 Number: \_\_\_\_\_
14. In the past twelve months, how many inservices have you attended?  
 Number: \_\_\_\_\_
15. How many nursing interest groups or organizations do you presently belong to?  
 Specify:  
 a. \_\_\_\_\_  
 b. \_\_\_\_\_  
 c. \_\_\_\_\_
16. How often have you read nursing journals in the past year?  
 Specify Journals most read:
- |          | Times per year |     |     |      |     |
|----------|----------------|-----|-----|------|-----|
|          | Once           | 2-4 | 5-7 | 8-10 | >10 |
| a. _____ | 1              | 2   | 3   | 4    | 5   |
| b. _____ | 1              | 2   | 3   | 4    | 5   |
| c. _____ | 1              | 2   | 3   | 4    | 5   |
| d. _____ | 1              | 2   | 3   | 4    | 5   |
17. How often have you read **non-nursing but health related** journals in the past year?  
 Specify Journals most read:
- |          | Times per year |     |     |      |     |
|----------|----------------|-----|-----|------|-----|
|          | Once           | 2-4 | 5-7 | 8-10 | >10 |
| a. _____ | 1              | 2   | 3   | 4    | 5   |
| b. _____ | 1              | 2   | 3   | 4    | 5   |
| c. _____ | 1              | 2   | 3   | 4    | 5   |
| d. _____ | 1              | 2   | 3   | 4    | 5   |

**SECTION II: Research Utilization**

**OVERALL RESEARCH UTILIZATION**

For questions 1 - 6, please use the following definition of overall research utilization:

The use of any kind of research findings (nursing and non-nursing), in any kind of way, in any aspect of your work as a registered nurse. Do not count as research, things you learned in the nursing school where you did your basic nursing training.

1. Overall, in the past year, how often have you used research in some aspect of your nursing practice?

Never	On 1 or 2			On about		Nearly	Do not
1	Shifts	3	4	half the	6	every	know
	2			shifts		shift	8
				5		7	

2. At one time or another, people writing in nursing have considered the items on the following list to be research utilization. When your actions are based on the findings of sound research, do YOU consider the following to be research utilization? (Circle Answer)

- Changing an aspect of your own nursing practice..... YES NO
- Changing a practice or routine on your "unit" or in your work area..... YES NO
- Trying a new procedure, technique, or other nursing intervention..... YES NO
- Changing a nursing procedure, technique, or other nursing intervention..... YES NO
- Changing a nursing policy, technique or other nursing intervention..... YES NO
- Changing your beliefs about a particular approach or procedure..... YES NO
- Educating or informing the patient or client..... YES NO
- Educating or informing another nurse..... YES NO
- Educating or informing another health professional..... YES NO
- Educating or informing a member of the public..... YES NO
- Persuading another nurse to make a change..... YES NO
- Persuading another health professional to make a change..... YES NO
- Persuading a client to make a change..... YES NO
- Persuading a member of the public to make a change..... YES NO
- Other (Specify: \_\_\_\_\_)..... YES NO

3. If the items in question 2 above are considered to be research utilization, overall in the past year have you used research in some aspect of your nursing practice?

Never	On 1 or 2			On about		Nearly	Do not
1	Shifts	3	4	half the	6	every	know
	2			shifts		shift	8
				5		7	

4. Would you use research more often in your practice if you could? (Circle answer)

YES                      MAYBE                      NO                      DO NOT KNOW

5. Do you agree with the statement: "If nurses used research more in their practice it would make a positive difference to patient care and outcomes"?

Strongly				Strongly
Disagree	2	3	4	Agree
1				5

6. What is the one most common source from which you learn about research findings? Be as specific as possible.
- 

**DIRECT RESEARCH UTILIZATION**

For questions 7 - 9, please use the following definition of direct research utilization:

The use of any kind of research findings (nursing and non-nursing) where you **directly use the findings** in giving patient care and/or in client interventions. Do not count as research, things you learned in your basic nursing training.

Direct research use often results in protocol, procedure, routine or policy development. The following are examples of research that can be used in a direct way:

- Following current CDC immunization guidelines in outpatient clinics
- Limiting suctioning (and other interventions known to cause increased intracranial pressure-ICP) in ventilator patients with known or suspected high ICP
- Developing a protocol for pain management based on pain control research to be implemented on an oncology unit
- 

7. Overall, in the past year, how often have you *used research findings in this direct way* in some aspect of your nursing practice?

Never	On 1 or 2 Shifts			On about half the shifts		Nearly every shift	Do not know
1	2	3	4	5	6	7	8

8. How often have you avoided using research in this *direct way* because you did not believe you had the *authority* to do so, even though you were convinced of the usefulness of the research?

Never	Rarely	Sometimes	Frequently	Always
1	2	3	4	5

9. Still considering this *direct* kind of utilization, how many times in the past year have you encountered a research finding or recommendation:

**SCALE:**

Never	On 1 or 2 Shifts			On about half the shifts		Nearly every shift	Do not know
1	2	3	4	5	6	7	8

- |                                                                                              |   |   |   |   |   |   |   |   |
|----------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|
| (a) That you <u>completely</u> implemented?                                                  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| (b) That you <u>partially</u> implemented?                                                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| (c) That you <u>modified</u> to fit your situation and then implemented?                     | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| (d) Where you <u>did nothing</u> , that is, did not implement the finding or recommendation? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

**INDIRECT RESEARCH UTILIZATION**

For question 10, please use the following definition of **indirect research utilization** which is different from the definition for direct utilization given above:

The use of research findings (nursing and non-nursing) to **change your thinking or opinions** about how to approach certain patient care or client situations. Do not count as research, things you learned in your basic nursing training.

Indirect research use usually does *not* result in protocol, procedure, routine, or policy development. The following are examples of research that can be used in this indirect way:

- Because you are aware of the stages of death and dying, you understand a newly diagnosed cancer patient's refusal to accept the diagnosis.
- Knowing that smoking during pregnancy can result in low birth weight babies, you anticipate lower birth weight and other related problems in babies of smoking mothers.
- Based on the knowledge that pregnancy is sometimes a trigger for domestic violence you raise your index of suspicion during prenatal visits.

10. Overall, in the past year, how often have you used *research in this non-direct way* in some aspect of your nursing practice?

Never	On 1 or 2 Shifts			On about half the shifts		Nearly every shift	Do not know
1	2	3	4	5	6	7	8

**PERSUASIVE RESEARCH UTILIZATION**

For questions 11 -12, please use the following definition which is different from the definitions for direct and indirect research utilization:

The use of research findings (nursing and non-nursing) to **persuade others, who are usually in decision-making positions, to make changes** in conditions, policies, or practices relevant to nurses, patients/clients, and/or the health of individuals or groups. Do not count as research, things you learned in your basic nursing training.

The following are examples of research that can be used in this persuasive way:

- You use your knowledge of the adverse effects of irregular shift rotations on employee performance and health to persuade your supervisors to improve the shift rotation in your unit.
- You use your knowledge of recent research which demonstrates that male infants experience significant pain during circumcision to persuade a physician you work with to use a local anesthetic during the procedure.

11. How often have you used knowledge of particular research findings to try to **persuade** the following groups of people to make changes in this way in the past year?

	Never	Rarely	Sometimes	Often	Do not Know
a. Nurse co-workers. . . . .	1	2	3	4	8
b. Physicians. . . . .	1	2	3	4	8
c. Other health professionals. . . . .	1	2	3	4	8
d. Nurse administrators. . . . .	1	2	3	4	8
e. Non-nurse administrators. . . . .	1	2	3	4	8
f. Community leaders. . . . .	1	2	3	4	8
g. Government representatives. . . . .	1	2	3	4	8
h. Members of the public. . . . .	1	2	3	4	8
i. Other (Specify: _____). . . . .	1	2	3	4	8

12. Overall, and including all of the categories of people in #11, in the past year how often *have you used research in this persuasive way?*

	On 1 or 2			On about		Nearly	
Never	Shifts			half the		every	Do not
1	2	3	4	shifts	6	shift	know
				5		7	8

**OVERALL RESEARCH UTILIZATION**

For question 13, please **reassess** your research utilization using the original definition of overall *research utilization*:

The use of any kind of research findings (nursing and non-nursing), in any kind of way, in any aspect of your work as a registered nurse. Do not count as research, things you learned in the nursing school where you did your basic nursing training.

13. Overall, in the past year, how often have you used research in some aspect of your nursing practice?

	On 1 or 2			On about		Nearly	
Never	Shifts			half the		every	Do not
1	2	3	4	shifts	6	shift	know
				5		7	8

14. If you circled a number from 2 to 7 in the above question, estimate how much of the research that you used was:

_____	% nursing
_____	% medical
_____	% other
<b>100%</b>	

### SECTION III: Individual and Organizational Factors

1. For each item, please circle the one number that best describes your beliefs about research.
- |                                                                         | Disagree<br>strongly | Disagree | Uncertain | Agree | Agree<br>strongly |
|-------------------------------------------------------------------------|----------------------|----------|-----------|-------|-------------------|
| a. Research is needed to improve nursing practice continually. . . . .  | 1                    | 2        | 3         | 4     | 5                 |
| b. Research findings are too complex to use in practice. . . . .        | 1                    | 2        | 3         | 4     | 5                 |
| c. I would change my practice as a result of research findings. . . . . | 1                    | 2        | 3         | 4     | 5                 |
| d. Research is not applicable to my practice. . . . .                   | 1                    | 2        | 3         | 4     | 5                 |
| e. Research helps to build a scientific base for nursing. . . . .       | 1                    | 2        | 3         | 4     | 5                 |
| f. It takes too much effort to apply research to practice . . . . .     | 1                    | 2        | 3         | 4     | 5                 |
2. How much faith do you have that researchers will produce research . . . . . A great deal
- |                                                               | None | 1 | 2 | 3 | 4 | 5            |
|---------------------------------------------------------------|------|---|---|---|---|--------------|
| a. that is <b>relevant</b> to you?. . . . .                   | 1    | 2 | 3 | 4 | 5 | A great deal |
| b. that is <b>easily used</b> by you?. . . . .                | 1    | 2 | 3 | 4 | 5 | A great deal |
| c. that can <b>safely</b> be used in your practice? . . . . . | 1    | 2 | 3 | 4 | 5 | A great deal |
3. How *willing* are you to implement research when it contradicts something you. . . . . Very willing
- |                                                     | Very<br>unwilling | 1 | 2 | 3 | 4 | 5            |
|-----------------------------------------------------|-------------------|---|---|---|---|--------------|
| a. learned <i>prior</i> to nursing school?. . . . . | 1                 | 2 | 3 | 4 | 5 | Very willing |
| b. learned in nursing school?. . . . .              | 1                 | 2 | 3 | 4 | 5 | Very willing |
| c. learned in your place of work?. . . . .          | 1                 | 2 | 3 | 4 | 5 | Very willing |
4. How often do you **actually implement** research when it contradicts something you. . . . . Very often
- |                                                     | Never | 1 | 2 | 3 | 4 | 5          |
|-----------------------------------------------------|-------|---|---|---|---|------------|
| a. learned <i>prior</i> to nursing school?. . . . . | 1     | 2 | 3 | 4 | 5 | Very often |
| b. learned in nursing school?. . . . .              | 1     | 2 | 3 | 4 | 5 | Very often |
| c. learned in your place of work?. . . . .          | 1     | 2 | 3 | 4 | 5 | Very often |
5. How important are the following in your decision to use or not to use particular research findings in your practice? Not at all important Very important
- |                                                                                      | Not at all<br>important | 1 | 2 | 3 | 4 | 5              |
|--------------------------------------------------------------------------------------|-------------------------|---|---|---|---|----------------|
| a. The research matches my personal values. . . . .                                  | 1                       | 2 | 3 | 4 | 5 | Very important |
| b. The research meets a clinical need. . . . .                                       | 1                       | 2 | 3 | 4 | 5 | Very important |
| c. The research is easy to understand. . . . .                                       | 1                       | 2 | 3 | 4 | 5 | Very important |
| d. The research is relatively easy to incorporate into my practice. . . . .          | 1                       | 2 | 3 | 4 | 5 | Very important |
| e. The results of implementing the research are visible to me. . . . .               | 1                       | 2 | 3 | 4 | 5 | Very important |
| f. The particular research based practice makes me feel like a better nurse. . . . . | 1                       | 2 | 3 | 4 | 5 | Very important |
| g. The particular research practice makes my job as a nurse easier. . . . .          | 1                       | 2 | 3 | 4 | 5 | Very important |
| h. The research is relevant to my particular practice situation. . . . .             | 1                       | 2 | 3 | 4 | 5 | Very important |
| i. Others who have tried the research are positive about it. . . . .                 | 1                       | 2 | 3 | 4 | 5 | Very important |

6. How much access do you have to do the following in your workplace?

	Very little				A great deal	Not available
a. Medical Library w/ research journals. . . . .	1	2	3	4	5	8
b. Unit library . . . . .	1	2	3	4	5	8
c. Library computers. . . . .	1	2	3	4	5	8
d. Electronic mail . . . . .	1	2	3	4	5	8
e. Internet research resources . . . . .	1	2	3	4	5	8

7. The knowledge that I use in my practice is based on.....

	Never	Seldom	Sometimes	Frequently	Always
a. information I learn about each patient/client as an individual.....	1	2	3	4	5
b. my intuitions about what seems to be "right" for the patient/client .....	1	2	3	4	5
c. my personal experience of nursing patients/clients over time.....	1	2	3	4	5
d. information I learned in nursing school.....	1	2	3	4	5
e. what physicians discuss with me.....	1	2	3	4	5
f. new therapies and medications that I learn about after physicians order them for patients.....	1	2	3	4	5
g. articles published in <b>medical</b> journals.....	1	2	3	4	5
h. articles published in <b>nursing</b> journals.....	1	2	3	4	5
i. articles published in <b>nursing research</b> journals.....	1	2	3	4	5
j. information in textbooks.....	1	2	3	4	5
k. what has worked for me for years.....	1	2	3	4	5
l. the ways that I have always done it.....	1	2	3	4	5
m. the information my fellow nurses share.....	1	2	3	4	5
n. information I get from attending inservices/conferences.....	1	2	3	4	5
o. information I get from policy and procedure manuals.....	1	2	3	4	5
p. information I get from the media (e.g., popular magazines, television, internet, etc.).....	1	2	3	4	5

8. Do you think that better access to the above resources is important to whether or not you use research?

Not at all important	Somewhat important	Quite important	Very important	Extremely important
1	2	3	4	5

9. During your workday is there ever time to do any of the following?

	Never	Rarely	Sometimes	Quite often	Frequently
a. Use the library. . . . .	1	2	3	4	5
b. Read journals/texts . . . . .	1	2	3	4	5
c. Reflect on your practice . . . . .	1	2	3	4	5
d. Participate in projects. . . . .	1	2	3	4	5
e. Participate in research . . . . .	1	2	3	4	5

10. Indicate the degree to which the following people are supportive of your using research in your practice:

	Not at all supportive			Very supportive		Do not know
a. Other nurses in your area. ....	1	2	3	4	5	8
b. Your immediate supervisor . . . . .	1	2	3	4	5	8
c. Administration (nursing) . . . . .	1	2	3	4	5	8
d. Administration (general). . . . .	1	2	3	4	5	8
e. Physicians. . . . .	1	2	3	4	5	8
f. Other health professionals. . . . .	1	2	3	4	5	8
g. Other (Specify: _____). . . . .	1	2	3	4	5	8

11. Is there someone in your organization who currently, or in the past year, has "championed" nursing research and/or research-based practice?

YES \_\_\_\_\_ NO \_\_\_\_\_ DO NOT KNOW \_\_\_\_\_

**Thank you very much.**

The careful consideration you gave to your answers will add to the knowledge base of how nurses use research in their practice and how that utilization can best be enhanced.

## APPENDIX C

### ORGANIZATIONAL CLIMATE INDEX FOR MILITARY UNITS

#### **PART I**

**Circle the word that best applies to your organization (not your ward or immediate work group)**

1. Here, objectives and missions are carefully communicated to everyone.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

2. Here, people help each other.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

3. Here, work is well organized.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

4. There is a good group spirit in here.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

5. Here, the findings of scientific research are taken into account.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

6. Here, one controls the quality of the work done.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

7. Here, activities are carefully planned.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

8. Outside the working hours, one still pays attention to things related to work.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

9. Here, one will find people that are willing to give a presentation.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

**Circle the word that best applies to your organization (not your ward or immediate work group)**

10. Here, imposed rules occupy an important place.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

11. Here, it is allowed to help each other mutually when in difficulties.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

12. It is expected that one behaves (strictly) according to the directions.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

13. Here, the contact between people of different levels is agreeable.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

14. Here, one considers how to proceed before starting.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

15. Here it is allowed to deviate from habits.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

16. Here, the quality of work is checked and evaluated.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

17. Here, people help each other when in difficulties.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

18. Here, the diffusion of information is done in a reliable way.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

19. Here, not respecting the rules is punished.

**1 = Never    2 = Sometimes    3 = Mostly    4 = Always**

## **PART II**

**Circle the word that best fits in the blanks and applies to your organization (not your ward or immediate work group)**

20. Here, ..... of the management believe(s) that results of scientific research are important.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

21. Here, ..... would attend a lecture.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

22. Here, ..... feel(s) concern from others.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

23. Here, ..... search(es) for new and other work methods.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

24. Here, ..... is/are interested in intellectual activities and problems.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

25. Here,.....patch(es) up a quarrel quickly.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

26. Here,.....help(s) new coworkers to feel settled.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

27. Here, the probability of promotion of ..... is determined by their diligence and their competencies.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

28. Here, ..... read(s) serious periodicals.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

29. Here, .....is/are informed about changes in the organization of the work.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

**Circle the word that best applies to your organization (not your ward or immediate work group)**

30. Here, .....considers not thinking forward as a severe shortfall.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

31. Here, ..... behave(s) in the same way.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

32. Here,..... know(s) what he or she has to do.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

33. Here,..... think(s) that scientific research is necessary.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

34. Here,..... can find in the regulations what he or she has to do.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

35. Here, ..... feel(s) oneself as a member of the group.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

36. Here,..... read(s) sometimes something technical or scientific.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

37. Here, decisions made by superiors are transmitted to ..... in such a way that he or she can easily apply them to his job.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

38. Here, ..... has/have many friends.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

39. Here, ..... pay(s) attention to the rules and regulations.

**1 = Nobody    2 = Some    3 = A lot of people    4 = Everybody**

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