INFORMATION NEEDS AND USES OF THAI NURSES:
A NATIONAL SAMPLE SURVEY

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ABSTRACT

WIRIYA PHOKHWANG JUST: Information Needs and Uses of Thai Nurses:
A National Sample Survey
(Under the direction of Edward J. Halloran)

Many studies had assessed what information nurses need and use in general or in

nurses' role-related tasks. No single study had investigated information needs and uses for

specific nursing-care activities such as care for patients dying or experiencing pain. This

original study aimed to describe and explore these missing aspects by employing Henderson

and Nite's *Principles and Practice in Nursing* to describe nursing-care activities and Dervin's

Sense-Making Theory and Wilson's *Model of Information Behavior* to explore Thai nurses'

information needs and uses and the factors influencing them. Stratified sampling, with

proportional allocation, was applied to survey 990 baccalaureate-degree nurses at 86 public

hospitals, drawn from 56,323 target nurses at 834 target hospitals throughout Thailand. The

study employed a researcher-developed questionnaire, preliminarily tested with 30 Thai and

23 American nurses, validated by 7 content experts after refinement, and pilot-tested with a

convenient sample of 30 Thai nurses. Data collection was done from April to July 2007.

Analysis included both descriptive and inferential statistics such as generalized estimating

equations (GEE). With 769 returned questionnaires (77.7 % response rate), the results

revealed that Thai nurses needed information from their colleagues, doctors, and

printed/electronic information sources more than other sources. For most activities, the

printed/electronic source they used the most was printed standards/protocols, followed by

printed textbooks, because these sources were available, easy to get, reliable, and trustful. For

nursing care and practice in general, they needed and used their colleagues, patients/family, doctors, printed kardex, patient charts/records, and printed textbooks the most, because these sources were available, easy to get, not difficult to understand, and tied to their nursing care and practice. Despite their rather positive attitudes towards information needs and uses, the nurses rarely used libraries, did not read research, and did not use research databases. No time to use, unavailability of research databases, and research being difficult to understand were the primary reasons of not using. Therefore, in order to adopt evidence-based practice into nursing, research information should be integrated into printed standards/protocols and textbooks and made available at hand.

DEDICATION

To my mother, Khun Mae Kly Phokhwang, my advisor, Dr.Edward J. Halloran, my husband, Dr. Armin Just, and my daughter, Phapratan Just.

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CHAPTER I

INTRODUCTION

In the era of technological advancement and information explosion, a massive amount of information is available for use. Yet, this era results in information overload on one hand and a gap between information available for use and the utilization of information on the other. Accordingly, information availability does not mean information accessibility (Dervin, 2003) and nor does it mean information utilization (Gerrish & Clayton, 2004). The inequality among information availability, accessibility, and utilization prevails in some situations and some populations. A major cause of this inequality comes from the information system and information provision that do not meet the information users' needs. In nursing and other health care professions, research-practice gaps (Gerrish & Clayton, 2004) and barriers to research or information utilization in nursing care (McCaughan, Thompson, Cullum, Sheldon, & Thompson, 2002) represent such unmet users' needs and inequality.

In order to deal with the information overload as well as to increase information access and utilization, work needs to be done at both individual and organizational levels. At the individual level, nurses, as healthcare professionals, should know what information they need, how they can locate it, and how they can use the needed information effectively for the purpose of improving the quality of patient care (Cowan, 1999; Griffiths & Riddington, 2001). At the organization level, authoritative persons in organizations should know what their health care professionals need and use and how to promote those needs and uses

(Gerrish & Clayton, 2004). The needs and uses of information by nurses as well as the provision of information according to nurses' needs and uses by health care organizations impact patient care and patient outcomes (Gosling Westbrook, & Spencer, 2004). This impact is especially critical regarding nurses who are the largest group of health care professionals, and are the only health care providers who are with patients 24 hours.

In order for health care organizations to provide appropriate information based on nurses' needs and uses, it is necessary for health care organizations including nurse administrators, policy makers, practice nurses, and educators to know the aspects of not merely what information nurses need and use, but also what factors influence their needs and uses. A research study such as this study that aims to investigate these aspects can inform these health care personnel and Thai nurses as well as leaders on the appropriate provision of information, including hardware, software, and people-ware, to enhance nursing practice.

This chapter discusses important backgrounds and problems that lead to the need to study information needs and uses of Thai nurses. The chapter includes a discussion of professional nurses, particularly Thai nurses, quality of care, information literacy, research-practice gaps, evidence-based practice, and the differences of health care systems and contexts between those in Thailand and those in other countries, where most studies in the information needs and uses of nurses have taken place.

Professional Nurses

Henderson (1969) defined professional nurses according to their unique function and nature of nursing care as follows:

> The unique function of the nurse is to assist the individual, sick or well, in the performance of those activities contributing to health or its recovery (or to the peaceful death) that he would perform unaided if he had the necessary strength, will or knowledge. And to do this in such a way as to help him gain independence as rapidly as possible. (p.4)

In a provision of quality nursing care to patients, nurses need specific nursing knowledge. Nurses are thought of as knowledge professionals or knowledge workers, who are using professional framework to gather data, making diagnosis, determining a problem, and planning intervention (Drucker, 1999). In their nursing care, nurses use special sets of skills to support their decision making and use critical thinking to solve clinical problems (Henderson & Nite, 1997).

Nursing knowledge and skills come from education, training, experience, and information seeking behaviors. Parts of nurses' knowledge and nursing knowledge are developed and increased from nurses seeking and using information when they encounter clinical problems. In nursing, data and information, particularly research information, that come from nurses and their information seeking behaviors are interpreted, transformed, and developed to be nursing knowledge (Nursing Center for Nursing Research [NCNR], 1993). Thus, health care professionals in the 21st century should have competencies in information seeking and problem solving in health care. Health care professionals should provide evidence-based and clinically competent care, demonstrate critical and reflective thinking, have problem solving skills, and use communication and information technology effectively

and appropriately (Pew Health Professions Commission, 1998). These competencies are

appropriate for nurses almost every where, including nurses in Thailand.

Nurses of Thailand

The description of Thai nurses includes nurse workforce, nursing education, work

settings, and responsibilities.

Thai Nurse Workforce

Thai nurses constitute 70 % of health care personnel in Thai health care system

(Srisuphan et al., 1998).   In 2001, there were about 100,000 nurses (Hiranpreuck, 2004).

Among these nurses, more than 70 % carry a baccalaureate degree from either one of nursing

schools (university faculties) or one of nursing colleges countrywide (Assalee, Thosigha, &

Honghern, 2004). The number of nurses having Bachelor of Science in Nursing (BSN)

increases every year because the Ministry of Public Health (MOPH) has been producing

more BSN nurses from two strategies: extending the two year nursing certificate degree of

technical nurses[1] to be BSN degree and having more BSN program entrants. In 2002 about

84,000 professional nurses had BSN in nursing (Bureau of Policy and Strategy, Ministry of

Public Health, 2005).   The Ministry of Public Health expects that all technical nurses will

become professional nurses, by the year of 2006 (Hiranpreuck, 2004). By 2015, Thailand

will have about 120,197-173,321 BSN nurses. This number is close to the demand for nurses

in Thailand (Srisuphan et al. 1998).   In 1998, about 1,000 nurses have Master's degree or

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[1] Currently, the Ministry of Public Health stops producing technical nurses graduating with a 2 year nursing
certificate program. This program was run from 1990-2000 as a result of nursing shortage.

doctoral degree in nursing (Srisuphan et al., 1998). It is estimated that there are 2500 nurses with either Master's or Doctoral degrees at the present[2].

Nursing Education

In order to be a nurse, a high school graduate needs to pass an entrance exam to study either a two-year nursing certification program or a four-year Bachelor of Science in nursing program (BSN) at one of nursing colleges of the Ministry of Public Health, of nursing faculties at universities, of other agencies, or of private nursing colleges and universities. After graduation, a two-year nursing graduate will work as a technical nurse (TN) whereas a four-year nursing graduate will work as a professional nurse or registered nurse (RN). If a technical nurse wants to be a professional nurse, he/she needs to extend her/his degree by enrolling in a two-year program for technical nurses at a nursing college or a nursing faculty of a university.   In order to have a master degree in nursing, a BSN nurse needs to study in a two-year master's degree program. For obtaining a doctoral degree, a master's degree nurse may spend 2 to 4 years in the program (Thai Nursing Council, 1997).   Currently, only universities provide master's degree and doctoral degree in nursing (Srisupan et al., 1998). In the past, some nursing schools under the auspice of the Ministry of Public Health had a one-year program that produced nurse assistants or practical nurses (PN).   In 2001, only one nursing college in the Ministry of Public Health still had this program (Hiranprueck, 2004) and currently some university hospitals still educate and train high school graduates to be practical nurses.

At present, Thailand has 65 nursing colleges: 15 nursing schools, which are called nursing faculties, of universities under the Ministry of University Affairs (recently changed

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[2] This number (2500 nurses) is estimated from Srisuphan et al. (1998), stating that each year 6 nursing schools (faculties) of universities in Thailand can produce about 240 Master's degree nurses, including PhD nurses.

to be under the Ministry of Education), 35 nursing schools under the jurisdiction of the Ministry of Public Health, 3 nursing colleges under the Ministry of Defense, 1 under the Royal Thai Police, 1 under the Red Cross, and 10 private nursing schools and colleges (Bureau of Policy and Strategy, Ministry of Public Health, 2005). The BSN nursing curricula among these schools, faculties, and colleges are similar. The curricula are also similar to those in the USA. Nursing students are taught and trained in fundamental nursing, adult and elderly nursing, psychiatric mental health nursing, pediatrics, obstetrics and gynecology, and community and public health. They also attend midwifery and primary care courses. Students are required to do suturing of minor lacerations and to deliver at least 5 babies before graduation (Anders & Wunaviktikul, 1999). After completing their four-year program and passing national nursing-license exam, they are licensed as both professional nurses and nurse midwives.

Work Settings

After graduation, nurses work in different settings dependently on their signed contracts. In general, nurses graduating from university-affiliated nursing schools work at 9 university-affiliated hospitals under the Ministry of Education or private hospitals nationwide. Nurses graduating from nursing colleges work at hospitals at a regional or provincial level, community hospitals at a district level, health care centers at sub-district level, or at specialized hospitals under the Ministry of Public Health. Graduate nurses from nursing colleges under the Ministry of Defense work at veterans hospitals under the same ministry. Other nurses who graduate from private nursing colleges/schools work at private hospitals. According to Bureau of Policy and Strategy, Ministry of Public Health (2005) among 84,000 BSN nurses in 2002 about 68.3 % worked at hospitals under the ministry of

public health, 12.9% worked at other public hospitals under other ministries, particularly at university-affiliated hospitals, 3 % worked at state enterprise hospitals, 4% worked at local government health care centers or organizations, and 11.7 % worked at private hospitals, clinics, and other health care organizations/agencies.

Responsibilities

Thai BSN nurses are legally and practically classified as both professional and midwifery nurses. Their responsibilities, as written in the Professional and Midwifery Act B.E. 2528 issued by Thai Nursing Council in 1985 and amended in 1997, include nursing care, midwifery care, and primary care to both sick and well (Thai Nursing Council, 2003). According to Thai Nursing Council (2003), nurses' responsibilities as professional nurses include (a) helping and caring individual, family, and community, who are sick for the purpose of alleviating the symptoms of illness, (b) preventing the sick individual, family, and community from health deterioration, (c) assessing individual, family, community's health status and conditions, (d) promoting health of both the sick and well, (e) rehabilitating health and conditions of the sick, (f) performing disease preventions of individual, family, and community, and (f) providing assistance to physicians, including executing a physician's instructions and descriptions in treatment. Furthermore, Thai nurses can give a medication under a physician's prescription or as a part of first aid treatment.

According to Thai Nursing Council (2003), the responsibilities of nurses as midwifery nurses involve nursing care to pregnant women during the periods of pregnancy and delivery: prenatal/pregnant, laboring/intra-natal, and after pregnant/postnatal periods. Nurses' responsibilities during the prenatal care include physically examining mothers and fetuses, giving advice, and providing care to pregnant women and families in order to

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promote health to mothers and their babies as well as to prevent complications during women pregnancy and childbirth. During the laboring or intra-natal period, nurses perform labor assessments and baby deliveries in normal cases. By law and regulation, nurses are allowed to perform their duties in abnormal cases of pregnancy and birth only when a medical practitioner is not available within an appropriate time and when a delay may result in endangering the life of the mother and her child. Nurses, however, are not allowed to use forceps or perform an operation or use injection to induce uterine contractions. For the postnatal care, nurses give nursing care to mothers, children, and families. As soon as the infant is delivered, nurses apply eye drops or ointment to an infant's eyes to disinfect and prevent infection from delivery. In addition, nurse midwives provide assistance to a physician and perform dependent tasks related to medical care and treatment of maternal and child health during pregnancy and labor under physician's instructions and prescriptions.

In summary, Thai nurses constitute 70% of health care workforce in Thailand. About 84% of Thai nurses have BSN degree. Their responsibilities include nursing care and primary care in both sick and well, including in labor and delivery.

Thai Nurses and Their English Skills

As Thai nursing has tried to improve quality of nursing care, a premium has been placed on acquiring advanced knowledge of nursing and medicine, much of it generated by research in the west. Stress on gaining new knowledge has created interest and demand for not only nursing skills and knowledge but also other related skills. Among other related skills, skills in using information technology to garner knowledge and English language skills or capability have been emphasized. The ability to use English is necessary because most clinical information such as research studies published and available in English

(Kajermo, Nordstrom, Krusebrant, & Bjorvell, 1998). English skills affect the needs and uses of information of nurses, particularly Thai nurses, who use English as a secondary language (Thompson, 2004). A lack of ability to use English skills constitutes low use or no use of certain information source in Thai nurses. A study in 352 nursing students at a large university hospital in Thailand revealed that more than 50 % of these Thai nursing students viewed English as a barrier to information searching from Internet (Vanichcharoenchai & Wattananon, 2002).

To the knowledge of this researcher, most studies have been conducted to investigate the information needs and uses of English spoken nurses and in developed countries such as the United States, Australia, Canada, the United Kingdom (Cogdill, 2003; Gosling et al., 2004; Griffiths & Riddington, 2001; Royle et al., 2002). No studies have assessed the needs and uses of information by Thai nurses. Among these Thai nurses, more than 80 % of them carry BSN degree, work at public hospitals, have major roles in primary care, nursing care, and nurse-midwifery care, use English as a second language, and work in Thai health care systems that differ from those in developed countries in terms of the infrastructures of health care system, patient acuity, and problems in health care (as described later).

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Quality of Care

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In *The World Health Report 2000 – Health systems: Improving performance* by World Health Organization (WHO), the report revealed that budget spending in health care of different countries that have different health care systems, do not parallel with health care performance. Among 191 countries, the US was ranked number 1 for health care expenditure and 37 for overall health performance. Thailand was ranked 64 for expenditure and 47 for performance (World Health Organization, 2000). This performance reflects quality of care.

For the quality of care, the health care system should obtain effectiveness, efficiency, and equity as its objectives (Aday et al., 1998). Effectiveness is concerned with the benefits of healthcare system, measured by improvements in health. Efficiency relates the resources required to the improvement of health. Equity is concerned with the fairness and effectiveness of the healthcare system to everyone in society (Aday et al., 1998). According to the Institute of Medicine (IOM), health care system in the 21st century should provide care that is safe, effective, patient-centered, timely, efficient, and equitable. In order to achieve these aims, among other strategies the health care organizations should apply evidence-based practice (primarily based on sound research evidence) and use information technology such as computer-based patient records to support decision making in health care (IOM, 2001). This study investigating aspects of information needs and uses of nurses may produce significant knowledge of the current situations and of evidence-based practice. Valid results from this study can provide support for allocation decisions of information/technology innovation for nurses by relevant health care organizations and agencies. Ultimately, quality of care for all Thai citizens will be enhanced.

In Thailand, the search for quality of care is important and dominant in the last decade because the health care system was reformed due to an increase in health care cost and a Bill of Rights for Patients enacted in 2001 as a new constitution in 2001 to ensure that patients receive efficient, fair, and effective care (Kunaviktikul et al., 2001; 2005). Parts of the reforms focus on primary care, disease prevention, and health promotion at community levels. The reforms and intended policy evolution from the Ministry of Public Health call for more nurses to staff health care centers at the sub-district level and for all nurses to become educated at the BSN level. Accordingly, numbers of both advanced nurse practitioners and

BSN nurses as well as of health care workers responsible for treatments and interventions to normal health problems and primary care at sub-district health care centers, particular those in rural areas where physicians are not available, have increased (Anders & Kunaviktikul, 1999; Hanucharurnkul, 2001).   The reforms have also employed accreditations such as hospital accreditations (HA) and international standards organization (ISO) conducted by quality assessment agencies to accredit patient care and services provided by health care organizations (Office of the National Economic and Social Development Board [NESDB], 2004). The reforms and accreditations impact nurses' responsibilities for nursing care, primary care, and quality of care they provide. Nurses are now encouraged to use advanced knowledge of nursing and medicine such as sound research information and reliable evidence in their nursing care (Assalee et al., 2004). As a result, achieving the quality and standards of care improvements by health care providers and nurses requires the support from health care leaders and organizations in providing sound information and research, information infrastructures, and technological supports for nurses' clinical decision making for patient care.

Concerning about the quality of care, National Health Development Plan under the 9th National Economic and Social Development Plan (2002-2006) set the strategies to improve quality and outcomes of health care by emphasizing the use of information, knowledge, and particular research among health care providers and organizations for their decision making in health care. Among 7 strategies used for such improvement, the plan incorporates a development of health knowledge and technology (Bureau of Policy and Strategy, Ministry of Public Health, Thailand, 2005)

Therefore, this proposed study, may inform every responsible party in the health care reforms and can support the national health development plan about what to prepare and support for the reforms and plan in relation to nurses' information needs and uses to enhance the quality of care.

Information Literacy

In addition, in order to obtain a high quality in patient care that is highly involved with advanced technology and information systems, nurses in the 21st century are required to have nursing informatics competency consisting of computer skills, and informatics knowledge and skills(Curran, 2003; Staggers, Gassert, & Curran, 2002). Regarding the informatics knowledge and skills, information competency or literacy is emphasized. Information literacy is the ability to identify the needed information, locate, evaluate, and to apply it appropriately (Shaw-Kokot, McGraw, & Moore, 2002). Information literacy is associated with information-seeking behaviors or information behaviors, which mainly emphasize the information needs and uses (Dervin & Nilan, 1986). That is, the needs and uses of information of nurses are related to their ability in identifying what information is needed, locating where needed information or what information source is needed, evaluating the retrieved information, and in applying of their needed and retrieved information. For example, results from a literature review by Estabrooks, Floyd, Scott-Findlay, O'Leary, and Gushta (2003) showed that the more nurses read research information, the more they use or applied it.

Concerning the importance of nurses' informatics competency, particularly nurses' information literacy in relation to their information needs and uses for nursing care, Nursing Center for Nursing Research (NCNR) in conjunction with the development of the National

Nursing Research Agenda (NNRA) recommended nursing scholars conducting research in three foci that are related to information needs and uses of nurses. These three foci are among seven foci of nursing informatics and nursing informatics competency (NCNR, 1993; American Nurses Association, 2001). These three emphasized that the research studies should investigate the aspects of nurses in "1) using data, information, and knowledge to deliver and manage patient care, 2) defining and describing data and information for patient care, and 3) acquiring and delivering knowledge from and for patient care" (NCNR, 1993, p. 12). This study of information needs and uses of Thai nurses specially addressed these recommendations.

In Thailand, even though there is no requirement for nurses to have informatics competency, nursing education increasingly pays attentions to it, particularly information literacy. Currently, all students in Master's degree programs in nursing are taught about information literacy (PhD exchange nursing students from Thailand, Personal communication, 2005; 2006). Majority of nurses in Thailand, however, graduated with Bachelor's degree in nursing; and few nurses have been trained about information literacy skills. The challenge here is to explore the information needs and uses of nurses in Thailand, where information literacy training is not abundant.

As health care organizations strive for quality of care by supporting the use of sound information/research evidence for decision making, research-practice gaps still remain. The research-practice gaps may influence the information needs and uses of nurses to a degree.

Research-practice Gaps

Gaps between research and practice exist due to several factors. The gaps such as those found in evidence-based practice and research utilization result from (a) individual

nurse factors, (b) the information or research attributes, and (c) the organizational structures, strategies, and culture that influence provision of information and supports to information/research utilization (Gerrish & Clayton, 2004; Lia-Hoagberg, Schaffer, & Strohschein, 1999; Nagy, Lumby, McKinley, & Macfarlane, 2001; Upton, 1999). For the cause related to individual factors, nurses viewed research being unrealistic to clinical practice (McCaughan et al., 2002). Regarding organizational-related factor, research results may not always be feasible in clinical situations and organizational contexts may not allow research utilization. For research related-factors, compatibility and complexity of research applied to clinical practice (Rosenberg &Donald, 1995) as well as barriers to research utilization (McCaughan et al., 2002) have been mentioned as causes of research-practice gaps. The research-practice gaps may hinder the needs and uses of information by nurses.

The research-based practice gaps bring an attention to study the information needs and uses in Thai nurses for few reasons. For one reason, it is worthy to study about to what degree the research-based practice gaps exist in clinical practice of Thai nurses, as determined by Thai nurses' attitudes towards information and research, availability of information provisions and supports from health care organizations, degrees of needs and uses of information among Thai nurses. For another reason, the results of studies about information needs and uses can explain factors influencing the gaps. The results can inform and guide nurse educators, administrators and policy makers, and practice nurses about having appropriate nursing education, administration, and practice to reduce the gaps and strengthen the needs and uses of information/research for nursing practices such as the evidence-based practice.

Evidence-based Practice

Evidence-based practice has been introduced into medicine, nursing, and other healthcare professions during the last decade when the highest quality of care has been sought (Sackett, Richardson, Rosenberg, & Haynes, 1997; Shorten, Wallace, & Crookes, 2001) and medical errors need to be minimized (IOM, 2001). The evidence-based practice is stimulated and facilitated by the development of information infrastructure in healthcare and the burgeoning of information and research published daily and available electronically, particularly in electronic databases and electronic full-text professional journals (IOM, 2001; Jacob, Rosenfeld, & Harber, 2003; Sackett et al., 1997). According to Sackett et al. (1997), evidence-based medicine or evidence-based practice is "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with best available external clinical evidence from systematic research." (p.2)

The evidence-based practice benefits both clinicians and patients. In medicine, evidence-based practice has at least two distinctive benefits: clinicians can make a wise decision for the best of the patient's interest, and thereby improve both cost-effectiveness and clinical effectiveness such as reducing patients' length of hospital stay, avoiding unnecessary treatments, and reducing the overall cost of treatment (Brasel, Weigelt, & Christians, 2003; Delaney, Barton, & Jacob, 2003; Fine et al., 2003; Rosenberg & Donald, 1995). Similarly, in nursing several studies have shown positive health care outcomes as a result of nursing practice using evidence-based practice (Angus, Hodnett, & O'Brien-Palla,2003; Berenholtz et al.,2004; Dufault, Bielecki, Collins, & Willey,1995; Gordon & Montgomery, 1996).

For example, a nursing study conducted by Angus et al. (2003) showed that two hospitals that successfully employed an evidence-based practice of intra-partum care, which is comprised of continuous presence, comforting touch, reassurance, and praise from a nurse, had shown distinctively higher rates of un-medicated births during a one-year study than another 8 hospitals that did not successfully employ the practice. Another study by Burns et al. (2003) used a clinical pathway developed from evidence-based practice for weaning trials and the withdrawal of sedation in patients on ventilators for more than 3 days. The use of the pathway could decrease ventilation days of patients in all 5 intensive care units (ICU), reduce the length of patient stays at both the ICU and hospital, and reduce the units' mortality rates. In addition, the use of the clinical pathway significantly reduced patient care cost.

Even though the evidence from research studies is valued as the best evidence--because it contains scientific merit--, the evidence-based practice values other kinds of evidence as well. These kinds of evidence can be in forms of data, information and knowledge that come from patients and families, colleagues, clinical experiences, expert opinions, patient charts and records, textbooks, and research (French, 1999; Ingersoll, 2000, 2006; McCaughan, Thompson, Cullum, Sheldon, & Raynor, 2005; Royle et al., 2002). Nurses value and use several kinds of evidence they can count on in their practice. What counts as evidence in nursing is related to nature of nursing care and practice and related to nurses' decision making in nursing care and practice. Nursing is rooted in human needs, and it adjusts to the needs that are affected by age, gender, culture, psychosocial states of patients, and pathological conditions and symptoms interfering with patients' normal daily functions (Henderson & Nite, 1997). Nursing is both an art and science of caring for human beings. Knowledge in nursing care derives from empirical, personal, esthetic, and ethical

sources (Carper, 1978). In their nursing care, nurses use any kind of information and knowledge, from tactic, intuition, experience, to research information (Benner, Tanner, Chesla, 1996; Clarke, 1999; French, 1999; Welsh & Lyons, 2001). Nature of nursing care and decisions to solve problems in nursing, which is pertinent to evaluation and judgment about human needs and conditions, not establishing a diagnosis of a problem as it is in medicine, (Crow, Chase, & Lamond, 1995) influence the use of information and knowledge of nurses. Nurses use both practical knowledge (knowing how to do) and theoretical knowledge that come from rules, guidelines, textbooks, and research for their nursing care. The use of these two kinds of knowledge depends on levels of proficiency in nursing care and nursing care situations. Novice and advanced beginner nurses tend to follow and use theoretical knowledge more than practical knowledge. Expert nurses use practical knowledge more than do novice nurses (Benner, 1984). According to Teekman (1997, 2001), for non-routine and complex tasks nurses still also use their own experience or practical knowledge for the nursing care and situations that need prompt acts. Nurses use both practical and theoretical knowledge for the nursing care and situations that require nursing care outcome evaluations. Nurses tend to use high level of theoretical knowledge such as research for the situations and nursing care that need critical inquiry and high validation and confirmation.

Based on the Sacket et al.'s definition and on the nature of nursing and nurses' decision making, Ingersoll (2000) defined evidence-based practice by specifying the evidence-based practice for nursing as follow: "Evidence-based nursing practice is the conscientious, explicit, and judicious use of theory-derived, research-based information in

making decisions about care delivery to individuals or groups of patients and in considerations of individual needs and preferences" (p. 152).

According to Ingersoll (2006) and White (1997), even though nursing values every kind of evidence, nurses should consider and be concerned about what is the best or what is poor evidence when applying it into their care and practice. Among various kinds of evidence, meta-analyses of randomized, controlled trials (RCT) produce the strongest or most reliable evidence, followed by experimental studies, quasi-experimental studies (time-series, non-equivalent control group) or matched case-control studies, non-experimental studies (correlational descriptive), program evaluations, quality improvement projects, case reports, clinical anecdote, and authoritative opinions, which are the weakest evidence.

Thus, the information needs and uses of health care professionals, including nurses, are associated with the adoption of evidence-based practice. Evidence-based practice requires its practitioners to have the ability to identify sound needed information and apply information appropriately. The needs and uses of information are among other indicators of whether nurses are ready for evidence-based practice in nurses (Pravikoff, Tanner, & Pierce, 2005; Tanner, 2000; Tanner, Pierce, & Pravikoff, 2004). In evidence-based practice adoption by nurses, the attributes of evidence-based practice, characteristics of nurses, and organizational factors influence the adoption and, in turn, may influence information needs and uses of nurses. These influential factors have brought an attention to the studies of information needs and uses of nurses.

With respect to evidence-based nursing practice that values the use of research evidence, experts, patients and families, and other kinds of evidence, it is important and significant to conduct a study that can inform health care personnel and relevant agencies

what information or evidence should be upgraded to be in the top of hierarchy of evidence as well as what information should be made as legitimate evidence for nursing practice.

In Thailand, evidence-based practice has been introduced to nursing in the past few years. There is an evidence-based practice support center, incorporated with an international center (JoAnna Briggs Institute Collaborating Center) to promote evidence-based practice among nurses in Thailand (http://www.joannabriggs.edu.au). Nursing education, particularly master's degree programs in nursing, have incorporated evidence-based practice into the programs. Thus, to prepare nurses in Thailand for evidence-based practice and to make evidence legitimate for use by Thai nurses, it is necessary to understand their information needs and uses.

Beside quality of care, research-practice gaps, information literacy, evidence-based practice that drive the need to study the information needs and uses of nurses in Thailand, the Thai health care systems and its contexts are also another driving force to this study.

The Differences in Health Care Systems and Related Contexts

Thailand has a health care system and contexts differently from those in other developed countries. These differences may distinguish the needs and uses of information of nurses in Thailand from those of other nurses. For example, the needs of information on patient care by Thai nurses may relate to tropical diseases and top-ranking infectious diseases such as AIDS whereas nurses from other developed countries such as the US need information about chronic conditions such as heart diseases. The difference of information needs and uses may be as a result of the natures of population health and problems specific to populations. In 2004, the leading causes of death in the US were heart diseases, cancers, strokes, chronic lower respiratory diseases, accidents, and diabetes mellitus (National Center

for Health Statistics, 2006). The leading causes of death in Thailand in 2003 were AIDS, followed by cancers, road accidents, heart diseases, tuberculosis, malaria, and diarrhea (Bureau of Health Policy and Strategy, Thailand, 2005).

Furthermore, the health care structure, healthcare personnel, and patient acuity in Thailand may cause the different needs and uses of information in Thai nurses from other nurses as well. For example, the United States healthcare has a third party payer system, and its healthcare management organizations have major influences on the cost and quality of healthcare. In contrast, the Thai healthcare system is a top-down management system in which the ministry of public health works as the top manager and is the most responsible party for the healthcare and well-being of the Thai population. In 2003, the United States doctor-population ration was 1:376, and in 2001, the nurse-population ration was 1: 126 (U.S. Census Bureau, 2006). In Thailand in 2002, a doctor- population ration was 1:3295 and the nurse-population ration was 1:739 (Bureau of Health Policy and Strategy, Thailand, 2005). The distribution of doctors and nurses and patient loads vary dependently on region and hospital level. For example, in 2002 the nurse-to-population ratios was 289 in Bangkok metropolitan areas (BMAs), 684 in the Central, 785 in the North, 765 in the South, and 1278 in the Northeastern). Nurses at community hospitals (district level) have the highest number of out-patient load (2,818 patients/nurse), followed by those at the regional/general hospitals (provincial level) (2,102 patients/nurse), and those at the university hospitals (753.8/nurse).

This high patient acuity and non-nursing jobs such as blood drawing and patient billing that nurses need to do are reasons among others that make nurses have no time for research utilization (Assalee et al., 2004; Sindhu & Pookboonmee, 2001; Tiloksakulchai et al., 2000).

In addition, compared to that of the United States, Thailand's information infrastructure system for healthcare is still in its infancy. Some large hospitals such as university affiliated hospitals and private hospitals use electronic health records that have patient records linking most units and services within the hospital and the Internet. However, majority of hospitals and health care centers under the ministry of public health do not have this system in place. The Ministry of Public Health recently has a plan to establish electronic health that links health care service systems among hospitals, educational institutions, and health care centers nationwide (The Ministry of Public Health, Thailand, 2006).

Moreover, telecommunication is a related context that may contribute the different information needs and uses of nurses in Thailand from those in other developed countries. Compared to the US populations, smaller percent of Thai populations own home telephones and personal computers and use the Internet. In 2003, about 62 percent of the US population had telephone main lines; 55 percent were cell-phone subscribers (U.S. Census Bureau, 2006); 62 percent had a personal computer; 55 percent had the Internet access (Day, Janus, & Davis, 2005). In 2003, about 10 percent of Thai people had telephone main lines; 19 percent were cell-phone subscribers; and 4 percent had a personal computer; 10 percent had Internet access (Office of the National Economic and Social Development Board [NESDB], 2004; U.S. Census Bureau, 2006).

In summary, professional nurses are knowledge workers, who need, seek, and use information for patient care and knowledge development. Their information needs and uses are influenced by a) quality of care that health care systems want to obtain and that patients expect, b) a requirement for nurses to have information literacy, c) research-practice gaps, d) an introduction and adoption of evidence-based practice to nursing. Similar to other nurses,

Thai nurses have been influenced by these factors as well. Nonetheless, Thai nurses'
information needs and uses may be different from those in developed countries because of
different health care systems and contexts. Thai nurses constitute 70 % of Thai health care
workforce. Their responsibilities are taking care of both sick and well, including delivering
babies and giving primary care. They use English as a second language. Most patients that
nurses' in developed countries give nursing care to are patients who have chronic diseases
and non-infectious diseases. In contrast, majority of Thai nurses' patients are infectious
disease and accident injured patients. Based on these backgrounds and problems, this study
aims to assess what information Thai nurses need and use for their nursing care and what
factors influence their information needs and uses. In the next chapter, a comprehensive and
critical review of the literature is presented.

CHAPTER II

REVIEW OF LITERATURE

The information technology explosion and the search for quality of care in health care organizations have led researchers to investigate information behaviors regarding the information needs and uses of health care professionals, particularly of physicians and nurses. Results of such investigations in nurses showed several aspects of information needs and uses of nurses, both in developed countries and developing countries like Thailand. These aspects are related to what information nurses need and use as well as what factors influence their needs and uses. This chapter aims to describe and explore these aspects. Besides describing and exploring these aspects, this chapter describes the philosophical and theoretical concepts and a conceptual framework used to explain the investigation of the information needs and uses among Thai nurses. The philosophical and conceptual models that can explain nursing and nurses' information behaviors are delineated in 1) *Principles and Practice of Nursing*, 6th edition (Henderson & Nite, 1997), 2) Wilson's 1996 *Model of Information Behavior* (Wilson, 1999); and 3) *Sense-Making Theory* (Dervin, 1998, 1999).

The discussion in this chapter starts with an introduction of information seeking behaviors. Then, the chapter will proceed with a section describing the above three conceptual models. Comments on theory, model, and concept application follow afterward. Then, the chapter continues with a literature review section. In this section, Wilson's model is used as an organizing structure for a literature review to define and identify concepts, constructs, and variables of interest in this study. Also, the literature review section entails

the facets of information needs and uses of Thai nurses found in the literature.   The chapter

includes a summary section of literature review and methods used in the existing studies of

information needs and uses of nurses. The chapter ends with a section of the study and

method.

Introduction: Information Seeking Behaviors

According to Wilson (1999), information seeking behavior is a subset of information

behavior. However, most people use the terms interchangeably. Detlefsen (1998) suggested

that information behavior is more accurate and appropriate than information seeking

behavior. According to Detlefsen (1998), information behavior is composed of all

information-related activities, including information seeking, retrieval, storage, management,

and use. According to Wilson (1999), information seeking behavior is mainly composed of

information needs, information searching behavior, and information uses. Generally,

scholars use the term *information needs and uses* when describing information seeking

behavior (Case, 2002; Prasad, 1992).

Scholars in the field of information behavior have defined and viewed information

seeking differently. They viewed the information seeking behavior as a process of problem

solving (Dervin, 1999; Marchionini, 1995; Wilson, 1999), a search process (Ellis et al, 2002;

Kuhlthau, 2004), a goal seeking and a need satisfaction (Brown, 1991), and as a role and task

accomplishment (Leckie, Pettigrew, & Sylvain, 1996).

For example, Dervin (1999) proposed that information seeking occurs because

humans are urged to seek, acquire, and manage information to make sense of the world when

they are faced with problems. Marchionini (1995) defined information seeking as "a process

in which humans purposefully engage in order to change their state of knowledge" (p.5).

According to scholars in the field of information behavior, information seeking behavior is a problem-solving process or goal seeking within related contexts that involve a) an information seeker, whose information needs prompt to look for information, b) information sources, which can be formal or informal, and c) the information system, which provides information and supports information seeking (Brown,1991; Leckie et al., 1996; Marchionini, 1995).

Several approaches have been used to explain the information seeking behavior of individuals. According to Pettigrew, Fidel, and Bruce (2001), cognitive, organizational, and social approaches as well as multifaceted approaches have predominantly been used. How an individual thinks and behaves in response to information needs is the focus of cognitive approaches. The social and organizational contexts that shape and influence the information seeking behavior of an individual are the focus of organizational and social approaches. The main interests in multifaceted approaches are cognitive and individual attributes as well as organizational and social factors.

The different approaches generate various models of information seeking behaviors. However, most models of scholars in the field of information and library science explain the information seeking behaviors of an individual and the factors affecting his/her information seeking behaviors in relation to how he/she needs, seeks, gives, and uses information in different contexts (Foster, 2004; Kuhlthau &Vakkari, 1999; Marchionini, 1995; Pettigrew et al., 2001). A model of Marchionini (1995) explains how information seekers seek information in an electronic environment. Dervin's model describes how information seekers make sense of their situation by seeking information (1999). Foster's model explains how scientists and researchers working on research projects seek the information (2004). A model

of Leckie et al. (1996) describes what factors influence information behavior of professionals such as lawyers, health care providers, and engineers. How students use their search process to have information in order to complete their assignments was explained by Kuhlthau (2004). Wilson's model describes what factors influence information behavior of information seekers (1999). Nevertheless, as Foster (2004) mentioned, most conceptual models explaining information seeking behavior focus on information seeking strategies and search processes for problem solving in related contexts, but few emphasize a holistic view of information seeking behaviors.

This study applied a cognitive approach and holistic view of Wilson's *1996 model of information behavior* to explain the information behavior in terms of information needs and uses of Thai nurses for their nursing care and practice in general. The study also applied Dervin's *Sense-Making* to explain information needs and uses among Thai nurses for their specific nursing care activities. The contexts of nurses' nursing care and practice in general and specific nursing care activities are described in *Principles and Practice of Nursing* (Henderson & Nite, 1997). What follows are a description of these three models and concepts and comments on the applications of each model/concept in this study.

Wilson's 1996 Model of Information Behavior

Wilson's *1996 model of information behavior* was revised from Wilson's general model of information behavior (1981), which was developed by reviewing studies in various fields, including "decision making, psychology, innovation, health communication, consumer research, and information system design" (Wilson, 1999, p. 256).

Figure 1

Wilson's 1996 Model of Information Behavior
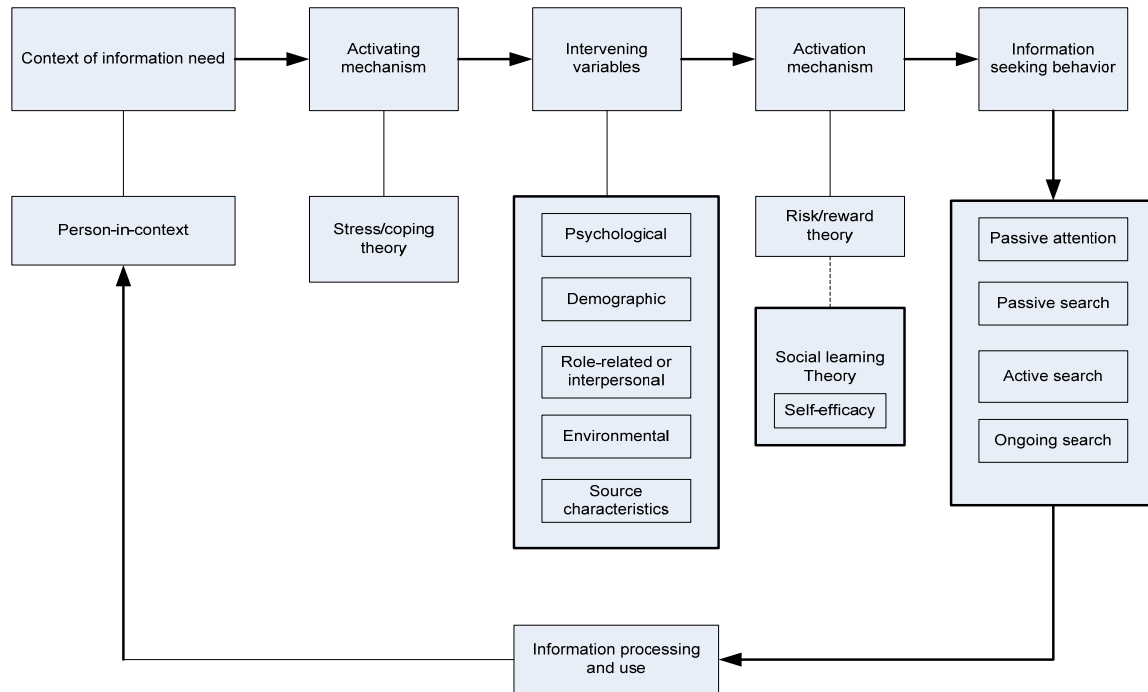
The Wilson's *1996 model of information behavior* illustrates components of general information behavior, which consists of person-in-context, activating mechanism, intervening variables, activation mechanism, information seeking behavior, and information processing and use.

Context of Information Need

According to the model, person in context is the main focus of the information needs. According to Wilson (1997), need, excluding extremely visible physical need such as hunger, is "a subjective experience that occurs only in the mind of the person in need and, consequently is not directly accessible to an observer" (p.552). Need is classified as cognitive need (need to know), affective need (need for gratification), and physical need. Information need is cognitive and affective. Information need is mainly classified in 3 types:

cognitive needs (need to elucidate or confirm knowledge, belief, and value), needs from

questioning behavior (need to know and need to solve questions or problems), and extension

needs (need to build one own knowledge extension). There is a motive for such needs.

Thus, in the study of information seeking behavior Wilson assumed that "a person

experiences an information need, there must be an attendant motive actually to engage in

such behavior" (p.553). Wilson used the concepts of stress and coping to explain the motive

for the need to seek information.

Activating Mechanism: Stress and Coping

Based on stress and coping theory by Folkman (1984) and Folkman and Lazarus

(1985), Wilson explained that information seeking is a coping strategy in that the information

seeker needs and seeks information to reduce uncertainty arising from stress or to solve

problem as problem-focused coping. Self-efficacy also plays a role in information seeking

for problem solving (as explained later).

Intervening Variables

In the context of person and information seeking, intervening variables that can

facilitate or impede information seeking include psychological factors, demographic

variables, role-related or interpersonal factors, environmental factors, and source

characteristics.

Psychological Factors

Cognitive dissonance, selective exposure, physiological, cognitive, and emotional

characteristics intervene the information needs and uses of individuals.

Cognitive dissonance. Cognitive dissonance means conflicting of knowledge, belief, and value that make people uncomfortable or drive people to have cognitive needs to seek information.

Selective exposure. Selective exposure explains why people seek information from some sources more than others. Generally people tend to expose themselves to the sources of their interest, needs, or existing attitudes.

Physiological, cognitive, and emotional characteristics. Physiological, cognitive, and emotional characteristics impede information seekers to seek the information from one source and influence them to seek from the others. For example, a person with visual problems may seek information from radio, instead of newspaper. People seek information because of a lack of a particular knowledge. People do not seek information from a source that they do not feel satisfied with or have a negative attitude toward that source.

Demographic Variables

Educational level and knowledge base, age, sex, and other demographic variables affect information seeking behaviors of individuals.

Educational level and knowledge base. Educational level and knowledge base determines information seeking behaviors of individuals. Knowledgeable persons or individuals with higher educational level may feel less need information, find information easier, and understand the information better than do individuals with less educational level and knowledge base.

Age, sex, and other demographic variables. Age, sex, and other demographic variables also influence information seeking behaviors of individuals. For example, women received more health information from all sources more than did men (Wilson, 1999).

Role-related or Interpersonal Factors

Roles or positions of individuals in a particular social context, attitudes to information sources from outside organization, resistance of individuals or groups to change in using specific information, and relationship of individuals to information sources influence the information sources used of individuals and groups.

Environmental Factors

Environmental/situational factors, including economic barriers, are intervening variables for information needs and uses of individuals. Economic barriers are related to direct *economic cost* and the *value of time*. Environmental/situational barriers are *time, geography*, and *national cultures*. Time to seek or lack of time to seek, geographic location of information seekers, different national cultures influence information needs and uses.

Source Characteristics

Accessibility, credibility, and channel of information are information source characteristics that influence information needs and uses of individuals.

Accessibility. Accessibility of information sources affects information uses. Lack of accessibility of some information sources may impose information seekers to seek other information sources.

Credibility. Credibility is reliability and accuracy of information. If information seekers realize that an information source is less reliable and accurate than the other sources, they may seek the more reliable and accurate ones.

Channel of communication. Channel of communication is presentation types of information such as a TV advertisement, publications or types of information sources such as

human-sources, printed source, including electronic sources such as computer and Internet. People may prefer to use information from one type to another.

Activation Mechanism: Risks/reward (self-efficacy)

Based on consumer research, Wilson explained the concepts of risk and reward in his model that when an information seeker perceives high risk such as high situational uncertainty, information needs and seeking will take place. Examples of risks are *performance* risk (whether the product performs to an accepted standard?), *financial* risk (is the product affordable?), *physical* risk (is the product harmful?), *social* risk (will the products impress others?), and *ego* risk (will the product improve person's self-esteem?).

In the social cognitive theory, which has the central focus in self-efficacy (Bandura, 1977), Wilson explained that information seeking may improve one's self-efficacy in coping with problems, as a result of using information. Also, the individuals' self-efficacy explains why some information sources are used more than others. The information seekers may possess the ability and confidence in seeking information from some sources and using it more than they do from other sources.

Information Seeking Behavior

Information seeking and acquisition are identified as *passive attention* (information acquisition may occur without an intention to seek), *passive search* (besides getting intentional information, the search brings other pertinent information), *active search* (actively and intentionally seek out information), and *ongoing search* (the search has been being carried out to update or expand what information one already has).

Information Processing and Use

In the information acquisition process and use, the information seeker has an *intention* to seek for information, *select* sources, *execute* information (use information sources), *evaluate* the retrieved information, and *implement* the retrieved information to their situations such as solving problems. The information processing and use is a part of the feedback loop, as illustrated in the model (Figure1). If the information seeker is unsatisfied with his/her needed and sought information, the information seeking is still continued. If he/she is satisfied, the information seeking is stopped.

In summary, the 1996 model of information seeking by Wilson (1997) can explain the information need and use of person-in-context. The model incorporates the concepts of decision making to solve problem by seeking information as a coping strategy to reduce uncertainty from not knowing information and as a way to increase self-efficacy of the information seeker. The model explains intervening variables facilitating or hindering information behavior. The intervening variables include psychological, demographic, role-related or interpersonal, and environmental variables of information seekers as well as information source characteristics. The model also describes the information acquisition and use process.

<center>**Sense-Making Meta-Theory**</center>

Dervin's *Sense-Making* (1999) is used to describe what information Thai nurses need and use and why they use certain information sources for their specific nursing care activities.

Sense-Making approach is a situational approach. Situations are used to predict information needs and uses. Information users, who are in the situations, define what information means to them (Dervin, 1992). *Sense-Making* approach has been used as a

<center>32</center>

qualitative approach using a time-line micro-moment interview that asks interviewees what-,

how-, and why-questions for each step of a situation the interviewees have gone through and

what they use to make sense of their situation. The questions are centered on *situation*, *gap*,

bridge, and *outcome* as they are a central metaphor of Sense-Making (as explained later). For

example, Cheuk Wai-Yi (1999) conducted a study in eight auditors, eight engineers and eight

architects working in Singapore to understand how they seek and use information for their

work. Follows are questions the researcher asked the interviewees.

　1. Please describe me a job that you have completed in your work place (situation)

　2. Tell me the steps that you need to go through to complete this job (situation)

　3. In Step 1 (2, 3,…)

- Do you have any questions in mind? What are they? (gap)

- What do you try to find out? (gap)

- What situation do you think you are in? (gap)

- What do you feel? (gap)

- How do you find the answer to these questions? (bridge) Any help?

(outcome)

　　　Most research studies employing *Sense-Making* use this step-taking approach. What

follows is a description of *Sense-Making*.

　　　Differently from other approaches that view information and knowledge as things,

objects, and processes, which are nouns, the *Sense Making* approach views information and

knowledge as a verb and noun. As a verb, information and knowledge is referred to as "the

making and unmaking of sense." As a noun, "information and knowledge are a product of

and fodder for *sense making* and sense unmaking." (Dervin, 1998, p. 36) Sense-Making is a

meta-theoretical tool that guides method, particularly methods for theorizing and conducting research (Dervin, 1999). In her *Sense-Making* meta-theory, Dervin presents 15 major meta-theoretical themes. These themes are related to the major assumptions that human beings are living with the nature of reality and the nature of knowing in the complex, analogic, elusive lived human condition (Dervin, 1999). What follows are a summary of *Sense Making*'s 15 meta-theoretical themes.

Human beings, living in material conditions and a changing world, move from time to time and space to space. In their moving, human beings face gaps of reality, the perception of which depends on and may change with time, space, interpretations, cultures, and conditions. They make sense in their understandings and feelings of reality in their world by bridging the gaps. Thus, Sense-Making mandates empirical attentions to focus on its function as a verb to systematically assess and understand how human beings make sense or unmake sense of their time-space-movement situations, based on their past, present, and future.

Sense Making assumes that knowledge does not only come from interpretive facts or from the results of "factizing" – that is the making of facts that are assumed real - but also come from what is sense made or unmade in response to non factual inputs such as emotions and feelings. Thus, *Sense Making* directs studies to view the nature of human beings as moving and being partially instructed and also to view humans' incompleteness in their movement as a basis for building a theory and study design. Also, positioning humans as theorists and the study of communication as "dialogic" are mandated by *Sense Making* because a dialogic interface can help researchers to understand what human beings really want and what they dream for.

Sense Making mandates that both researchers themselves -as a tool and a vehicle of humbled discourse dialogues- and ordinary persons -as theorists- are not imposed by assumptions in order to reveal all patterns and multiple "connectings" between entities and events. By not being imposed by assumptions, researchers can look at all possible research questions and remain open to multiple interpretations. In this way, *Sense Making* is a meta-theory of deconstructive interpretation. As abovementioned, *Sense-Making* is centered on its situation, gap, bridge, and outcome/help metaphor. This metaphor is simply illustrated in Figure 2.

Figure 2

Sense-Making Metaphor
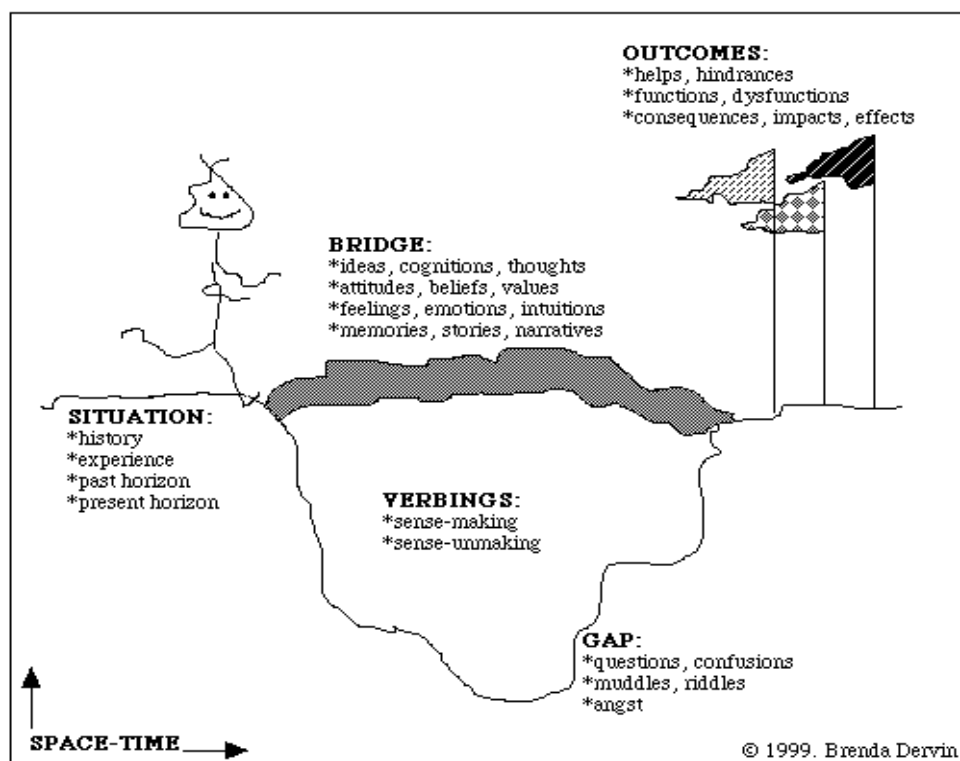
Taken from: Dervin, B. (1999). On studying information seeking methodologically: The implications of connecting metatheory to method. Information Processing and Management, 35(6), 727-750.

Sense Making uses a central metaphor in that human beings, living in a material and changing world as well as having history and partial instruction, travel through time-space. In their traveling, they meet new situations, face gaps, bridge those gaps, evaluate outcomes, and move on. To bride the gaps, human beings use sense making and unmaking. *Sense Making* defines information as sense made and information and knowledge as a product of sense making. *Sense Making* focuses on the phenomena of how human beings bridge the gaps (such as seeking information) and what make them bridge the gaps appropriately (such as information system design). *Sense Making* mandates using discourse dialogues, human beings as theorists, and researchers as a tool to understand, explain, and interpret these phenomena.

An example of Sense-Making studies is a study conducted by Dervin, Connaway, and Prabha (2003). The researchers conducted a project study of faculty, graduate students, undergraduates, and netLibrary subscribers from 44 central Ohio colleges and universities. The study explored why and how college and university users use electronic information and how system design features fit their needs. The researchers employed three methods of data collection: online, phone, and focus group interviews. These three methods were centered on *Sense-Making* metaphor. In the online interview assessing what the respondents used as *bridge*, the respondents were asked about electronic sources of input they used to answer a question, plan a project, and write a paper or proposal. The respondents were also asked to what degree they used the electronic sources for their college/university life and for their personal/privacy life. In a phone interview assessing about the *situation* and *gap* relevance, the respondents were asked to rate a situation leading them to seek information from 10-point scale, in which 10 signifies the most positive and 1 signifies the opposite. Examples of these

rating questions inlcude "What were your big questions in the situation (SITUATION

REMINDER)—the things you needed answers to, or needed to unravel, or unconfused?"

"How challenging was the situation?" "How confusing was the situation to you?" The

respondents were also asked about *outcome/help* of information sources. Examples of

outcome/help related questions include "How did the input help?; To what degree (10 helped

me a lot $\rightarrow$ 1 helped only a little)" "What qualities of input that helped?" and "When you

think about the input you got from this source_____ how do you evaluate it in terms of

trustworthiness on a 10-point scale, with 10 meaning very trustworthy and a 1 not

trustworthy at all?"

This study uses Sense-Making metaphor as a quantitative approach in the

investigation of information needs and uses of nurses for their specific nursing care activities

(as described later).

Principles and Practice of Nursing

Principles and Practice of Nursing, 6th edition (PPN6) provides continuity from the

past editions of the best selling textbook (*Principles and Practice of Nursing* edition 1-5;

1922-1955). PPN6 was built and organized around nursing philosophy and the current

literature using science and expert opinions through 1975 as its twin supports (Halloran,

1995). Halloran (2004) emphasized that Henderson's *Principles and Practice of Nursing* is

the first evidence-based textbook of nursing. It is considered a nursing bible in the 20th

century (Halloran, 1995). Like Nightingale's *Note on Nursing,* the textbook is still practical

and useful to current nursing. To date many textbooks, articles, research studies, abstracts,

and reference databases such as *International Nursing Index* (INL) and the *Cumulative Index*

to Nursing and Allied Health (CINAHL) are rooted in Henderson's *Nursing Studies Index*

(NSI) volume I-IV [1900-1969] (Henderson, 1984) and in Henderson's *Principles and Practice of Nursing* (Halloran, 1995; 2004).

Principles and Practice of Nursing, 6th edition (PPN6) (Henderson & Nite, 1997) is applied in this study to explain what nursing is and what nursing care activities are and to guide an investigation of what information Thai nurses need and use in their nursing care activities.

<div align="center">

Definition of Nursing

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Henderson defined nursing as follows:

> Nursing is primarily helping people (sick or well) in the performance of those activities contributing to health, or its recovery (or to a peaceful death) that they would perform unaided if they had necessary strength, will, or knowledge. It is likewise the unique contribution of nursing to help people to be independent of such assistance as soon as possible. (Henderson & Nite, 1997, p.34)

Nursing care is a unique function of nurses in assisting human beings in accordance with their needs that are affected by age, gender, culture, psychosocial states of patients, and pathological conditions and symptoms interfering with patients' normal daily functions. Similarly to the statement of nursing definition above, the unique function of nurses stated by Henderson appears in an International Nursing Council's publication, *Basic Principles of Nursing Care* (1969), which is widely used and has been translated into more than 30 languages, including Thai (International Nursing Council, 2006).

The discussion of the unique function of nurses also appears in Henderson's essay "The Nature of Nursing." In her essay, Henderson (1995) wrote, "I see nursing as primarily complementing the patient by supplying what he needs in knowledge, will, or strength to perform his daily activities and also to carry out the treatment prescribed for him by the physician" (p. 218). The unique function and nature of nursing care are manifested through

nursing care activities. The activities are centered on philosophy in nursing that focuses on

patients' needs and helping patients to be independent. These activities make nursing a

distinctive profession, complementary to medicine.

Nursing Care Activities

According to Henderson (1969), nursing care has its root in fundamental human

needs. Human beings need foods, clothes, shelters, love, approval, and social acceptance.

Nursing care attempts to meet patients' needs, both basic human needs and patient needs that

are modified by conditions or symptoms such as coma, shock, hemorrhage, marked

disturbance of body fluids or acute oxygen want. The nursing care to meet the patients'

needs is adjusted to individual patients according to their age, sex, cultural backgrounds,

temperament or emotional states, and physical and intellectual capacities. Nursing care

activities include procedures that nurses perform to meet patients' physical, psychosocial,

and spiritual needs. These nursing care activities are mainly comprised of 1) health

evaluation and planning for patient care, 2) basic nursing care, 3) performing or helping

patients, their families, medical doctors or health care teams in therapeutic measures,

procedures, and technique for patient care and treatment, and 4) symptomatic nursing care

(Henderson & Nite, 1997). Nursing care activities may vary from country to country. For

example, all BSN nurses in Thailand can delivery babies in normal cases whereas BSN

nurses in the US cannot do this activity unless they are nurse midwives. What follows are

descriptions of these nursing care activities.

1. Nursing care activities for health evaluation and planning for patient care. For these

activities, nurses perform a) observing patients, reporting about patient to health care teams,

and recording about patients and nursing care, b) patient health examination, c) vital sign

measuring and monitoring patients, d) patient admission, e) patient care planning, f) patient rehabilitation, and g) patient discharge /terminating care. These activities include health education, promotion, and prevention nurses give to individuals, families, and communities.

2. Basic nursing care activities. Nurses assist patients in their daily functions or provide conditions that enable them to breath normally, eat and drink adequately, eliminate body waste products, move and maintain their desirable posture, sleep and rest, dress, maintain body temperature properly, keep body clean and well groomed, avoid dangers in environments, communicate with others, worship, work on something to achieve their goals, play and socially participate, and learn or discover for normal development. The activities for this nursing care include basic nursing care activities a) for daily body function such as bathing, general hygiene care, bedding, normal feeding, posturing, and environment setting for patients, b) for psychosocial care and supports such as giving information or mental supports to make patients feel less worried about their health conditions, and c) for spiritual supports such as letting patients and family pray, worship, and have their worship materials with them.

3. Nursing care activities for therapeutic measures, procedures, or technique that nurses perform or help patients, their families, and medical workers (other than nurses perform). These nursing care activities consist of a) administration of oxygen and other gases and the use of ventilators (respirators), b) oral administration of drugs, c) parenteral administration of foods, fluids, and medicines, d) intubation of the alimentary tract for medication, irrigation and drainage, and dialysis, e) irrigation of vulva, perineum, and vaginal canal for cleaning and medication, f) incision and puncture of body cavities for drainage and medication, g) irrigation and medication of the eye, ear, nose, and throat and

removal of foreign bodies, h) local applications of heat, cold, and chemicals for circulatory effects, i) baths and pacts for circulatory and sedative effects and improvement of muscle tone, j) radiation energies and therapeutic applications, k) processing sterile supplies and equipment used in patient care and treatment, l) application of surgical dressings, m) application of restraints, splints, casts, and traction for protection and support, n) suturing minor lacerations, and o) delivering babies in normal case.

4. Symptomatic nursing care activities. These nursing care activities are given and adjusted to patients who have symptoms of a) marked disturbance of intake and output of gases demanding medical intervention or first aid, b) marked disturbance of nutrition, fluid and electrolyte balance such as starvation, under-nutrition, obesity, vomiting, c) marked disturbance of elimination such as constipation, diarrhea, retention or suppression of urine, incontinence of urine or feces, d) motor disturbances – hypoactivity, immobilization, e) motor disturbances—hyperactivity, f) disturbances of consciousness and orientation, g)anxiety, depression, insomnia, h) hyperthermia or hypothermia, i) local injury or wound with infection, j) systemic infection with or without febrile states, k) disorders of communications attributable to impairments of sight, hearing, and speech, l) the preoperative state, m) the postoperative state, n) pain, and o) death and dying.

Nursing care activities are universal; most nurses perform these activities (Henderson & Nite, 1997; Halloran, 1995). However, they may vary from country to country, as abovementioned. Basic nursing care activities are principles and fundamentals of nursing care.

The philosophical and conceptual models that are applied in this study have been described. What follows is a commentary of the applications of this theory, model, and concept.

Comments on Theory, Model, and Concept Applications

Wilson's 1996 Model of Information Behavior

In the applications of Wilson's 1996 model of information behavior, the researcher considers both of its strengths and weaknesses and how the model can be applied in this study.

Wilson's 1996 model of information behavior has both strengths and weaknesses. Regarding the strengths, first the model is general and broad in scope in that it can be applied to all kinds of information seekers. Second, the model provides a comprehensive view of thinking (Niedzwiedzka, 2003) or "a map of area" (Wilson, 1999 p.252) in assessing information behavior. Third, the model includes all elements of information behavior, from person in context, need identification, information use, and intervening factors to information acquisition.

However, the model has a critical weakness. It lacks of systematic power and explanatory power (Jarvelin & Wilson, 2003) in that it does not suggest clearly organized concepts and relationships that can be tested or predicted. According to Fawcett (1998), a conceptual model is "a set of relatively abstract and general concepts and the propositions that describes or link those concepts" (p. 3). An example of 11 proposition statements in Bystrom's model of task-based information seeking is "the more information types are needed, the greater the share of people as source" (Jarvelin & Wilson, 2003). No such

propositions are provided in Wilson's model (Wilson, 1999). In addition, few studies have tested and supported the model (Niedwiedzka, 2003; Case, 2002).

Based on her study applying Wilson model to explain information seeking behaviors of health care managers, Niedzwiedzka (2003) pointed out several weak points of Wilson model's. For example, Wilson graphically separated a person from intervening variables whereas some variables such as psychological, demographic, and role-related interpersonal variables are parts of the person-in-context. Niedzwiedzka (2003) suggested that the intervening variables should be re-categorized as personal variables (psychological, demographic, role-related or interpersonal factors) and environmental variables (including information sources). Another example, the graphic model suggests the intervening variables influence information seeking behavior and information processing and use but not information need. In fact, the intervening factors influence both information needs and uses. For another example, instead of using theory of stress/coping theory, risk/reward theory, it is better to use "stress," "perception of risk," "hope of reward," and "perception of self-efficacy."

Despite its weaknesses, Wilson's model provides four main applications in this study.

First, the model can be used to analyze the existing information need and use studies in nurses and identify an area of future research interest, information uses of nurses in Thailand. That is, *Wilson's 1996 model of information behavior* is used as an organizing structure of literature review or as a theory of problem (Mishel, 2006) to define the problem related to information needs and uses among nurses and define contributing factors of the information needs and uses under this study. As Wilson (1999) noted,

> The limitation of this kind of model, however, is that it does little more than provide a map of the area and draw attention to gaps in research: it provides no suggestion of

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causative factors in information behavior and, consequently, it does not directly suggest hypotheses to be tested. (p. 251-252)

Second, even though the model does not suggest hypothesis testing for the causative factors, a comparison of findings across several studies that support the model may suggest exploring such factors (Jarvelin & Wilson, 2003). Therefore, with the support of the empirical studies of information needs and uses among nurses, the model can help explain information need and decision making to solve clinical problems of nurses in general (not specific to nursing care activities) as well as help examine and explore nurses' information seeking behaviors. It can help explain why nurses, in the context of clinical practice and their nursing care, need and use information from some information sources more than the others. That is, the model can help in identifying what factors influence information needs and uses among Thai nurses.

Third, its broad concepts allow a comprehensive investigation of the information needs and uses of Thai nurses. To date no study has been conducted to describe the whole picture of information behavior by Thai nurses. A descriptive study such as this study is a good approach to start with before investigating and exploring the information needs and uses of individuals and groups in deeper details or by studying specific aspects (Case, 2002).

Fourth, the model and its explanation as well as the literature review guided by the model are used to define and describe information, information needs, and information uses in the contexts of nursing care and practice.

Sense-Making

Sense-Making is used not only in studies that generate other theories but also in studies that test and apply this theory (Dervin, 1999; Teekman, 1997). *Sense-Making* has been used in many areas of studies, such as communication practices, health communication,

information seeking and use (Dervin, 2005). However, rarely do researchers apply *Sense-Making* in the study of information needs and uses of nurses. One *Sense-Making* study conducted in nurses looked at reflective thinking in nursing for non-routine nursing care situations (Teekman, 1997). In this study, the purpose in applying this theory is to describe the information needs and uses for nursing care activities. This study will apply the concepts and metaphor of Sense-Making in the quantitative survey investigation of what information Thai nurses need and use for their specific nursing care activities. The activities that nurses perform in their patient care serve as situational contexts in this study. These activities are defined and classified by Henderson and Nite (1997) in their sixth-edition book, *Principles and Practice of Nursing.* There are a number of reasons for applying Sense-Making for the investigation of what information Thai nurses need and use in their nursing care activities.

First, *Sense-Making* allows for the evaluation of the affective aspect of nurse, information seekers, for how nurses view information sources used in the nursing care activities and for what source nurses prefer to use in their nursing care activities is. This affective aspect is rarely assessed in information need and use studies (Julien, McKechnie, & Hart, 2005), and rarely do theories of information behavior allow this kind of investigation.

Second, even though in-depth details about information needs and uses among Thai nurses for each nursing care activity cannot be presented due to the application of *Sense-Making* as a quantitative approach (rather than qualitative approach), generalization of the finding is allowed. To be able to generalize the finding is what this study has aimed for because many studies in the information need and use studies have a lack of generalization.

Third, Wilson's model of information behavior cannot clearly explain and predict the information needs and uses in a specific situation or nursing care activity; *Sense-Making* can.

Fourth, instead of asking respondents to reflect on a situation that made them want to seek information, which is a major approach of *Sense-Making*, this study uses Sense-Making metaphor to assess situation, gap, bridge, and outcome/help of information needs and uses of nurses for their specific nursing care activities. In this application, each nursing care activity is equal to a situation. In each nursing care activity, nurses are asked to indicate which information source from pre-listed sources they need the most when they are not sure or do not know how to do nursing care for that activity. This asking is to investigate what information sources nurses need when they face a gap in their nursing care activity. In the assessment of bridging the gap, nurses are asked to indicate what printed/electronic information source from prelisted sources they use the most for each nursing care activity. For the outcomes/helps, nurses receive a prelisted set of attributes of printed/electronic information sources and are asked to select the reason for their using a resource the most or what quality of that source helps in making sense of nursing care activity.

This study does not apply Sense-Making as a qualitative approach such as the Micro-Moment Time-Line interview (Teekman, 1997; Cheuk, 1999) intentionally suggested by *Sense-Making*. The Micro-Moment Time-Line interview focuses on how individuals seek and use information and what make them seek and use information from certain sources. Therefore, some important applications of the intended purposes of *Sense-Making* cannot be applied well in this study. For example, a qualitative approach study by Cheuk (1999) revealed that individuals need and use information according to their time-space movement situation. Therefore, in this study, information need does not equate to "gap," but it is a force in the middle of "gap," "situation," and "help" (Cheuk, 1999).

As a result, when using *Sense-Making* as a quantitative approach, the researcher needs to empirically define situation, gap, bridge, and outcome appropriately. For example, the outcome/help is defined as which attributes of information sources nurse believe make sense to them and to their nursing care activities, or why they use those sources. In the literature, the use of information sources of nurses depends on how nurses perceive the sources to be available and easy to access, applicable and useful, easy to understand, and reliable and truthful.

In brief, Sense-Making can be used to describe what information Thai nurses need, what information sources they use, and why they use those sources in their nursing care activities. Sense-Making uses situations (such as nursing care situations) as predictors of information needs and use.

Principles and Practice of Nursing

In order to carry out nursing roles and functions, nurses need and use data, information, and knowledge that come from several sources such as their own knowledge and experience, textbooks, professional literature, patients and families, and experts. To date, no study has been conducted to investigate what information nurses need and use for each nursing care activity. In order to promote evidence-based practice among Thai nurses, it is necessary to know what Thai nurses really need and use for their nursing care activities.

Many studies investigating the information needs and uses among nurses do not define what nursing is and what nursing care means. All of them have assessed information needs and uses among nurses in general, not specific nursing care activities. Nurses have been asked what information they needed and used in their nursing care and practice but not asked what information they needed and used with patients who had gone through operation,

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who were dying, and so on. These kinds of studies have added a number of information need

and use studies, but quality of studies that can inform the information providers about the real

needs and uses of information users, whose needs and uses depend on situations (Dervin,

2003). They fail to explain what nurses really need and why they want information/evidence

for their specific nursing care, which is a focus of evidence-based practice. By applying

nursing care activities from *Principles and Practice of Nursing*, nurses' information needs

and uses for each specific nursing care activity will be revealed.

A combination of *Principles and Practice of Nursing, Wilson's 1996 model of*

information behavior, and *Sense Making* provides a conceptual framework of this study.

Conceptual Framework of the Study

Sense-Making metaphor can fit in the 1996 Wilson's model of information behavior to

explain a complete picture of information needs and uses of nurses. In the Wilson model, the

person-in-context and context of information need, which can be described as *situation* in

Sense-Making, is nursing care activity nurses perform. Activating mechanism and

intervening variables represent *situation-gap-bridge relevant factors* because all of these

factors are related together. The relevant factors can be explained by Cheuk's comment

(1999) in her Sense-Making study, as mentioned earlier. To her, information need is not

equal to *gap*, but it is a force in the middle of "gap", "situation", and "help" or outcome of

information sources used.   In addition, as suggested by Niedzwiedzka (2003) earlier that

intervening variables are parts of information needs and uses; they are not separated from

each other; and they influence both information needs and uses. Based on the literature

review using Wilson's 1996 model of information behavior and other findings, all situation-

gap-bride relevant factors contribute to gap-bridging or information needs and uses of nurses.

Information seeking behaviors are *bridge* that information seekers use to overpass the gap

and to make sense of situations. *Information processing and use* are outcomes or *"help."*

The fitness of Sense-Making and the 1996 Wilson's model of information

behavior is displayed as the study framework in the following figure 3.

Figure 3

Conceptual Framework for Studying Information Needs and Uses of Thai Nurses

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The conceptual framework shows the concepts and variables of interest in the proposed study. Person-in-context is Thai nurses. Situation or context of information need includes nursing care activities, nursing care and practice in general, time-related such as working shifts, setting such as patient units/wards and types of hospitals, magnitude or degree of information needs, purposes and sources of information needs. Situation-gap-bridge relevant factors include activating mechanism relating to problem solving and decision making and intervening variables. Intervening variables include psychological factors (attitude and awareness), demographic factors (age, education--for degree attainment, training for enhancing knowledge and skills--, knowledge base -- a lack of particular skills and knowledge--, years of experience as a nurse), role-related or interpersonal factors (role and related tasks), environmental factors (organizational support for time and information provisions, peer support, culture, and work load), source characteristics (availability, accessibility, applicability and usefulness, reliability and trustfulness). Bridge or information seeking behavior includes searching strategies, information processing and use (sources used and degree of uses). Help/outcome of information uses is related to source evaluations for why nurses use a particular source for their nursing care in general and specific nursing care activities. This outcome is similar to source characteristics. This study is not interested in self-efficacy of nurses in using particular sources, as it is suggested by Wilson's 1996 model. However, it is interested in skill competencies of nurses in using particular sources such as computer competency and data-based or computer-based information use. This competency is included in demographic factors.

In the next section, a review of literature about information needs and uses of nurses will be presented. The conceptual framework presented above is used as an organizing structure for the literature review.

Literature Review

This section reviews related literature and empirical studies regarding the information needs and uses of nurses. The review includes situation or contexts of information need, situation-gap-bridge relevant factors, which consist of activating mechanism, intervening variables, and bridge, which includes information seeking behavior, and information processing and use of nurses. The section also entails a review of information need and use studies of nurses in Thailand. The section includes a summary of literature review related to findings and methods. The section ends with shortcomings in existing studies that lead to the proposed study and methods for investigating information needs and uses of nurses in Thailand.

Situation: Context of Information Need

Context of information needs in nursing or situations involves definitions of information, information need, nursing contexts, information needs in nursing contexts.

Definition of Information

According Webster's dictionary, information is defined as "1: the communication or reception of knowledge or intelligence" and "2 a: (1) knowledge obtained from investigation, study, or instruction" (http://www.merriam-webster.com). According to the literature, several information and library science scholars such as Buckland (1991), Dervin (1999),

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McCreadie and Rice (1999), and Schement (1993) discussed and defined "information", as follows:

Buckland (1991) defined information as a) information-as-thing being informative in forms of data, objects, and documents; b) information-as-process, which includes acts of informing, communication, and changing in the state of knowledge; and c) information-as-knowledge as achieved by the process.

Similarly to Buckland, Schement (1993) viewed information as (a) a thing, as (b) a process because information is a part of the act of becoming informed, and as (c) a product of manipulation in the sense that information needs to be produced in order to exist.

Similar to Buckland and Schement, McCreadie and Rice (1999) defined information as a) a resource or commodity, b) data in the environment, and c) representation of knowledge.

Differently from other scholars, Dervin (1999) defined information as *sense-made* because people think and seek for information in order to understand the world or to make sense of their being and living. In her well-known theory, *Sense-Making*, Dervin (1999) defined information as "sense-made that stands as a bridge over a gap between one time-space moment and another and simultaneously between material and interpretive worlds." (p. 739)

Several scholars, but not Dervin, have viewed information similarly. Therefore, Case (2002) assumed that: a) the information must be useful; b) its transmission or exchange is intentional; c) it must be represented in a recordable form; and/or d) it must be true.

In summary, information may exist in forms of a) things, objects, data, images, conversation, b) knowledge, and c) the process of its exchange, including the products of

information manipulation for intended purposes of information producers, seekers, and/or users such as problem solving and making sense of the world.

In the context of nursing, information is defined as data, text, documents, objects, knowledge, and conversations derived informally and formally from human information sources such as patients/families, discussions with colleagues, and professional conferences as well as from printed/electronic information sources such as patient charts/records, research databases, journals, books, standards, guidelines, and manuals (Clarke, 1999; French, 1999; Welsh & Lyons, 2001) for the purposes of fulfilling information needs of individual nurses in their nursing care and practice or for their personal purposes.

Information Need

Based on the literature review about definition of information need (Wilson, 1999) and of information (Dervin, 1999), as mentioned earlier, information need in context of nursing is defined as any desire to have data, information, and knowledge to answer questions, solve problems, make sense of nursing care and practice situations, and/or make decisions about their nursing care and practice; that is, any desire that could be potentially fulfilled and/or any question or problem that could be potentially solved in part through the use of information resources.   Information need(s) of nurses denotes a state of requiring information or knowledge as a result of having an information/knowledge gap for patient care and practice or for professional development (Fakhoury & Wright, 2000; Gosling et al., 2004; Royle et al., 2002).

Nursing Contexts

The context of information need in nursing has nurses as person-in-context. Nurses' information needs involve nursing care activities and their tasks or functions related to nursing care and practice.

Nursing activities. The nursing activities signify what nursing is and what function of nurses is (Halloran, 2004; Henderson, 1969). Nurses should perform nursing care with appropriate data, information, and knowledge in order to meet patients' needs and quality of care. Each nursing care activity requires a certain types and different degrees of data, information, and knowledge. In order to improve nursing care activities for the quality of care, it is crucial to know what information nurses need and use for each nursing care. Nonetheless, no study has investigated what information nurses need and use for each of these nursing care activities.

Tasks or functions related to nursing care and practice. Nurses perform their functions related to not only nursing care activities, but also other related-nursing care and -practice tasks as well. As such, nurses are classified into groups according to functions or tasks they perform. For example, nurse administrators or head nurses perform administration tasks; nurse educators perform teaching tasks either to nursing students or patients; nurse supervisors supervise nursing staff; staff nurses perform nursing care and practice to patients or clients; and nurse researchers conduct research to develop new and improved methods. In addition, practice nurses or staff nurses provide nursing care based on types of patients, problems or health conditions, and of nurses' specialties such as nurse midwives, medical/surgical nurses, intensive care unit nurses, community nurses, and advanced nurse practitioners (Henderson & Nite, 1997).

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Information Needs in Nursing Contexts

In the patient care and nursing context, the information needs of nurses involve

factors such as nursing care activities, nurses-related tasks, times related to patient care, and

the settings under which patient care is taking place, patient expectation, a magnitude of

information need, and purposes of information needs. These factors affect the nurses'

information needs, which in turn affect the information uses of nurses. Nursing care

activities and nurses-related tasks are described above. What follows describes the rest.

Time related to patient care. Time related to patient care specifies the information

needs and uses of nurses. Problems in patient care for specific contexts requiring

information to solve may arise either during nursing care delivery (patient encounter) or after

giving patient care. Researchers found that about 72% of information seeking of nurse

practitioners occurred during patient encounters (while patients were still in the clinic).

During the provision of patient care, the need of information for an individually cared patient

is positively related to the information seeking incidence (Cogdill, 2003; Rasch & Cogdill,

1999). At a nurse's work place, information related to direct patient care was needed and

sought during patient care whereas information for non-direct care such as nursing education

was needed and sought when nurses had free time (Royle, Blythe, Potvin, Oolup, Chan,

1995).

Settings. Settings under which patient care taken placed also affect the information

needs of nurses. Different patients require different nursing care resulting in different

information needs and uses. The information needs of nurses depend on the complexity of

patient care context (Thompson, 1999) as well as nurses' clinical domains such as intensive

nursing care, medical-surgical nursing care, etc. Thompson et al. (2001a) found that the

nurses' clinical domains tended to influence information sources used more than do nurses'

education (Thompson et al., 2001a). Educational attainment did not account for the

information needs and uses in nurses from 6 medical, 6 surgical, and 3 coronary care units

(CCU) from 3 hospitals in the United Kingdom. CCU nurses needed information about

advanced nursing care more than about primary care. They tended to use written information

such as clinical guidelines and protocols more than practice nurses or nurses in general units

(Thompson et al, 2001b). They also had more positive attitude toward the technologies for

local guideline and online databases than did other nurses (Thompson et al., 2001a).

Besides settings, the patient's expectations and a magnitude of information need are also

important factors.

Patient's expectation. Patient's expectation causes nurses to need and seek for

information. Rasch and Cogdill (1999) and Cogdill (2003) found that during the week after

clinical patient care nurse practitioners sought information because they perceived that

patients expected nurses to know and to have information for them.

Magnitude of information need. The magnitude of information need stimulates the

information use of nurses. Rasch and Cogdill (1999) and Cogdill (2003) found that the more

nurse practitioners need information, the more they use it (r =0.57, p <0.05). However, not

every information need is pursued. Even though more than a half of the incidences of

information-need were pursued, the frequency of pursuing the needed information was only

two thirds of the frequency of the information needs. Nurse practitioners needed information

weekly, but they may seek biweekly.

Purposes of information need. Nurses need information for patient care and practice

and for professional development. For patient care, nurses need several kinds or domains of

information. Examples of information needs of nurses are found in a study by Cheng (2004).

The researcher conducted a study about the information needed from proposed clinical

questions by clinicians, including nurses, in 44 Hong Kong public hospitals. According to

the mail survey in a sample of 1,565, with overall response rate of 52 %, only 31.4%

answered the first question asking the clinicians to post a clinical question in the survey.

The researcher found that nurses asked questions related to patient/problem only (40.7%),

intervention only (22.1%), or both (33.7%). However, most information requested by nurses

was about equipment or technology (30% of clinical questions). This study showed that

nurses needed information non-directly related to patient care more than directly related to

patient care. This finding showed that in the patient care context nurses may seek or not seek

the information, which they do not have. Instead, nurses seek the information, which they

need or are interested in.

For personal and professional development, nurses needed information in obtaining

their educational degree (Urquhart & Davies, 1997; Gosling et al., 2004), filling gaps of

knowledge (Gosling et al., 2004; Fakhoury & Wright, 2000), confirming their knowledge

(Urquhart & Davies, 1997), and conducting research studies (Gosling et al., 2004).

Several investigators found that nurses needed and sought information for

professional development, personal use, and non-direct patient care purposes more often

than for patient care (Cheng & Lam, 1996; Gosling et al., 2004; Lundeen, Tenopir, &

Wermager, 1994; Urquhart & Davies, 1997), even though some found the opposite (Royle,

DiCenso, Bolin-Cummings, Deber, & Hayward, 2000). The conflicting findings may be a

result from most studies that asked nurse respondents for their information uses in general,

not specifically in real time clinical practice as Blythe and Royle (1993) and Royle et al.

(2000) did in their studies. Blythe and Rolye (1993) conducted an ethnographic study by observing the information needs of 32 nurses at a hematology and oncology unit, by semi-structured interviewing 16 nurses, and by using a questionnaire survey to all of 32 nurses. Royle et al. (2000) conducted a study by using focus groups, online questionnaire survey, and online tracking system to record the uses of online information system by 44 nurses from a medical unit at a tertiary teaching hospital in Canada.

In summary, in the clinical care context, the needs for information by nurses are related to nursing care activities and nurses' role-related functions, times related to patient care, the settings under which patient care is taking place and complexity of patient problems or patient care, patient expectation, a magnitude of information need, and purposes of information needs and uses. In general, nurses reported the need for information for professional development more than for patient care. In the real time practice, nurses need information for patient care more than for professional development. However, no study has been conducted to assess what information nurses need and use for their specific nursing care activities.

<center>Situation-Gap-Bridge Relevant Factors</center>

Activating Mechanism

Rarely, do studies and literature on the information needs and uses of nurses mention that the information needs of nurses are activated by uncertainty from not knowing and that nurses use stress-coping strategies to reduce the uncertainty by making a decision to seek information. Instead, the studies and literature focus on decision making to solve clinical problems being the activating mechanism of the information needs and uses in nurses.

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According to Crow et al. (1995), the decision making to solve clinical problem in nursing is pertinent to evaluation or judgment about a condition. To judge a condition, nurses use knowledge, experience, intuition, and cognitive ability for their clinical decision making (Benner et al., 1996). When nurses have information needs and when the time comes to decide on which information source can be used for making decisions on patient care, nurses use both their cognitive strategies and task complexity to select the source.

In making a decision by using cognitive strategies, nurses may use either *hypothetic-deductive reasoning* (White, Nativio, Kobert, & Engberg, 1992) or *domain-specific knowledge structure* (Crow et al., 1995).

With respect to the hypothetic-deductive reasoning, two types of reasoning: inductive and deductive are used. In the inductive reasoning, hypotheses of patient problems are generated from data collection. Then, in the deductive reasoning, the hypotheses are used to determine what information needed to accept or reject the hypotheses (Buckingham & Adams, 2000). Similar to physicians, nurse practitioners, whose roles are primary cares under physicians' supervisions, decide the etiology of the patient's problems based on their data collection and then they decide to confirm and solve the patient's problems by seeking the needed information. For example, a nurse practitioner performs Pap smear to have result information in order to confirm the hypothesis, set that abnormal discharge is a sign of cervix cancer (White et al., 1992).

In regard to the domain-specific knowledge structure, nurses use their cognitive strategies to categorize problems either by the core concepts or a set of procedural rules (e.g. child care, medical-surgical nursing care). The categories in the core concepts can help nurses to recognize what problems requiring information to solve. The procedural rules

provide nurses with strategies to gather and combine data and information (Crow et al., 1995).

An example of nurses using domain-specific knowledge structure to seek information for clinical decision making is found in a study by McCaughan et al. (2005). The researchers conducted a survey in 146 British nurse practitioners and practice nurses, in-depth interviewed in 33 of them, observed their real-time information consultants for clinical decision making for 120 hours, and conducted a documentary and resource audit at each nurse's work place. The researchers identified that nurses need information for their clinical decision making related to assessment, diagnosis, intervention, patient education, referral, service delivery and organization, and information seeking for specific aspect of practice. However, the researchers found that most decisions requiring consulting with information source(s) were related to interventions; for instance, what intervention works for targeted or specific patients, what is the best timing to intervene, and which prevention strategies work best for patients.

Thompson (1999) argued that a decision to seek what information is based on not only nurses' cognitive strategies for categorizing the domain-specific knowledge and *hypothetic-deductive reasoning*, but also other factors such as complexity of clinical problems or nature of tasks.

Regarding the task complexity, the use of information depends on the nature of the clinical problems or tasks (Thompson, 1999). For example, a study by Teekman showed that in nurses' non-routine tasks and their reflective thinking to complete tasks nurses may use different information sources with different processes of reflective thinking. The reflective thinking process can be displayed as a pyramid: "thinking for action" (at the bottom of the

pyramid), "thinking for evaluation" (middle), and "thinking for critical inquiry" (top). In the thinking-for-action process, which is focused on here and now, nurses may use their own experience and available and close-at-hand information sources such as their available colleagues. In the thinking-for-evaluation process, which needs multiple perceptions and responses, nurses may employ many kinds of information sources from human information sources to printed information sources. With regard to the process of thinking for critical inquiry, which is highest on the reflective thinking pyramid, nurses may use the highest level of information sources such as research.

In conclusion, generally nurses need information according to the specific domains, which are assessment, diagnosis, intervention, patient education, and other aspects of services in general. The use of information sources depend on nature and complexity of nursing care problems and tasks. No studies have investigated whether nurses need and use information specifically to nursing care activities such as health evaluation and planning for patient care, fundamental nursing care activities, procedures, measures, and technique nurses perform to health patients and health care teams, and symptomatic nursing care activities.

Intervening Variables

Intervening variables of the information needs and information uses of nurses include psychological factors, demographic variables, role-related or interpersonal factors, environmental factors, and source characteristics.

Intervening Variables: Psychological Factors

Attitude toward information and technological system (Royle et al., 2000) and awareness of information (Gosling et al., 2004; Griffith & Riddington, 2001) are psychological factors intervening the information needs and uses of nurses.

Attitude. Attitude toward the information and the technological system (Royle et al., 2000) also affect the use of information. Positive attitudes enhance whereas negative attitudes thwart information uses. Gosling et al. (2004) investigated how 3,128 Australian nurses used online clinical evidence and what factors influenced their uses. The researchers used a quota sampling that required 25% of nurses working at each hospital from 81 hospitals in New South Wales, Australia, to complete a 25-item questionnaire. The questionnaire asked the respondents about their reasons for and attitudes about using the Clinical Information Access Program (CIAP), which was available at the point of care and at home. The quota was met when 3,128 nurses from 65 hospitals (84%) answered the survey. The researchers found that Australian nurses, who have positive attitudes such as viewing using clinical information and database system as a part of their role, used the information system more frequently than did nurses, who did not have this view (P<0.5). Bawden and Robinson (1997) found that British nurses, who had a rather negative attitude to certain publications and databases such as CINAHL and MEDLINE, rarely used CINAHAL and MEDLINE because they thought that these databases are "too American" and "too medical." Also, some British nurses did not use research because they did not see as it is their responsibility to use research in practice. They viewed that using research put another burden on nurses (McCaughan et al., 2002). Besides time, American nurses saw a lack of value for research in practice as the first barrier to their using research (Pravikoff et al., 2005).

Awareness. Awareness of information availability was found as an influential factor in some studies. Gosling et al. (2004) found that the more awareness, the more use. Among 1,791 Australian nurses who heard about the availability of clinical information and database system, 74 % of these nurses use it. Because of not knowing the databases and unawareness

of their existence, most of 310 nurses in Hong Kong did not use the databases (Cheng & Lam, 1996).

In summary, positive attitudes toward information and technology system and awareness of information facilitate information uses of nurses. Negative attitudes toward information and unawareness or not knowing information impede the information uses of nurses.

Intervening Variables: Demographic Variables

Some studies found that age, education as well as knowledge base, and years of experience affect information needs and uses.

Age. Age was found to influence the information needs and uses in some studies. Chan, Brew, and de Lusignan (2004) conducted a survey study about electronic information uses in 105 community nurses working at a primary care center in a mixed urban and rural county in England. Most of the 67 nurses, who responded to the survey, were older than 40. The researchers found that age was a factor influencing the use of information resources and systems. Even though older nurses (50 and over) had more training about computer use, they tended to feel less confidence in using computers, email, and the Internet than younger ones. Significantly, the older nurses had lower confidence in using electronic medical records than the younger nurses ($p < .001$). However, this study employed a small sample of nurse respondents from only one setting.

Education. Education, either for degree attainment or training for knowledge and skill enhancement, affects the information needs and uses of nurses in some studies (Cogdill, 2003; Gosling et al., 2004; Rasch &Cogdill, 1999; Royle et al., 2002).

Rasch and Cogdill (1999) and Cogdill (2003) found that in a study of 134 American nurse practitioners (NPs) (44.6% response rate) Master's degree and post-Master's degree prepared NPs had significantly higher information needs than did non-degree prepared NPs ($p<0.5$). Royle et al. (2002) found that in long term care organizations Canadian nurses with higher degrees had more information needs and more use of printed information than did nurses with lower degrees. Gosling et al. (2004) reported that in Australian clinical nurse consultants, clinical nurse educators, and nurse educators, who have at least a post-registration certificate, showed more frequent use of information system and databases than did student nurses, registered nurses, and post-basic qualification clinical nurse specialists. By asking 144 British nurses in a hospital to answer the survey about the use of computer as well as knowledge, confidence, and frequency of using the databases, Griffith and Riddington (2001) found that among 82 British nurses (72 % response rate) more degree-educated nurses indicated more CINAHL use than did lower degree-educated nurses ($p<0.05$).

With regard to training, researchers found that training in database use increased specificity and sensitivity in finding needed information and performance of searching information in clinicians, including nurses (Cheng, 2003; Griffith & Riddington, 2001), and nursing students (Shorten et al., 2001). Gosling et al's study (2004) found that training had no effect on frequency of use, but helped in finding the needed information. Also, they found that 341 (63%) of 537 nurses, who heard about the clinical information system, indicated lack of training in online information systems as the first reason for not using the information system. Wozar and Worona (2003) concluded from their study, in which they

trained 8 nurses how to use electronic information databases, that if nurses were trained, they would use these information systems.

Knowledge base. Knowledge base is related to perception of and knowledge about information as well as skills in using information/information source. A lack of information/knowledge as well as computer skills and information and technological skills influence information uses (Cheng & Lam, 1996; Dee & Stanley, 2005; Gosling et al., 2004; Griffith& Riddington, 2001; Royle et al., 2000, 2002; Tanner et al., 2004; Wozar &Worona, 2003). These factors are described in more details below.

Knowledge base: a lack of information/knowledge affects the needs and uses of information of nurses by either stimulating or hindering nurses to need and use information. Nurses need and use information because they perceive a lack in a particular information and knowledge. Fakhoury and Wright (2000) found that community psychiatric nurses, who did not have training skills on successful management of severe mental illness, reported 8 times more likely to have information needs than did nurses, who indicated having training skills on this topic (p< 0.05). The lack of training skills and knowledge on management of severe mental illness motivated the community psychiatric nurses to need information on this topic and other mental care related information. McCaughan et al. (2002) found that some nurses did not use/utilize information or research because they have a lack of knowledge in how to use or evaluate the research. In addition, some researchers found that a lack of other language skills such as English was a barrier to use research. One hundred percent of 253 (80% response rate) Finnish nurses (Oranta, Routasalo, & Hupli, 2002) and 54 % of 237 (70% response rate) Swedish nurses (Kajermo et al., 1998) saw research published in foreign language (English) as a barrier to utilize research. Swedish nurses emphasized enhancing

knowledge of research and skills in literature search as important facilitators. They also indicated communication styles of research as facilitators. Among the research communication styles, they suggested that research should be translated to Swedish (Karjermo et al., 1998).

Knowledge base: computer skills affect computer-mediated information use (Gosling et al., 2004; Royle et al., 2000; 2002; Secco et al., 2006; Thompson et al., 2001a; 2001b). Gosling et al. (2004) found that computer skills were positively related to the online information use. Nurses who rated their computer skills as good, very good, or excellent used information system and databases more than did nurses who rated their computer skills lower than good (t=-15.5, df 1807, p<0.05). Secco et al. (2006) conducted a survey study in information uses of 400 pediatric nurses from a children hospital in Canada. Results from 113 nurses significantly showed that nurses with better computer- and literature-database search skills had more uses of computer-based information. However, this study received a rather low response rate (25% response rate). Similar to Gosling et al. and Secco et al's finding, results of Chan et al's survey study (2004) in 67 primary care nurses in the UK suggested that older British nurses who lacked computer skills tended to use information from books more than computer-mediated information. Analogous to others' findings, the findings from a study by Thompson et al. (2001a) suggested that British nurses used computer-mediated information less than other printed information sources, and human-information sources. Nurses reasoned that the computer-mediated information was less convenient and less applicable to clinical practice, when compared to human information source, and that its access required information and computer skills.

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Knowledge base: information and technology skills influence information use,

particularly electronic information/research databases, of nurses in some studies (Griffith &

Riddington, 2001; Tanner et al., 2004). Tanner et al. (2004) and Pravikoff et al. (2005) found

that most American nurses did not use electronic database information because they had a

lack of information literacy skills, which are the ability to search, locate and retrieve needed

information, evaluate, and apply the needed information appropriately.   Compared to

physicians, nurses reported fewer amounts of use and frequent uses of electronic information

(Cheng & Lam, 1996; Estabrooks, O'Leary, Ricker, & Humphrey, 2003) and were less

successful in finding the information they wanted (Cheng & Lam, 1996). In addition, few

nurses used electronic information and applied searching strategies (Cheng & Lam, 1996;

Pravikoff et al., 2005; Tanner at al., 2004; Urquhart & Crane, 1994). More than 70 percent

of Hong Kong nurses (n=310) did not know the information system service provided by the

hospital libraries and 90 % did not use electronic information because they did not know the

search methods (Cheng & Lam, 1996). Similarly, Royle et al. (1995) found that 44 Canadian

nurses, who were instructed in 2 hour information search, whose working unit was equipped

with computer and information/ database system, and who were allowed to utilize the

information system for 6 months, had greatest difficulties in formulating search questions

and choosing the appropriate search terms. Searching skills were viewed as one among other

barriers (computer skills, time, and access) to electronic information use in these nurses. In

addition, researchers found that lacks of confidence and skills in using information

technology were a reason for not using electronic information in British and American nurses

*(*Griffith, & Riddington, 2001; McCaughan et al., 2005; Tanner et al., 2004; Pravikoff et al.,

2005).

Years of experience.   In the information need and use studies among nurses, researchers found that years of experience as a nurse may or may not affect nurses' information needs and uses. Benner (1984) found that novice, advanced beginner, competent, proficient, and expert nurses use information and knowledge differently. Novice and advanced beginner nurses use "knowing that" knowledge or theoretical knowledge, which comes from theories, rules, guidelines, and principles found in textbooks, more than do proficient and expert nurses. Proficient and expert nurses, who have been in clinical practice at least 5 to 6 years, use "knowing how" knowledge or practical knowledge, which comes from their experiences, more than do novice and advanced beginner nurses. According to studies in 146 primary care nurses (McCaughan et al., 2005) and in 122 acute care nurses in British (Thompson et al., 2001a; 2001b), researchers interviewed, asked nurses to sort Q-statements, and observed, including made information source audits, about nurses' perception and use of information in relation to the information accessibility and usefulness (McCaughan et al., 2005; Thompson et al., 2001a; 2001b) as well as barriers to research utilization (McCaughan et al., 2002). The researchers found that senior nurses in primary and acute care tended to use human information more than printed information because the senior nurses valued clinical specialists and experienced colleagues more than printed information. However, based on the above studies, Thompson, Cullum, McCaughan, Sheldon, & Raynor (2004) suggested that the clinical experience is a weak predictor of printed information uses in these primary and acute nurses. Gosling et al. (2004) reported that senior nurses (clinical nurse consultants, clinical nurse educators, and nurse educators) with more than 5 years of full-time post-registration experience used information system and databases more frequently than did student nurses, registered nurses, and clinical nurse

specialists with 3 year experiences in relevant specialist fields. However, this finding did not show statistical significance. Similarly, Rasch and Cogdill (1999) and Cogdill (2003) did not find a relationship between years of NP experience and information needs and uses.

In brief, age influences the information uses of nurses. Older nurses use computer-mediated information less than do younger nurses (Chan et al., 2004). Nurses with higher educational degree, more knowledge base of using information tools such as computer and information technology, and with more training in information use have more information needs and uses than do nurses with less educational degree, knowledge base, and training (Cogdill, 2003; Gosling et al., 2004; Rasch & Cogdill, 1999; Royle et al., 2002). Nurses with a lack of computer skills and information skills use computer-mediated information less than other printed information and human-information (Chan et al., 2004; Gosling et al., 2004; Thompson et al., 2001). Even though some researchers found that years of clinical experience affect information uses (McCaughan et al., 2002; 2005; Thompson et al., 2001), others found no relationship between years of experience and information uses (Cogdill, 2003; Gosling et al., 2004; Rasch & Cogdill, 1999). Overall, Thompson et al. (2004) suggested that role, clinical experience, and education attainment are weak predictors of printed information use by nurses.

Intervening Variables: Role-related or Inter-personal Factors

Role and related tasks. Nurses' role and related tasks are found to influence information needs and uses in some studies (Cogdill, 2003; Fakhoury & Wright, 2000; Leckie et al., 1996; Lundeen et al., 1994; Rasch & Cogdill, 1999; Royle et al., 2002; Thompson et al., 2001a; 2001b).

Nurses' role and related tasks influence not only what information nurses need (Cogdill, 2003; Gosling et al., 2004; Leckie et al., 1996; Rasch & Cogdill,1999), but also the hierarchy and quality of information sources they use (Royle et al., 2002). As suggested by a general model of information seeking of professionals, including nurses, proposed by Leckie et al. (1996), work roles and associated tasks specify characteristics of information needs, awareness of what information is needed and available, and which sources should be used. For example, nurse administrators require information on staffing, workload, and budgeting whereas clinically administrative nurses need clinical-related information such as information on tracking equipment, medications, reports, patient admission, transfers, and discharges. Nurse practitioners, whose major role is treatment intervention under supervising physicians, needed information about drug therapy, diagnosis, and other therapy-related information (Rasch &Cogdill, 1999; Cogdill, 2003). In a study using semi-structured interviews, several of 50 British midwives in Bawden and Robinson's study (1997) expressed their needs of information relevant to their role such as pre-conceptual and post-natal care and information on current hot topics such as water births. Fakhoury and Wright (2000) reported that about 76% of 110 (55 % response rate) community psychiatric nurses in the United Kingdom indicated the need for information regarding mental illness. Information about mental health law, state benefits, voluntary services, and therapy were the most frequent information needs. In a study of 133 survey participants (78.4 % response rate) from a community agency, 47 participants (83.9%) from nursing homes and 42 focus group participants from both agency and nursing homes, Royle et al (2002) observed that the quality of information matters more to nurses in advanced roles (management and policy making nurses) than it does in lesser roles (nurse aides and LPNs). Thompson et al. (2001a;

2001b) found that British nurses in coronary care units (CCU) tended to rely on local

protocols and guidelines, drug related-printed information sources, and pharmacists in their

primary care more than did medical and surgical nurses.

In short, nurses need and use information relevant to their nursing role and related

tasks. Role and related tasks denote what information nurses need and use. Advanced role

nurses have more use of printed information than do lower role nurses (Royle et al., 2002).

Intervening Variables: Environmental Factors

Organizational factors. Researchers found that organizational support (Bawden &

Robinson, 1997; Gosling et al., 2004; McCaughan et al., 2002; Royle et al., 2002), time

provided by organizations to use the information (Dee & Stanley, 2005; Gosling et al., 2004;

McCaughan et al., 2002; Royle et al., 2000, 2002; Wozar & Worona, 2003), and

organizational culture (McCaughan et al., 2002) affect the information needs and uses of

nurses.

Organizational supports include budget, information/knowledge and technological

provision, and personal and peer supports for the facilitating information needs and uses of

nurses. A lack of the organizational supports hinders whereas presence of such supports

facilitates information uses and research utilization of nurses (Oranta et al., 2002).

Organizational support: budget is a barrier found among other organizational

supports affecting information needs and uses of nurses. Lacking budgetary support of a

hospital organization for the availability, accessibility, and uses of information system was

identified as a barrier to information use of nurses in Britain (Bawden & Robinson, 1997).

American nurses and other health care professionals in Lundeen et al.'s study (1994)

suggested that health care organizations should provide sufficient budget to allow for

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accessible and available information/technology system in order to increase the information uses.

Organizational support: information/knowledge and technology provision influence information needs and uses in some studies. Some researchers found that nurses were information underserved, in comparison to physicians (Bawden & Robinson, 1997; Cheng, & Lam, 1996). As already mentioned above (Information source characteristics) a lack of organizational provision of training on how to use information (Gosling et al., 2004; McCaughan et al., 2002; Royle et al., 1995), and a lack of access to information (Lundeen et al, 1994; Fakhoury & Wright, 2000; McCaughan et al., 2002; Royle et al., 1995) were found to be barriers to information needs and uses of nurses in many countries. American nurses indicated that improving availability and accessibility of research reports, enhancing more administrative and colleague supports, and providing education and research knowledge can facilitate research utilization (Carroll, Greenwood, Karen, Sullivan, Ready, & Fitzmaurice, 1997).

Organizational support: personal and peer support is another important factor influencing information needs and uses of nurses. Bawden and Robinson (1997) found that information use in nurses was hindered by limited (a lack of) understanding of their roles and information needs by librarians and other information providers. Gosling et al. (2004) reported that the frequency of information system uses of Australian nurses is positively related to support from their supervisors, colleagues, and other hospital staff (p<0.05).

Time provided to use information is another organizational factor posing a barrier to information uses and research utilization of nurses (Gosling et al., 2004; McCaughan et al., 2002; Royle et al., 2000; Royle et al., 2002). Gosling et al. (2004) found that 210 (39%) of

537 Australian nurses who did not use information systems indicated a lack of time as a reason. American nurses suggested increasing time available for reading and utilizing research as the first facilitator to research utilization (Carroll et al., 1997).

Organizational culture includes values, norms, beliefs, and assumptions that are implicitly and explicitly embraced in organizations (King & Anderson, 2002). McCaughan et al. (2002) suggested that organizational cultures such as workload, resistance to change to making decisions based on research hinder information needs and uses of British nurses.

In short, for environmental factors regarding the organizational supports, studies reveal that budgetary support, provision of information, support for knowledge and technology, as well as personal and peer support, and time provided for information search facilitate information uses of nurses. Environment factor with respect to organizational culture such as workload and resistance to change to research based practice hampers information needs and uses of nurses.

Intervening Variables: Source Characteristics

According to NCNR (1993), accuracy, timeliness, and utility, including accessibility and quality of information affect the needs and uses of information by nurses. In another word, not only does the quality of information, but also the information attributes such as availability, accessibility, and usefulness of information affect the use of information sources, as the following details.

Quality. Quality of information derives from its suitability for solving problems and filling a knowledge gap. In clinical practice, particularly the practice emphasizing the use of research evidence such as evidence-based practice, clinical trials are the highest quality information. Nurses valued the quality of information for its accuracy and reliability

(Bawden & Robinson, 1997; Blythe & Royle, 1993; Thompson et al., 2004). Quality of information mattered to some nurses (Blythe & Royle, 1993; Urquhart & Davies, 1997) although it did not in others (Bawden & Robinson, 1997; Dee & Stanley, 2005; Royle et al., 2000). However, nurses who were concerned about the quality of information were also found to prefer information that is considered concise, less time consuming, applicable, useful, and accessible (Bawden & Robinson, 1997; Blythe & Royle, 1993; Pettigrew, 1996; Thompson et al., 2001a, 2001b, 2004). According to studies by Thompson et al. (2001a, 2001b, 2004), McCaughan et al. (2002), and McCaughan et al.(2005), even though nurses in the study by McCaughan et al.(2005) indicated using personal experiences more than any other sources in making decision, the findings of these three studies suggested that nurses made decisions in their clinical practice by using information from human information sources such as nurse specialists and their experienced colleagues, more than from printed information sources. Nurses did so because they considered nurse specialists and experienced colleagues as trustworthy and reliable as well as more accessible, useful, applicable, and more time-efficient sources of information than the printed information sources (Thompson et al., 2004).

Availability. Availability describes the presence and ready- to-use of information. Pravikoff et al. (2005) conducted a survey of American nurses to explore information needs, uses, searching strategies, and research utilization in order to estimate their readiness for evidence-based practice. The researchers used geographically stratified random sampling to select 3,000 nurses, whose names were generated from a list of more than 2 million nurses nationwide. The researchers used a response percentage of the 2000 National Sample Survey of Registered Nurses (Spratley, Johnson, Sochalski, Fritz, & Spencer, 2001) in deciding on

the percentages of a mail-out for each region as their geographic stratification. For example, only 10.5 % of nurses in the Pacific region responded to the national survey; therefore, the researchers mailed 10.5% of 3,000 questionnaires to nurses in this region. The researchers found that even though 53 % of 760 American nurses indicated that their work places provided them with access to electronic information, about 50 % of them reported that the provision was inadequate. They mentioned that in its inadequacy the provision may hinder the electronic information use of these nurses.

Nurses in Thompson et al. (2001a) appeared to use human information sources more than printed ones because the human sources are "close at hand" to these nurses. Acute and community nurses in Plymouth, England used information from their colleagues more than printed source because colleagues were more available and accessible than printed information (Urquhart & Crane, 1994). In addition, Swedish nurses in Kajermo et al's study (1998) ranked limited availability as the first barrier to research utilization (rated as moderate or great barrier). McCleary and Brown (2003) conducted a study of 176 Canadian pediatric nurses (33.3 % response rate) and found that their respondents rated the research reports that were not compiled in one place as the second greatest barrier to research utilization whereas no time to read the research was considered the primary barrier.

Accessibility. Accessibility of information denotes the easiness to physically and intellectually access and use information (Thompson et al., 2001a). Most nurses preferred to use information that is accessible, convenient, easy to use, applicable, and fast (Bawden & Robinson, 1997; Dee & Stanley, 2005; Royle et al., 2000; Thompson et al., 2001; Urquhart & Davies, 1997). Thompson et al., (2004) ascertained that even though there is available and accessible printed information, nurses used human information sources more than printed

ones when making a decision in clinical practice. Nurses used research-based information and printed information for professional development. Printed information of clinical trials, guidelines, and protocols were also used for resolving conflicts between colleagues. Researchers concluded that human information sources are considered more accessible, more useful, less challenging, and requiring less critical appraisal than printed information.

Usefulness. Usefulness is defined as the ability of the information sources to help in answering nurses' clinical questions for their decision making (Thompson et al., 2001b). Thompson et al. (2001b) conducted a study in 122 British nurses from 6 medical care units, 6 surgical units, and 3 coronary units in three acute care hospitals. The investigators asked nurses to sort a Q-sample of information sources nurses viewed as useful. In addition, they interviewed 108 nurses, made 180 hour observations, and conducted a documentary analysis to refine and interpret the Q-sorts' results. The findings suggested that nurses used human-information more than printed information. These British nurses considered human information, particularly from clinical nurse specialists and experienced colleagues, as more useful than printed information. To them, the human information is more truthful, reliable, accessible, and more available than printed information. Similarly, nurses in Secco et al.'s study indicated information from colleague discussion having the greatest impact on nursing care (2006).

In conclusion, nurses use human-information more than printed information in their clinical practice. Human-information is more useful, accessible, and available for the tasks of clinical nurses in health care team. Nurses consider experienced colleagues and nurse specialists as reliable sources of information for their clinical practice. Nurses use research information, protocols, and guidelines less than human-information. Therefore, if research in

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any form is the highest quality information, quality of information does not matter as much as the quantity of information to clinical decision making in nurses.

<div align="center">*Bridge*</div>

Information Seeking Behavior

Few studies of information seeking behavior of nurses have paid attentions on the pattern of information seeking behavior, whether the behavior is classified as passive attention, passive search, active search, or on going search. However, some studies have investigated the information seeking behavior of nurses in the aspect of searching and retrieval strategies. The studies in these respects revealed the pattern of the library use and electronic information searching strategies (Cheng & Lam, 1996; Tanner, 2000; Tanner et al., 2004). These aspects are described in more details in the following section.

Information Processing and Use

Leckie et al. (1996) described information uses as information seeking, searching strategies, and information resources used. The focus of information processing and use studies in nurses is the information uses of nurses in relation to information sources used, including information/research utilization, information search strategies, and outcomes of using information.

Information Source Used

Some studies revealed that nurses use their own experience more than other information sources (McCaughan et al., 2002; 2005; Thompson et al., 2001a; 2001b, 2004; Teekman, 1997; Secco et al., 2006). However, besides using their own experience, nurses sought and used information from two main sources: human-information sources such as their colleagues and printed and electronic sources such as textbooks, reference manuals,

journals, and electronic databases. In their gathering information for nursing care, nurses in Secco et al's study (2006) indicated having the greatest use of interpersonal information sources such as their colleagues and electronic mails, followed by non-computer-based information sources such as textbooks and manuals, and having the lowest use of computer-based information sources. A study by Dee and Stanley (2005) found most of 25 nurses and 25 graduate nursing students in the United States used human-information source daily whereas they referred to printed-information source only on a weekly basis. From a total of 1,097 American nurse respondents to a mail survey (37% response rate), in which about 67% of 760 nurses are actively working in clinical settings, indicated that they always or frequently used information from their colleagues (Pravikoff et al., 2005). However, Urquhart and Davies (1997) found the opposite. According to their study in 210 nurses, midwives, and health visitors in the United Kingdom, Urquhart and Davies employed 4 weekly-sent questionnaires that asked for patient care purposes what type of information respondents needed and used as a result of critical incidents (situational problems that made respondents need information to be solved) during the past week. Results from 168 respondents, who answered the weekly critical incident questionnaire at least once (78% response rate), and from 434 returned questionnaires out of 840 weekly sent questionnaires (52% response rate) showed that respondents used ward reference's books (72%) more frequently than they asked colleagues (56%).

Nonetheless, most studies showed that nurses used human information more than printed information and they rarely used computer-mediated information such as electronic databases and research articles (Bawden & Robinson, 1997; Chan et al., 2004; Morris-Docker, Tod, Harrison, & Black, 2004; Royle et al., 2000; Royle et al., 2002). Nurses also

rarely used a library (Pravikoff et al., 2005; Tanner et al., 2004) and they used it less than

other health care professionals (Cheng & Lam, 1996). Pravikoff et al. (2005) found that 76

% of American clinical nurses (n=760) never used CINAHL and 58% never used MEDLINE.

In addition, more than 80 % rarely asked or did not ask for a librarian's assistance and they

never used a hospital library.

Especially with regard to information/research utilization, some researchers found

that nurses rarely utilized information/research into their clinical practice. Tanner et al.

(2004) and Pravikoff et al. (2005) reported that more than 50% of American clinical nurses

(n=760) did not use research to support their practice at all.

Search Strategies

With respect to the information search strategies, few studies have investigated the

information search strategies of nurses. These studies investigated the pattern of library use

and electronic search strategies (Tanner, 2000; Tanner et al., 2004; Urquhart & Crane, 1994).

For the library use, when information seekers need information, they have the option to ask

librarians or to look for information and retrieve it by themselves from card catalogs, book

shelves, and/or online databases. In electronic search strategies, the information seeker may

apply terms and keywords such as medical subject heading (MeSH), combine searches by

Boolean operators (AND, NOT, and OR), and refine a search by broadening, limiting,

truncating, and using database features (e.g., "limit fields," advance search) (Shorten et al.,

2001). These search strategies yield specificity and sensitivity of the needed information.

In her study conducted in 181 registered nurses (RNs) and 80 advanced nurse

practitioners (APRNs), with more than 30 % of response rate Tanner (2000) found that more

than 80 % of RNs and more than 50% of APRNs consulted a librarian less than 4 times a

year. More than 60 % and 50% of RNs did not use CINAHL and MEDLINE, respectively.

Approximately, 46% and 24% of APRNs did not use CINAHL and MEDLINE, respectively.

Just about 11 % RNs and 31 % of APRNs indicated their MEDLINE search as "successful".

Urquhart and Crane (1994) reported that majority of 70 nurses in Plymouth, England

used less than two information sources and no search strategies. From 1,097 mail survey

respondents (37.2%) but only 987 usable questionnaires, Tanner at al. (2004) reported that 75

% of American nurses did not use CINAHL and 55 % did not use MEDLINE. Among these

databases users, 6% and 6.5 % indicated poor CINAHL and MEDLINE search skills,

respectively.

Outcomes of Information Use

Regarding the outcomes of information use, the use of information has been found

to benefit nurses themselves and/or patient care. Urquhart and Davies (1997) found that 90

% of nurses (n=210) indicated that obtained information increased their knowledge and 86%

indicated that the information was immediately used. Ninety six percent of respondents

believed that information obtained would contribute to their future patient care and nursing

practice. Royle et al. (2000) conducted a study in 39 Canadian nurses by using an online

survey, record-tracking of information system use, interviewing, and focus groups.   The

researchers found that most nurses used information to make changes for their patient care,

especially for patient education (59.2%) and nursing interventions (33.3%). Gosling et al.

(2004) found that 85 % of over 3000 nurses, who answered the survey assessing online

information use at the point of care, believed that online information and databases can

improve patient care.

In short, except for one study (Urquhart & Davies, 1997), most investigations

revealed that nurses preferentially use information from human-information sources more

than printed sources (Blythe & Royle, 1993; Chan et al., 2004; Cogdill, 2003; Dee & Stanley,

2005; Pravikoff et al., 2005; Rasch & Cogdill, 1999; Royle et al., 2000; Royle et al., 2002).

Nurses rarely used computer-mediated information and electronic-database information

(Bawden & Robinson, 1997; Morris-Docker et al., 2004; Pravikoff et al., 2005; Royle et al.,

2000; Tanner et al., 2004). They also rarely utilized research into their clinical practice

(Pravikoff et al., 2005; Tanner et al., 2004). However, nurses indicated positive outcomes of

information uses either for nurses themselves or for patients (Gosling et al., 2004; Royle et

al., 2000; Urquhart & Davies, 1997).

The deviating finding of the study by Urquhart and Davies (1997) from others'

findings may be as a result of the study investigating the critical incident needing information

in real-time practice of nurses. Nurses in this study showed their needs and uses for reliable

information such as drug references. This finding showed that information attributes, clinical

situations, and other factors intervene on information needs and uses of nurses.

Studies of information needs and uses of nurses in other countries have been

reviewed. The following section is a review of the information needs and uses of nurses in

Thailand.

Information Needs and Uses of Nurses in Thailand

Available research studies on Thai nurses revealed aspects of research utilization and

what barriers to research utilization among Thai nurses are (Sindhu & Pookboonmee, 2001;

Tiloksakulchai et al., 2000; Assalee et al., 2004). No studies have been conducted to

investigate other aspects of information needs and uses of Thai nurses.

Sindhu and Pookboonmee (2001) used a proportionally random sampling of 1,500 BSN nurses working at public hospitals that have more than 250 beds nationwide. The number of required nurse samples (470) that were expected to answer the survey is based on 1 percent of 47,000 clinical BSN registered by the Thai Nursing Council. The researchers mentioned that they randomly sampled 50% of target hospitals and proportionally selected a number of nurses in each hospital. Nonetheless, they did not mention how many target hospitals participated in the survey. They accidentally sampled nurses in each selected hospital by mailing the questionnaires to the head nurse of each selected hospital and asking the head nurse(s) or coordinator(s) to distribute to and collect the questionnaires from nurses. Seven hundred and seventeen nurses returned the questionnaires (47.8 % response rate).

About 88% of nurse respondents in this study had a baccalaureate degree in nursing. Only 17% of nurses indicated that they had utilized research in their clinical practice. More than 80% ranked unavailability and inaccessibility of research as the most important barrier to research utilization. Approximately, 74% did not feel capable of evaluating the quality of the research, and 65 % indicated insufficient time on the job to implement the research or new ideas as a barrier. Moreover, the attitudes of Thai nurses in this study toward research were rather poor. Almost half of them believed it was not necessary to use research in making changes in nursing practice. They did not see a value of research for practice (40.7%) and perceived that they received little benefit from research (39.8%). In addition, it was found that baccalaureate-degree nurses perceived more barriers to utilize research than Master's degree nurses (Sindhu & Pookboonmee, 1999 (p<0.05).

In the investigation of nurses' research utilization, Tiloksakulchai et al. (2000) used a quota sampling to study 1,033 nurses by enrolling 25% of Thai nurses working in each

hospital at eight university-affiliated hospitals. Similar to Sindhu and Pookboonmee's (2001) using the accidental sampling technique to obtain samples, the researchers asked the head nurse(s) or coordinator(s) at each hospital to distribute to and collect the questionnaires from nurses within two weeks after the questionnaires arrived at the hospital. The researchers accepted as valid questionnaires if they were returned within a month after distribution. Results of their study showed that more than 90 % of nurses had a baccalaureate degree in nursing. Approximately, 45% of nurses had applied research in their clinical practice. Nurses in this study indicated time as the primary barrier (61.8%), no support from administrators as second (33.5%), and no support from nursing colleagues as third (30.1%). Moreover, 23% indicated unavailability of information and research resources as barriers.

Assalee et al. (2004) surveyed a sample of Thai nurses working in surgical peri-operation rooms. A random sampling from about 2000 nurses who attended a national conference about peri-operation nursing was employed to obtain 400 nurses. Based on 292 nurses, who responded to the survey (73 % response rate), just over 70 % of nurses had a baccalaureate degree. About 34% of nurses reported that they used to utilize research in their clinical practice. The respondents rated being isolated from colleagues with whom they could discuss research findings as the first barrier (73.3%), not seeing the value of research to practice as the second barrier (71.2%), and inadequate facilities for research implementation as the third barrier (62.3%). Moreover, they ranked relevant research literature not being compiled in one place as the fourth barrier and unavailability of research reports as the sixth barrier among the top ten barriers.

Taken together, Thai nurses rarely applied research information in their clinical practice. Thai nurses have rather poor attitude toward research. They did not regard it

necessary to use research and did not see the benefits of using research for their practice. They also view themselves as not having sufficient knowledge and capability to evaluate the quality of research. Unavailability and inaccessibility to research, no time on the job to implement research, and no supports from administrators and colleagues are major barriers for their research utilization.

Summary

Studies about information needs and uses have revealed major interesting points for both findings and methods.

Findings

In the context of nursing, nurses need and use information for patient care as well as for personal development (Gosling et al., 2004; Royle et al., 2000; Urquhart & Davies, 1997). However, in the clinical care context, human information sources are generally preferred over printed sources (Blythe & Royle, 1993; Cogdill, 2003; Dee & Stanley, 2005; Rasch & Cogdill, 1999; Royle et al., 2000; Royle et al., 2002; Thompson et al., 2004; Urquhart & Davies, 1997). Decision making to solve a problem, based on information, activates the information need of nurses. Nurses need and seek information by using both "domain-specific knowledge" strategies and "hypothetic-deductive reasoning" (Crow et al., 1995; White et al., 1992). In addition, complexity of problems and nursing care influence what information nurses need and use (Thompson, 1999). Quantity of information is valued more by most nurses than is the quality of information (Bawden & Robinson, 1997; Blythe & Royle, 1993; Thompson et al., 2004). Major intervening variables related to psychological, demographic, and role factors of information uses include attitude to information and practice (Royle et al., 2000), awareness of information and information technology (Gosling

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et al., 2004; Griffith & Riddington, 2001), nurses' roles, age (Chan et al., 2004), education (Cogdill, 2003; Fakhoury & Wright, 2000; Gosling et al, 2004; Rasch & Cogdil,l 1999; Sindhu & Pookboonmee, 2001), knowledge base such as computer skills, information and technology skills (Gosling et al., 2004; Griffith & Riddington, 2001; Royle et al., 2000; Secco et al., 2006; Sindhu & Pookboonmee, 2001; Tanner et al., 2004), and English skills (Oranta et al., 2002; Kajermo et al., 1998). Information source characteristics that affect information uses include availability, accessibility, and usefulness of information (Assalee et al., 2004; Royle et al., 2002; Sindhu & Pookboonmee, 2001;Thompson et al., 2004; Tilokskulchai, Apanakapnt, &Karnchanakunakorn., 2000; Wozar & Worona, 2003). Environmental factors influencing information uses of nurses consist of organizational supports for budget, time, and knowledge and information provision (Bawden & Robinson, 1997; Royle et al., 2002). Urgency of information needs and confidence in using information are activation mechanism for the information needs and uses of nurses (Cogdill, 2003; Tanner, 2000).

Methods

Regarding the studies' methods, the review revealed that in formation need and use studies employ either quantitative methods such as mail surveys (Assalee et al., 2004; Chan et al., 2004; Pravikoff et al., 2005; Sindhu & Pookboonmee, 2001; Tanner at al., 2004; Tilokskulchai et al., 2000), qualitative methods such as interviews (Royle et al., 2002;), or mixed methods such as using a combination of mail questionnaires, interviews, and observation for data collections (McCaughan et al., 2002, 2005; Thompson et al., 2001a, 2001b). Descriptive mail surveys are predominantly used to investigate information needs and uses of nurses in general (Griffith & Riddington, 2001; Pravikoff et al., 2005; Sindhu &

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Pookboonmee, 2001; Tanner et al., 2004; Tilokskulchai et al., 2000). Online questionnaire

and tracking records of information system uses are also employed to investigate both

information needs and uses of nurses in general and in real-time practice (Gosling et al.,

2004; Royle et al., 2000). The mail survey and interview questions are constructed to ask the

nurse respondents to describe and evaluate the information needs and information uses in

their clinical practice, but not specific to nursing care situation or nursing care activities

(Assalee et al., 2004; McCaughan et al., 2002, 2005; Sindhu & Pookboonmee, 2001;

Thompson et al., 2001a, 2001b, 2004; Tilokskulchai et al., 2000). Vignette cases (Urquhart

& Crane, 1994) and critical incidents (Urquhart & Davies, 1997) needing information to

solve are also employed to explore nurses' information uses specific to the provided vignette

cases and critical incidents. Numbers of samples in the studies rank from few samples (8

participants) to a large number of samples (over 3000) from a single unit setting (Griffith &

Riddington, 2001; Royle et al., 1995; Royle at al., 2000; Secco et al., 2006) to multi-site

settings (Assalee et al., 2004; Cheng & Lam, 1996; Gosling et al., 2004; Sindhu &

Pookboonmee, 2001; Tilokskulchai et al., 2000). The response rates are from more than 25%

(Secco et al., 2006) to more than 80% (Gosling et al., 2004; Oranta et al., 2002). Few

studies employ a conceptual framework or theory to explain the information needs and uses

of nurses (Cogdill, 2003; Secco et al., 2006). Many studies are empirical-based. Many of

analysis approaches are descriptive in nature, with few inferential statistics (Cogdill, 2003;

Fahoury & Wright, 2000; Gosling et al., 2004; Secco et al., 2006). The review reveals some

shortcomings of existing studies and gaps leading to further study as described in the

following section.

Shortcomings in Research Studies

Even though many studies are strong in designs such as using mixed methods (Bawden & Robinson, 1997; Blythe & Royle, 1993; Cogdill, 2003; Rasch & Cogdill, 1999; Royle et al., 2002; Royle et al., 2000) and employing a large sample size (Gosling et al. (2004), there are some shortcomings in these existing studies. Shortcomings of the existing research studies of information needs and uses are related to study designs, statistical analysis, instruments and theoretical frameworks, and outcomes.

Study Designs

The literature review revealed several shortcomings of study designs.

First, some studies employed convenient samples in few settings (Griffiths & Riddington, 2001; Secco et al., 2006; Wozar & Worona, 2003). Some of these studies also received small percentage of response rate (Secco et al., 2006; Wozar & Worona, 2003). Their results cannot be generalized well, if compared with those from studies using randomized samples or quota samples with multiple settings and enough sample sizes (Assalee et al., 2004; Fakhoury & Wright, 2000; Gosling et al.,2004; Rasch & Cogdill, 1999; Sindhu & Pookboonmee, 2001; Urquhart & Davies, 1997). The sampling techniques used in many studies may produce sampling errors and frame errors. Even though Pravikoff et al. (2004) employed geographically stratified sampling to obtain nurse samples, they used the response rate of a previous national survey to indicate the number of their samples in each region instead of using proportional sampling.

With regard to frame error, existing studies had this error because they did not include or list all elements of the population in the sampling frame as a result of omissions, inclusions, and duplications of samples (Biemer & Lyberg, 2003). Gosling et al.' s survey

(2004) included nurses from 65 of 81 target hospitals because the quota was met at 84% having 3,128 nurses from 65 hospitals. Frame error from an omission of some hospitals happened in this study. In Sindhu and Pookboonmee's study (2001), the researchers studied only BSN nurses working at more than 250-bed public hospitals, but their population frame included all BSN nurses registered by the Thai nursing council. Their frame included both nurses working at hospitals with more than 250 beds and nurses working at non-target hospitals such as those with less than 250 beds and private hospitals. According to Hiranprueck (2004), about 30 % of Thai nurses worked at community hospitals with less than 250 beds. Even though the researchers did not mail the questionnaire to nurses working at non-target hospitals, when calculating their number of samples, they should not have included those nurses. Unlike Gosling et al. in their study (2003) that used quota sampling and described the met response quota of samples, Tiloksakulchai et al. (2000) did not mention the response-percentage rate and the target population in their quota sampling. Assalee et al.(2004) omitted some peri-operation nurses in their sampling frame. The researchers randomly sampled only peri-operation nurses who attended the national peri-operation nursing conferences.

Second, many studies use a single method for data collection, particularly self-reporting questionnaires (Assalee et al., 2004; Gosling et al., 2004; Secco et al., 2006; Sindhu, & Pookboonmee, 2001; Tanner 2000; Tiloksakulchai et al., 2000). The results of self-report questionnaire may be weak if the studies do not employ a reliable and valid questionnaire, which appeared in some studies. Over reporting of information needs and uses and response errors in such studies may present. McKnight and Peet (2000) pointed out that results of self-report studies in information seeking behavior of health care providers usually

showed a higher use of printed information than of colleagues whereas the observational studies showed the opposite. Wozar and Worona's study (2003) represents this point. A participant in their study reported using an Internet resource in the questionnaire, but her log-in file did not confirm such use (Wozar & Worona, 2003). To compromise for response errors from using self-report instruments in data collection, the studies need acceptably reliable and valid instruments.

Third, even though some studies employed stronger methods such as using vignette and critical incident cases to investigate information needs and uses (Urquhart & Crane, 1994; Urquhart & Davies, 1997), these methods lead to different findings from other studies and from real clinical practice situations of nurses. In real time practice, most studies showed that nurses use human information sources more than printed information sources whereas the study by Urquhart & Davies (1997) revealed the opposite. This contradiction results from the vignettes and the critical incident cases that direct, give a clue, or raise awareness to information sources used (Uruart & Crane, 1994; Urquhart & Davies, 1997).

Statistical Analysis

In relation to statistical analysis, many studies use descriptive statistics such as frequency, percentage, and mean to describe the information needs and uses of nurses (Assalee et al., 2004; Huber & Huggins, 2000; Sindhu, & Pookboonmee, 2001; Tanner, 2000; Tiloksakulchai et al., 2000; Urquhart & Davies, 1997; Wozar &Worona, 2003). Thus, the generalization of study results explained by descriptive statistics is weak, if compared with correlations and inferential statistics such as T-test, Chi-square, multiple logistic regressions used in some studies (Cheng, 2004; Cheng, 2003; Cogdill, 2003; Fakhoury &

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Wright, 2000; Gosling et al., 2004; Griffifths & Riddington, 2001; Secco et al., 2006;

Thompson et al, 2001a, 2001b; Urquhart & Crane, 1994).

Instruments and Theoretical Frameworks

Corresponding to instruments and theoretical frameworks used, few studies addressed

the details of instrument development (Blythe & Royle, 1993; Urquhart & Davies, 1997;

Royle et al., 2000; Royle et al, 2002; Gosling et al., 2004; McCaughan et al., 2002;

Thompson et al., 2001a; 2001b), but these studies and many other studies did not report

reliability and validity of instruments (Chan et al., 2004; Fakhoury & Wright, 2000; Griffiths

& Riddington, 2001; Secco et al., 2006; Wozar & Worona, 2003). Besides research

utilization studies, few information need and use studies addressed clear concepts or

theoretical frameworks used in conducting the study and constructing the instrument

(Thompson et al., 2001a; 2001b; Cogdill, 2003; Secco et al., 2006).

Outcomes

Concerning the outcomes of information need and use studies, the profuse use of

quantitative studies add a number of studies that describes patterns of information needs and

uses of nurses in general. In addition, this kind of study focuses on source defining

information (asking what-questions), but not on user-defined purpose (asking why- and how-

questions) (Dervin, 2003). In another word, many studies employed cognitive approach; few

employed effective approach that investigates attitude and perceptions of nurses' information

users towards information sources and situational contexts. Moreover, rather than using

situational contexts or nursing care activities, the studies normally use characteristics of users

such as age, gender, information accessibility to predict the information needs and uses. The

results of objective responses from this kind of studies, which usually employed closed-

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ended questionnaires, lead to disparities or inequalities of getting information or of being informed between the ones who have and those who do not have that characteristic (Dervin, 1989).

Furthermore, the findings from existing studies cannot well explain a whole and true picture of information needs and uses of nurses, particularly for their specific nursing care, due to low uses of well defined concepts, frameworks, reliable and valid instruments, and of reliable design and sampling as well as of inferential statistics. Consequently, a lack of generalization in the information needs and uses prevails. In addition, an aspect of information needs and uses of nurses for their specific nursing care activities is left unexplored. This aspect is very important if nursing is going to emphasize evidence-based practice; it is necessary to know what kind of information or evidence nurses need and want for their nursing care activities.

Additionally, several studies have evaluated the information needs and uses of nurses and other healthcare professionals in the United States and other developed countries (Gosling et al., 2004; Pierce, 2000; Tanner, 2000). No study has investigated the information needs and uses by nurses in Thailand where health care system differs from those of other developed countries and evidence-based practice has been introduced in the past few years (Dr. Orapan Thoshingha, evidence-based practice educator, Personal communication, November, 16, 2004). Furthermore, no study has investigated information seeking with regard to information needs, seeking, resources used, and information or research utilization of Thai nurses. Few studies have investigated barriers to research utilization, which is a single aspect of information needs and use, in Thai nurses (Assalee et al., 2004; Sindhu & Pookboonmee, 2001; Tilokskulchai et al., 2000). Among these studies, none has investigated

whether nurses' English language skill is a barrier to research utilization and whether the nurses prefer, trust, need, and use English or Thai-published sources.

In conclusion, the shortcomings of information need and use studies are related to epistemology and methodology; that is, how information needs and uses are perceived or defined and how they are measured. In the existing studies, definitions, concepts, theoretical frameworks are not well defined and applied to assess the information needs and uses of nurses in situational contexts of nursing and their nursing care activities. These shortcomings result from the information need and use studies in nurses that are rooted in information science and social science. The information science and social science provides concepts and theories applied to general information users (Pettigrew et al., 2001). Thus, when they are applied to nursing, many researchers still assess the aspects of information needs and uses of nurses as they are general information users. In fact, information needs and uses of nurses are different from those of general information users and other health care professionals (NCNR, 1993). However, when researchers conduct studies in nurses, they still mainly assess nurses' clinical information needs and uses in general, not specific to nursing care activities. These shortcomings are gaps to be filled with the following proposed study.

Purposes of the Study

Gaps in the literature review are related to the studies that do not look closely at the nature of nursing or context, as Dervin (2003) emphasized that "context is a necessary source of meaning" and phenomena reside in it (p. 117). In order to fill these gaps, one needs an understanding about the nature of nursing care related to nurses' information needs and uses. No studies have been conducted to investigate what other types of information are used by Thai nurses; why they use those types; what attitudes they have towards information sources

that make them need and use some information sources over other sources for their clinical practice in general and specific nursing care activities.

The findings and literature review call for further investigation about information uses of nurses in Thailand. This study is designed as a cross-sectional descriptive and exploratory survey employing a close-ended questionnaire. This study has four purposes: 1) to identify what specific information Thai nurses need and use for their clinical practice in general, 2) to explore what factors influence these needs and uses, 3) to identify what information Thai nurses need for their specific nursing care activities, and 4) to explore what information characteristics influence the uses of information sources for their specific nursing care activities.

This study employed Wilson's 1996 model of information behavior to explain the first two purposes. This applied Henderson and Nite (1997)'s nursing care activities and Dervin's *Sense-Making* to explain the latter two purposes.

Operationalized concept definitions

Based on the conceptual framework and study purposes, concepts in this study are operationally defined as below.

In the context of specific nursing care activities (situation), nursing care activities were defined as the nursing care nurses perform to patients. These activities are described in *Principles and Practice of Nursing,* 6th edition (Henderson & Nite, 1997). Information need (gap) was operationally defined as the question asking "Usually, when you are not sure or you do not know how to do this nursing care activity, which of the following information sources do you need most?" Information uses (bridge) operationally defined as the question asking "Usually, which of the following printed/electronic source for information and

knowledge do you use most for your nursing care of this activity?" Help or outcome was operationally defined as the question asking respondents to select the prelisted descriptors of information source evaluation (available and easy to get, applicable and useful, easy to understand, and reliable and useful). This question asked "What best describes the reason you use this source the most?"

In the context of nursing care and practice in general, nursing care and practice in general was operationally defined as nursing care and practice that nurses perform in general according to their roles and related tasks as practice nurses, education nurses, administrative nurses, or others. This nursing care and practice are not specific to any nursing care activity. Information need was operationally defined as the question asking "Nurses need information to answer questions, solve problems, make decisions, and/or fulfill nurses' desire to have information for nursing care and practice. In your working day, how often do you need information for your nursing care and practice, patient education, and/or practice at administration unit, education unit, or other units?" Information use was operationally defined by questions asking how often nurses use certain information sources such as research databases, hospital libraries, etc. For example, a question asked "Usually, when you are looking for information to answer questions, solve problems, make a decision, and/or enhance knowledge for your nursing care, which of the following information printed/electronic information sources would you use the least?"

In the following chapter, the study methods were described.

CHAPTER III

METHODS

This research was a descriptive study of the way nurses in Thailand need and use information. The study was designed to overcome some gaps in previous research by employing theoretical constructs related to nursing practice and personal attributes of nurses as well as elements of theories related to the information needs and uses. The study aimed to answer the following research questions:

1. What information do Thai nurses need and use in their clinical practice in general and in their specific nursing care activities?

2. To what degree do Thai nurses need and use information in their clinical practice in general and specific nursing care activities?

3. What factors do influence information needs and uses of Thai nurses?

    3.1 Are information needs and uses of Thai nurses associated with certain individual nurse factors (psychological, demographic, and role-related interpersonal factors such as attitudes and perceptions toward information needs and uses, age, length of nursing care experience in month, level of English skills, computer skills, education, and nurses' roles and related tasks)?

    3.2. Are information needs and use of Thai nurses associated with certain environmental characteristics and culture such as time provided by nurses' work place, information provision by health care organizations, nurse-patient

ratio, and nurses' uses of certain communication sources such as mobile phones?

    3.3. Are information uses of Thai nurses associated with certain characteristics of information sources such as quality, availability, accessibility, and usefulness?

    3.4. Are information needs and uses of Thai nurses associated with nursing care activities?

To answer the research questions above, the study needed to have both internal and external validity. That is, the study needed to maximize variance due to true score and to minimize error variance by controlling extraneous sources of error variance (Kerlinger, 1986). According to Dillman (2000) the sources of error variances come from a) sampling error (e.g., the number of persons or units surveyed is not representative for the estimated sample), b) coverage error (all elements of population are not listed or included in the sampling frame), c) measurement error (e.g., poor questionnaire), and d) non-response error. Thus, to maximize true variance and minimize error variance by controlling extraneous variables, the study should have a) appropriate theory and concept supporting the study, b) valid and reliable measure(s) with least error, c) an enough effect size, d) a high statistical power to detect the maximum treatment effects or mean differences, and e) an appropriate statistical data analysis (Lipsey, 1990).

In the chapter two, appropriate concepts, theories, and literature supporting the study (a) were provided. This chapter explains how the study complies with the rest (b, c, d, & e) to produce valid and reliable results. This chapter includes a description of study design in relation to settings and sample, of instrumentation, of research procedures, including data collection and analysis, and of plan of study.

Study Design

In order to discover and explore what information Thai nurses needs and uses in their clinical practice, the study was designed as a cross-sectional descriptive survey. The principal investigator conducted the survey in a national sample of Thai nurses, as described below.

Setting and Sample

Setting

Thailand has 76 provinces located in 5 main natural regions: 17 in the fertile plain of Central region, 9 in the Eastern, 17 in the mountainously Northern, 19 in the semi-aridly plateaus of Northeastern, and 14 in the coastally peninsular of Southern region (NESDB, 2004). If classified by sources of funding, there are two main types of hospitals in Thailand: public and private. The public hospitals are classified by level of care, institutional affiliation, geographical area, number of beds, medical specialty, and populations served.

At the tertiary level, which is the highest level of care, there are 9 university-affiliated or medical school hospitals, in which 5 are located in Bangkok and 4 located in a business hub and the densest-populated city of each region. Six of these hospitals have more than 1000 beds with all kinds of medical specialists and advanced medical technology. All of these hospitals are under the jurisdiction of Ministry of Education.

At the secondary care level, there are 27 regional hospitals (all are under the responsibility of Ministry of Public Health) located at those five regions, 156 provincial or general hospitals (69 are under the Ministry of Public Health; the rest are under the Ministry of Defense, the Ministry of Interior, and under other agencies), and 692 community hospitals located at district or sub-district areas. Each regional hospital has more than 500 beds with medical specialists in all fields. Each provincial or general hospital has between 200 to 500

beds with medical specialists, but not in all fields. Each province has at least a general or regional hospital. The community hospitals with 10-150 beds have family doctor(s) and serve about 10,000 populations or more.

At the primary care level, 214 municipal health care centers located at municipal and Bangkok areas, and 9,765 health care centers located at sub-district areas. Each center serves a population of 1000-5000. In addition, there are 40 specialized hospitals (e.g., 12 maternal and child health hospitals, 11 psychiatric hospitals) (Bureau of Policy and Strategy, Ministry of Public Health, 2005).

Thai nurses work at every level of health care settings. Among 100 % of health care providers working at health care centers, few (15%) are baccalaureate nurses (BSN) whereas majority are health care workers (52%) and nurse midwives and technical nurses (32%), who graduate with a two-year program in public health, nursing midwifery, and nursing respectively (Hiranprueck, 2004).

The distribution of nurses varies region by region. According to the Bureau of Policy of Policy and Strategy, Ministry of Public Health (2005), in 2002 Thailand has 84,683 BSN nurses. Among this number, 19,889 (23.5%) nurses work in Bangkok metropolitan areas (BMAs); 21,545 (25.4%) nurses in the Central and East; 15,456 (18.3%) nurses in the North; 10,993 (13%) in the South; and 16,860 (19.9%) nurses work in the Northeastern[3].

Nurse samples in this study are BSN nurses, who work at the following hospitals: (a) university-affiliated hospitals under the Ministry of University Affairs, (b) regional, (c) provincial, and (d) community hospitals under the Ministry of Public Health. These hospitals are the basis for obtaining a representative sample of nurses. Nurses are the unit of analysis in this study. This study includes only nurses working at these hospitals because these

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[3] In this proposed study, BMAs are combined with Central region for regional strata.

hospitals are easier to access than other hospitals and they provide services to general

population, not specific to particular groups of population as those found in the military

hospitals mainly serving military people or those found in specialized hospitals such as

psychiatric hospitals.

Samples

Eligible samples in this study were nurses working at above eligible hospitals.   In

2002, there were about 113,718, but just only 76,000-91,000 actively practice nurses.

Among the active nurses, 65% of them worked at public hospitals under the Ministry of

Public Health and 15% work at university hospitals under the Ministry of University Affairs

(recently changed to the Ministry of Education). The target populations in this study were

56,323 BSN nurses: 8,496 from university hospitals under the Ministry of Education, 25,083

from regional and general/provincial, and 22,744 from community hospitals under the

Ministry of Public Health (Bureau of Policy and Strategy, Ministry of Public Health 2005).

On average, in 2007 about 1025 baccalaureate degree nurses worked at a university-affiliated

hospital (range = 88 - 2111), 450 at a regional hospital, 264 at a provincial hospital, and 30

nurses at a community hospital.[4]

This study involved two inquiries: a pilot test of questionnaire and a main study

survey. A number of samples used in this study were dependent on inquiry. Inclusion criteria

of samples in each inquiry were nurses (a) working at university hospitals (under the

Ministry of Education), regional, general, and at community hospitals (under the Ministry of

Public Health) (b) having at least a BSN degree and (c) willing to participate in the study.

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[4] The Bureau of Policy and Strategy does not provide separate numbers of nurses working at regional hospitals
and of nurses working at general hospital. The investigator estimates the numbers from calling each university,
regional, and provincial hospitals, taking available information provided by the Bureau of Policy and Strategy,
the Ministry of Public Health (2005) and obtaining information available on the hospital websites that the
investigator had sampled from.

In regard to the pilot test of the questionnaire, a convenient sampling of 30 nurses, who were 10 nurses from a university, 10 from a regional, and 10 from two community hospitals, were employed to answer the questionnaire. This number is about one tenth of the least expected respondents in the survey (as described in detail below), as suggested by Nunnally (1978).

In the survey study employing the questionnaire, the adjusted questionnaire after the pilot test was distributed to a sample of nurses, excluding those in the pilot test. The number of nurse samples and of respondents should be enough to secure statistical power that is dependent on sample size, type of statistical analysis, effect size, and significant level (Cohen, 1992). In this study, four criterion strategies were employed to compute the sample size: using estimation precision (e.g. confidence intervals), using power estimation based on testing hypotheses, estimating expected response rate based on the response rate of a previous study in which its design is similar to this study, calculating for design effect, and calculating for response errors. After sample size was finalized, the sample selection was conducted.

Sample size computation: Estimation precision. In the estimation precision, two strategies were applied. One was based on independent response, in which answers of one respondent were not correlated to other respondents. It was based on the assumption that in one hospital a response of one nurse does not influence on responses of other nurses. The other one was based on clustering response. In one hospital, there is a correlation between nurses in responding the survey.

What follows is a computation strategy based on precision to estimate a required sample size of nurses completing the survey. The final sample size was projected from a calculation for the expected number of respondents.

For the independent response, the sample size was calculated by using the formula, suggested by Dillman (2000) and by Weaver (M. Weaver, a statistic consultant at Research Support Center, School of Nursing, University of North Carolina, Chapel Hill, Personal communication, August, 24, 2006).

$$n = \frac{(N)(p)(1-p)}{(N-1)(B/C)^2 + (p)(1-p)}$$

Where n = the completed sample size needed for desired level of precision

N = the population size

p = the proportion of population expected to choose one of the two

response categories (dichotomous items). In this study before collecting

data, the proportion of respondents who answer "yes" or "no" was

unknown

so that the proportion of 0.5 was used. Normally, it is set at 0.50

or 0.80 for more homogenous sample (Dillman, 2000). However,

using 0.50 would lead to a larger sample size than using 0.80 (M.

Weaver, Personal Communication, August, 24, 2006) and it

always provides enough sample size for smaller or larger population

(Biemer & Lyberg, 2003).

B = acceptable amount of sampling error or precision. It can be set at,

0.1, 0.05, or 0.03, which are + /- 10, 5, or 3% of the true population

value respectively.

C = Z statistic associated with the confidence level; 1.96 corresponds to

the 95% level.

Based on the Bureau of Policy and Strategy, the Ministry of Public Health (2005),

56,323 Thai BSN nurses worked at target public hospitals. Therefore, the sample size with

the proportion to answer dichotomous items of 0.80, 5 percent acceptable sampling error, and

95 % confidence was computed as below.

$$n = \frac{(56,323)(.80)(.20)}{(56,322)(0.05/1.96)^2 + (.80)(.20)}$$

$$= 245$$

If the proportion was set at 0.50, the completed sample size would be

$$n = \frac{56,323(.50)(.50)}{(56,322)(0.05/1.96)^2 + (.50)(.50)}$$

$$= 382$$

Based on the above computation, this study needed 245-382 nurses to complete the

survey using the close-ended questionnaire.   This size range is the same as suggested by

Dillman (2000) and similar to the one suggested by Ferketich (1991) in that the size of 200-

300 should be considered for a study survey and for factor analysis.

Sample size computation: Estimating expected response rate. With the size ranging

from 245-382, if the response rate was expected to be at least 50.0 %, 490-769 questionnaires

should be distributed. The response rate of 50 % was set in order to assure that non-response

bias did not affect the results. In addition, this percentage was established in accordant with

a response rate of a previous study employing a stratified random sampling to have Thai

nurses working at more than 250-bed hospitals under the Ministry of Public Health. This

study used a self-reported questionnaire assessing the barriers to research utilization. It received a response rate of 47.8% (Sindhu & Pookboonmee, 2001).

Sample size computation: Power estimation. In addition, if it was based on power estimation that is related to type of statistical analysis, effect size, and significant level, the above sample size can yield statistical power. In this study, associations of many variables would be analyzed by using Chi-square and a significant level of 0.05. Regarding the chi-square analysis using maximum likelihood method, the statistical significance of each coefficient in the acceptable model was evaluated by using Wald test (W_j), where the coefficient (B_j) is divided by its standard error (SE_j) (Tabachnick & Fidell, 2001). Its contingency can be set at $W=0.10$ for small effect size, $W=0.30$ for medium effect size, and 0.50 for larger effect size. Statistical power $(1-\beta)$ is the probability of rejecting the false null hypothesis. Cohen (1988) suggested $\beta = 0.20$ and statistical power $(1-\beta) = 0.80$ as a minimal desire. According to Cohen (1992), in order to obtain medium effect size $(W=0.30)$ with the power of 0.80, and alpha of 0.05, the chi-square of 2x3 contingency table that has 2 degree of freedom, the sample size of 107 is needed. The chi-square's degree of freedom for the contingency table = (number of row - 1)(number column - 1).

Thus, the expected respondents set at 243-382 in this study yielded sufficient power to detect meaningful associations. It was empirically and statistically reasonable for this study to have a sample size of 769 with expected response rate at least 50% for reliable and valid results.

The study employed a stratified and cluster sampling method with probability proportion to size (pps) was used to select hospitals, where were primary sampling units (PSU), and nurses, who were secondary sampling units (SSU). Stratified samplings give

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equal probability to unit level and individual level. The proportions of sampled units and of sampled subjects in each unit level are similar to those of the population (Trochim, 2005). Convenient sampling, as used in many studies, does not allow equal probability to every nurse selected. In sampling, the sampling method should guarantee equal probability of selection method (epsem) (Biemer & Lyberg, 2003; Kish, 1995), no matter how large or small the hospitals at which nurses are working.

To implement the systematic sampling method with pps, the 797 hospitals were stratified by hospital types and regions. In this stratified sampling, university-affiliated hospitals were stratified into only one university-affiliated hospital stratum at a national region because the researcher selected only 2 hospitals from this stratum. Regional hospitals were stratified into 5 strata (one stratum per each region); one hospital was selected from each stratum. Similar to the regional strata, provincial hospitals were stratified into 5 strata (one stratum per each region); two provincial or general hospitals were selected from each stratum. Community hospitals were stratified into 75 provincial strata because one community hospital was selected from each of 75 provinces. This stratified sampling results in 86 strata and selected 92 hospitals (PSUs) from 797 hospitals (Figure 4). Selected hospital samples included 2 from 9 university-affiliated hospitals, 5 from 27 regional hospitals, 10 from 69 provincial hospitals, and 75 from 692 community hospitals. Within each stratum, either systematic or simple random sampling was used to select hospitals. In the university hospital stratum and provincial stratum that more than one hospital was selected, the systematic sampling technique, which is proportional-to-size sampling, was applied. In the regional hospital stratum and community stratum, simple random sampling was used because only one hospital was selected from each hospital stratum.

Within each selected hospital, a sample of nurses was selected in order to reach the required sample size. The number of nurses selected from each hospital was proportionally allocated (see below). A result of this step yielded 115 university-hospital nurses, 192 provincial-hospital nurses, 154 regional-hospital nurses, and 308 community-hospital nurses (shown in Figure 4).

However, these sampling strategies result in design effect of clustering response (Biemer & Lyberg, 2003). Therefore, the sample size should be inflated by using the design effect as well.

Sample size computation: Design effect. The design effect (deff) is the ratio of the actual variance, under the sampling method used, to the variance calculated under the assumption of simple random sampling. For cluster samples, the main components of design effect are the intraclass correlation or rho (ρ), and the number of units within each cluster (m). Rho is a statistical measure of within cluster homogeneity. It represents the likelihood that two units drawn randomly from the same cluster will have the similar values on the variable in question, relative to two units drawn at random from the population as a whole. The design effect (deff) is calculated as $1 + \rho \, (m - 1)$ (Kish, 1995). As such based on rho (ρ), which is assumed to be 0.01 that may account for correlations of responses among samples within group or hospital (M. Weaver, Personal Communication, August, 12, 2006), a required sample size x deff for each hospital cluster is as below.

Calculating the numbers of nurses as a result of design effect from each stratum was based on the assumption in that nurses from each hospital stratum were selected equally from every selected hospital. This equal selection could provide enough sample sizes for smaller

hospitals than did for larger hospitals yet the sample sizes of larger hospitals were still

sufficed.

At university-affiliated hospitals, without considering a design effect a simple random

sample = 115 from 2 hospitals of 9 hospitals; 58 nurses per each hospital. If considering the

design effect, $1 + 0.01(57) = 1.57$; therefore, the sample size x deff = 115 x 1.57 =181.

At regional hospital, a simple random sample without design effect was equal to 154

nurses from 5 hospitals of 27 hospitals; about 31 nurses per each hospital. With design effect

it was equal to 154 x 1.30 = 200.

At provincial hospital, a simple random sample without design effect was equal to

192 nurses from 10 hospitals of 69 hospitals; 19 nurses per each hospital. With design effect

it was about 192 x 1.18 =227 nurses.

At community hospital cluster, as simple random sample with out design effect was

308 nurses from 75 hospitals of 692 hospitals; 4 nurses per each hospital. With design effect

the sample size of this cluster would be 308 x 1.03 = 317 nurses. Overall sample size with

design effect was equal to 925 nurses.

Sample size computation: Percent of response errors. Non-response errors may

happen in this proposed survey study. That is, a smaller number of samples or from which

fewer samples responded to the survey than they are required (Cochran, 1977; Dillman,

Eltinge, Groves & Little, 2001). As a result, the sample mean is not an unbiased estimator of

the population mean. Thus, the values of the characteristics for sample units should be

weighted or adjusted prior to averaging to compensate for the unequal selection probabilities

(Beimer & Lyberg, 2003; Dillman, Eltinge, Groves & Little, 2001). For example, at the

community hospital level in order to achieve a response rate of 50 percent from PSUs and

from SSUs, at least 2 nurses from each of 38 hospitals are required to answer the survey.

However, fewer nurses or fewer hospitals may respond to the survey. If this response

happened, the researcher needed to use a statistic procedure such as a survey-mean procedure

in SAS to adjust for mean and standard error (M. Weaver, a statistic consultant at UNC-

School of Nursing, personal communication, August 17, 2006). Therefore, besides

adjusting such errors during data analysis this study also used 5 percent to adjust for

sampling errors and response errors such as item non-response error. The numbers of nurse

samples after the 5 percent adjustment were equal to 971, as it is illustrated in the Figure 4.

Approximately, 190 nurses would be selected from two university hospitals (95 per each),

210 nurses from 5 regional hospitals (42 per each), 238 nurses from 10 provincial hospitals

(23-24 per each), and 333 nurses from each of 75 community hospitals (4-5 per each)[5].

Figure 4

Sampling Strategy to Obtain Nurse Subjects

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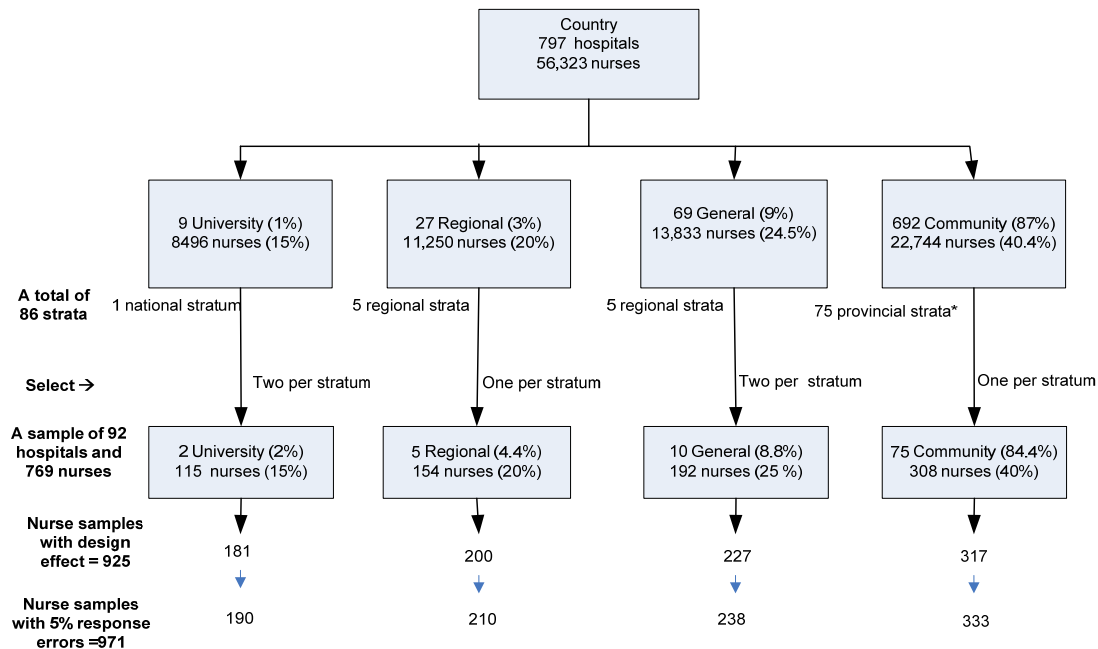
[5] In the real data collection, the researcher distributed the questionnaires to 210 university hospital nurses, 225 regional nurses, 241 provincial nurses, and 331 community nurses.

Sample selection: Selecting hospitals. The numbers of nurses selected from university and provincial hospital strata were proportionately allocated based on the target samples. In selecting numbers of nurse samples at university and provincial strata, where two hospitals were selected from each stratum, and in order to guarantee epsem and pps of sampling technique, the researcher used Excel spreadsheet. The sample selection started with 1) calculating cumulative total number of nurses, 2) calculating cumulative proportions corresponding to those cumulative totals (these cumulative proportions set up the cut-points for sample selection), and 3) generating enough random numbers between 0 and 1 by using the RAND() F9 function to get a required number of hospitals. The selected hospital had the random number in the range of more than the lower cumulative proportion to higher cumulative proportion of that range. For example, the first random number of northern provincial hospitals is 0.0979359, the selected hospital is Srisangwan, in which its cumulative proportion is equal to 0.122830089, which is in the range of more than 0.082588112 to 0.122830089.   The researcher generated an extra random number or 2, in case both of random numbers selected represent the same hospital - e.g., the researcher generated 2 numbers and they turned out to be 0.01 and 0.02; both would lead to selecting a hospital having the cumulative proportion in this range.

Table 1 is an example of selecting hospitals in the provincial stratum of northern region. In this stratum, Srisungwan and Maesod hospitals were selected.

Table 1

An Example of Proportional to Size Sample Selection

Provincial hospitals	Number of nurses	Cumulative	Cumulative proportions	Random numbers
Lumpoon	314	314	0.082588112	0.0979359
Srisangwan*	153	467	0.122830089	0.545324656
Payao	322	789	0.207522357	
Chaingkum	202	991	0.260652288	
Prae	381	1372	0.360862704	
Nan	350	1722	0.452919516	
Smdej Prachaotaksin Maharaj	251	1973	0.518937401	
Maesod*	240	2213	0.582062073	
Petchaboon	261	2474	0.650710153	
Sukhothai	245	2719	0.715149921	
Srisungwon	200	2919	0.767753814	
Uthaithani	287	3206	0.8432404	
Kumpaengpet	280	3486	0.91688585	
Pichit	316	3802	1	

Note. * Randomly selected hospitals.

The sampling methods used in the study allowed for estimating means separately in each stratum and also allowed for combining means of all strata in statistical analysis using proc mean and survey mean in SAS (M.Weaver, Personal Communication, November, 03, 2006).

Sample selection: Selecting individual nurse samples. Convenient sample selection was applied to select individual nurse samples. At university-affiliated, regional, and provincial hospitals, the researcher distributed the copies of questionnaire by either hand or mail to head nurses in order for the head nurses to distribute the questionnaires to convenient nurse samples. At the community hospitals, the copies of questionnaire were mailed to the head nurse of each hospital and the copies of questionnaire were distributed to convenient nurses in the hospitals by the head nurses.

In summary, in the planning of this study, samples of this study were BSN Thai nurses working at university hospitals, regional, general, and community hospitals. The study employed two samples: a sample of 30 nurses by using non-probability sampling for a pilot-testing of the questionnaire and a sample of 971 nurses by using probability sampling for a main survey. The stratified random sampling techniques were applied to select 92 hospitals (PSUs) in order to maximize the generaliability of results to the universe of nurses in Thailand. In selecting the hospitals and numbers of nurses working at each hospital in each stratum, PPS with epsem were applied whenever possible. In selecting individual nurse samples (SSUs), convenient sampling was applied to select nurses at each selected hospital.

Instrumentation

The instrument used in this proposed study was a paper-and-pencil questionnaire. The questionnaire was researcher-developed and derived from empirical studies and the literature. The questionnaire was constructed in English and in Thai versions. In order to have a Thai version of the questionnaire to be used with Thai nurses in the main study, the researcher had employed several steps: constructing the questionnaires in English, assessing content validity

of English version questionnaires, translating the questionnaires, and pilot testing. Follows are descriptions of the development and testing of the questionnaire.

<p style="text-align:center">*Constructing the Questionnaire*</p>

Items in the questionnaire were developed and derived from the literature and previous studies. Especially, items were derived from Tanner (2000), Pravikoff et al. (2005), Pierce, Pravikoff, and Tanner (2003) and Royle et al. (2002).

Although the exiting questionnaires have many flaws, particularly no evidence of to what degrees these questionnaires are reliable, these questionnaires provide some good items, scopes of assessment, and scaling methods to be used and adjusted in this newly developed questionnaire. Regarding developing, designing, and scaling the survey questionnaire, the researcher had followed the principles of questionnaire design and construction suggested by many scholars in the field of questionnaire design and development and survey quality such as Dillman (2000; 2005), Campanelli (2005), and Dr. Paul Biemer, a survey consultant at Odum Institute for Research in Social Science at the University of North Carolina, Chapel Hill. The researcher had had chances to attend short courses for training in surveys from all of these scholars. Additionally, in developing this new questionnaire, the researcher had been continuously consulting with Dr. Biemer and a nursing expert, Dr. Edward Halloran. What follows are the principles applied in the construction of the questionnaire.

Generating Items and Item Statements

In developing, designing, and scaling the questionnaire, the researcher had followed the principles of writing questions and constructing survey questionnaires suggested by Dillman (2000) in the second edition of his book, *Mail and Internet Surveys: The Tailored Design Method* and other scholars in the field of questionnaire survey. For example, the

researcher used as simple and as few words as possible and used complete sentences when writing a question. The researcher used dark print for questions and light print for answer choices (Dillman, 2000). The researcher tried to create good items by avoiding ambiguity that can be caused by very long statements, multiple negative wordings, double barreled or double idea items, and vague pronoun references (DeVellis, 2003). The first question should apply to everyone and be easy, interesting, and motivational to move respondents on to the next questions (Dillman, 2000; Lessler & Kalsbeek, 1992). The respondents should have an accurate and ready-made answer to a question (Dillman, 2000). The researcher avoided open-ended questions to reduce respondent burden and difficulties in recording and analysis (Lessler, Kalsbeek, 1992). If open-ended questions are used, they should be structured and used appropriately with the nature of questions or with the purpose of asking such questions (Dillman, 2000). The answer categories should be from 5 to 7 (Campanelli, 2005; Dillman, 2000). In addition, in the assessment of values, attitudes, and beliefs, the researcher used a multi-item rating scale to assure that the scale is sufficient for reliability and validity (Knapp & Brown, 1995; Pedhazur & Schmelkin, 1991).

Designing Scaling Format

The questionnaire has two types of questions: questions about events or occurrences of behaviors such as how often nurses read nursing journals and questions asking for evaluation or attitudes such as to what extend nurses agree or disagree with the statements asking about their information needs and uses.   The question formats and scaling were constructed in binary options (yes/no), numerical ranking style, prelisted options, open ended questions, and a summated rating scale, which is a Likert scale having option gradations in an agree and disagree format. What follow is an example of a summated rating scale in a Likert scale

format that assesses nurses' attitudes and beliefs about information needs and uses, including

research utilization.

To what extent do you agree or disagree with the following statements about using printed information and research in nursing care/practice? (SA = Strongly Agree; A = Agree; N = Neither Agree nor Disagree; D = Disagree; SD = Strongly Disagree; NO   = No Opinion)

   It is very important for nurses to practice with sound information such as research evidence.

In generating questions and designing question format and scaling, the researcher had

been concerned with the following issues.

1. Questions about events and behaviors with reference to a time frame. When asking

about events and behaviors, the researcher had been concerned two important matters of

using a time frame or reference period. First, the periodic reference terms such as last week,

usually, often, and rarely have different meanings to different people (Campanelli, 2005).

For example, the question that asks "How many times have you attended a conference last

year?" had been changed to "How many times have you attended a conference in the past

year?" if the researcher meant the past year. Some scholars have found that some

respondents may interpret last year as a calendar year whereas others may consider it as the

previous one-year time period. Second, using a reference period is determined by the

periodicity or regularity of the target events, patterns of event occurrences, and analytic goals

of the survey (Schaeffer & Presser, 2003). For example, the conference question asked a

year period reference whereas the email question asked a month period reference (How often

do you use email in the past month?).

2. Defining the event. The questions that have a definition of event or variable should

provide the definition preceding the actual question (Dillman, 2000). For example, in a

question asking the information needs in nursing care and practice the researcher defined

information needs before the actual question as "Nurses need information to answer questions, solve problems, make decisions, and/or fulfill their desire to have information for nursing care and practice. How often do you need information for your nursing care and practice?"

3. Rating scale using neutral midpoint and "no opinion." In the Likert rating scale the researcher needed to be concerned about using neutral midpoint and "no opinion." This kind of scales can create response bias and measurement error. Many studies' results and many opinions vary accordingly to the topic and populations of studies. Many scholars oppose using "no opinion" and midpoint whereas many others open up to the topic and populations of the studies. Several reasons explain why the researcher needed to be careful in using midpoint and "no opinion."

First, according to Biemer and Lyberg (2003), the neutral midpoint (neutral or neither agree nor disagree) should not be used alone in rating scales such as the Likert scale because the midpoint can represent true neither agree nor disagree or true no opinion. The midpoint should be used with "no opinion" or vice versa. Using both can differentiate the answers between neutral opinion and "no opinion" of respondents (Biemer & Lyberg, 2003).

Second, "no opinion" can be used as a filter to distinguish true opinion respondents from those who are being forced to have an opinion on a topic, in which they give little or no thought (Dillman, 2000). However, many scholars oppose using "no opinion" because it can have three different meanings: no true opinion, did not know how to answer, and did not want to answer (McCleary & Brown, 2003). The "no opinion" respondents come from those who have positive and those who have negative opinions (Campanelli, 2005; Krosnick & Fabrigar, 1997). Some scholars found that "no opinion" can lower the number of

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respondents offering their opinion because the use of "no opinion" can encourage

respondents to answer "no opinion" (Shaefer & Presser, 2003; Krosnick & Fabrigar, 1997).

However, the researcher used "no opinion" to screen out the true "no opinion"

respondents by adding "no opinion" as one of response choices (Campanelli, 2005). This

"no opinion" filter was placed as the last choice of rating responses to prevent encouraging

having "no opinion" (Krosnick & Fabrigar, 1997).

In this study's questionnaire, a decision to use the "no opinion" and neutral midpoint

in the questions that ask about attitudes and beliefs of information needs and uses, including

research utilization, is based on two pieces of evidence. One is the similarity of using "no

opinion" questions of the questionnaires from existing studies assessing attitudes and beliefs

towards research utilization and barriers to research utilization with this study. The other is

the inputs from respondents in the questionnaire's preliminary test.

Many studies assessing attitudes towards research utilization of nurses have used

BARRIERS: The Barriers to Research Utilization Scale (Funk, Champagne, & Tornquist,

1991), which has 28 items with response choices of: 1=to no extent; 2 =to little extent; 3 = to

a moderate extent; 4 = to a great extend; and "no opinion." In those studies, the use of the

"no opinion" (without the mid point response) choice resulted in a large percentage (9-50%)

of respondents rating "no opinion" on 4-12 items (Carroll et al.1997; Dunn et al.,1998;

Kajermo et al.,1998; McCleary and Brown, 2003; Oranta, 2002). However, no information

on the use of "no opinion" is available from the Thai studies by Sindhu and Pookboonmee

(2001), Assalee et al. (2004), and Tilokskulchai et al. (2000). Sindhu and Pookboonmee

(2001) used the BARRIERS scale with the same 4 rating responses but did not include "no

opinion" in the scale. Assalee et al. (2004) adapted the scale of Sindhu and Pookboonmee

(2001) by changing the 4 rating responses to 3 response choices (agree, disagree, and not sure). Tilokskulchai et et. (2000) did not assess values and attitudes toward research utilization.

Nevertheless, in this study's questionnaire the researcher decided to use both midpoint (N= neither agree nor disagree) and "no opinion" responses for the Likert rating-scale questions that ask the respondents to rate to what extent they agree or disagree with the statements about the information needs and uses for their nursing care and practice. There are at least two reasons for using them. First, the researcher considered using "no opinion" as a filter that separates respondents who do not have opinions from respondents who have opinions. Also the researcher used the midpoint "neither agree nor disagree" for respondents who have this attitude. Therefore, the "no opinion" respondents do not leave the questions unanswered; and the respondents are not forced to have opinions. Non-response items are reduced, and consequently non-response error is reduced. Second, regarding a preliminary test of the questionnaire with doctoral nursing students (4 Thai, 1 Taiwanese, and 3 Americans), non-response items existed when using the questionnaire with "no opinion" whereas these same students debriefed no problems in rating when "no opinion" was allowed. Dr. Paul Biemer also suggested having the midpoint (neither agree nor disagree) and "no opinion" responses in the questionnaire. In addition, the results from a preliminary test to see the response patterns with 30 Thai nurses and 23 American nurses showed no problems of answering question pattern regarding the neutral midpoint ('neither agree nor disagree') and "no opinion." As a result, the researcher chose to maintain the "no opinion" filter in this questionnaire.

4. Threatening and sensitive questions. The researcher needed to be careful in using questions about socially undesirable behaviors and cultural sensitivity. For example, the question asking "How old are you?" is viewed as an impolite or sensitive question in the US whereas it is very common in Thailand. For use with American respondents, this question should be changed to be "What age do you have?" (P. Biemer, Personal communication, June 7, 2006). A national sample survey of registered nurses asked, "What is your year of birth?" (Spratley et al. 2001).

Whether questions are sensitive or not depend on individuals' attitudes and perceptions about social desirability as well as culture. In Thailand people ask one another this question all the time, even though they have just been introduced to each other. In Thai culture, Thai people value seniority, closeness, and respectability. They refer to older and younger people as their older and younger siblings. They refer to people, who are in the same age range with their parents or with their grandparents, as their older or younger aunts or uncles and as their grandparents, respectively. By knowing the age of someone and addressing that person according to his or her age, Thai people can show how much they value and respect him/her. Nevertheless, in asking about the respondent's age the researcher used "Which year were you born?" in order to be able to apply with any respondent. Both American and Thai nurses in the preliminary tests indicated no sensitive question to them in the questionnaire.

5. Relevant questions. Regarding asking questions that should be relevant to respondents, the researcher followed suggestions made by Campanelli (2005) in that the questionnaire developers should be concerned about the following questions: Can the respondent understand the question? Is the respondent able to answer the question? and Is the

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respondent willing to answer the question? Respondents may be annoyed if the questions are

not relevant to them or not applied to them. A filter question should be used to establish a

line of responding to subsequent questions (Scheaffer & Presser, 2003).   For example, the

question was constructed as:

13. How often do you use the Internet/World Wide Web to search for information?

☐   Once or more a day

☐ Once or more a week

☐ Once or less a month

☐ Few times a year

☐ Never →**SKIP to Question 15**

14a. Do you search for nursing and health-related information from the Internet/World

Wide Web?

☐ Yes

☐ No →**SKIP to Question 15**

6. Response dimensions and categories. Response categories should be mutually

exclusive (Dillman, 2000).   Question forms and response categories can be constructed in

different response dimensions: absolute frequency (the number of times the event occurs in a

time-frame reference), relative frequency (how often), regularity, and date of occurrence

(Scaeffer & Presser, 2003). The researcher needed to be aware of overlapping or a gap

between responses. For example:

How often do you use the databases such as CINAHL, MEDLINE?

☐ Daily

☐ Weekly

☐ Monthly

☐ Few times a year

☐ Never

This question has a gap between responses "Monthly" and "Few times a year." "Few

times a year" means two to three times a year whereas "monthly" means once a month or

more, but less than once a week. In this question, respondents who use the databases more than two or three times a year, such as five or six times a year, may find no right response choice for them to check. They may end up leaving it unanswered. Therefore, the "Few times a year" was changed to be "Less than once a month." Similarly, some respondents may not find their relevant response from the responses daily, weekly, monthly, yearly, and never for the question asking "How often do you use the following information sources for your nursing care, patient education, and/or for your practice at an administration unit, education unit, or other unit?" The reason is that the respondents do not work every day. A Ph.D. nursing student pointed out that she could not answer this question because she normally works only 4-5 days a week. Corrected question in this proposed study is started with "In your working day, how often do you use…" In her questionnaire, Tanner (2000) used "How often in a clinical day do you need information?" The proposed questionnaire uses "working day," instead of "clinical day" because this question can be answered by nurses who are not working in units/wards such as nurse administrators, infectious control nurses, and educationally role-related nurses.

In addition, relative frequency carries evaluative information. The word "rarely" should not be used and should be replaced by "few times a year" (P. Biemer, Personal communication, June 7, 2006). Similarly, evaluative response categories should be clearly defined because they can have different meanings to different people. For instance, the question asks "How do you rate your English skills?" Its response categories include poor, fair, good, and very good. Each category was clearly defined. For example, poor means respondents cannot read English textbooks with understanding, write a paper, listen to English speaking with comprehension, or speak with foreigners.

7. Matrix questions and check-all-that-apply questions. In designing the questionnaire format the researcher avoids using inappropriate formats such as those of some questions derived from the studies above. For example, in Tanner's study (2000) a matrix question asked, "Please place a check in all boxes that identify tools for seeking clinical information that are *available* to you at hospital, and/or at your home and that you *use* at your work and/or at home OR that you *need* at work or home." This question was changed to individual-space format questions, whereby the questions are repeated in consecutive spaces for each information tool/source. Dillman (2000) found that using the individual format slightly improved response rate and reduced non-response items.

For another example, another question of Tanner (2000) asked, "Which resources do you use when searching for information that you need in order to give nursing care to patients or clients? (Check all that apply; then rank the top five—from entire list of print, human, and electronic resources—that are MOST useful to you, e.g. 1st =most useful source)." This question has at least three weak points. First, it seems very confused and difficult for respondents to answer because it asked two questions at once. Non-responses to this double-question format will be higher than those to questions that asked one at a time (Dillman, 2000). Second, check-all-that-apply format should not be used in order to reduce primary effect, which happens when respondents tend to select the first answer and they may check all that satisfy or "satisfice" them (Dillman, 2000; Dillman & Tarnai, 2004; P.Biemer, Personal communication, May 04, 2006). Third, the ranking questions should not ask respondents to rank more than the top three of the list (Dillman, 2000).

8. Designing the questionnaire. Compared with face-to-face and telephone interviews, the mail survey can ask about all possible topics, even sensitive topics, it can reduce the risk

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of social desirability effect, and it has no risk of interviewer effect (Dillman, 2000; Lyberg & Kasprzyk, 2004). Additionally, the cognitively designed questions of mail survey such as questions asking the respondents to prompt a recall on an event can produce similar answers to those of face-to-face and telephone survey (Dillman & Tarnai, 2004). However, the self-administered mail survey tends to receive lower response rates compared with other methods such as the face-to-face interview (Lyberg &Kasprzyk, 2004). A study conducted by Tanner (2000) and another study by Pravikoff et al. (2005) used self-administered mail questionnaires assessing information literacy of nurses received response rates of only 34.8% and 37%, respectively. A study of Secco et al. (2006) received only 26 % response rate. Nonetheless, the mail survey can increase response rates and reduce measurement error if the survey is properly designed (Dillman, 2000).

Therefore, in designing the self-administered questionnaire used in this study the researcher paid attentions to the length of questions and to a respondent-friendly format (Dillman, 2000). The aspects of design format includes the facets of using open versus closed questions, number and response categories in fixed alternative questions, and the cover page of the questionnaire.

The greatest concern about this study's questionnaire is its length. The previous version of the questionnaire used in the preliminary test with 30 Thai nurses and 23 American nurses is about 20 pages long. Certainly, this length produces respondent burden, resulting in non-response error. Hence, the researcher needs to consider reducing the length. Firstly, the researcher should consider whether every question was necessary and matched with study objectives and measured variables of interest that are supported by theories and literature (Wiggin, 1998; Biemer & Lyberg, 2003). Furthermore, the researcher should think

about which question deserves space in the questionnaire most and how each question was going to be analyzed (Campanelli, 2005). Secondly, the researcher needed to be certain that every question was easy to understand and answer. It is not merely the length of the questionnaire but also question wording, the flow and order of the questions, and other aspects such as layout that can influence the respondents in answering the survey (P. Biemer, Personal communication, May 24, 2006; Biemer & Lyberg, 2003; Mangione, 1995). However, the shorter a questionnaire, the more likely it will be to obtain a better response rate (Mangione, 1995).

Time can be used to assess whether the questionnaire is in a reasonable length. The time in answering the survey should not be more than 45 minutes to 1 hour (P.Biemer, Personal communication, May 04, 2006). In order to be certain that the length and time were not problems for respondents, the researcher had considered two key matters: One was comparing the time and response rate of a study that used the same length of questionnaire as that of this study's questionnaire; another one was preliminarily testing this study's questionnaire with a sample of 30 Thai nurses and 23 American nurses.

A study that could be compared was conducted by Best (2005). The researcher developed a mail questionnaire that had 170 items and was 18 pages long to assess perceptions and attitudes of about 200 teachers having been teachers in Hare Krishna primary and secondary schools worldwide. Most of the questions were in the Likert scale format. In her pilot testing, the pilot test respondents could complete the questionnaire within 30 minutes to 1 hour. In her data collection, she used a $2 incentive for each respondent, provided a prepaid postage to the school's head or principal, who collected the questionnaires, and employed multiple contacts by using telephones, emails, and postal

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mails. She received a 90% response rate from teachers and 100 % response rate from schools. However, she received many complains about the length of the questionnaire. She said that if she did it again, she would use a shorter questionnaire and that if she could be able to meet her target subjects, she would distribute the questionnaires in person (E. Best, Personal communication, August 12, 2006).

Preliminary Testing

Regarding the preliminary testing of the first draft-proposed questionnaire with 8 doctoral nursing students (3 of them are active nurses) that resulted in refining the previous version of the proposed questionnaire, it took about 25-40 minutes and 45 minutes to 1 hour for American nurses and others to complete the questionnaire, respectively. However, this group of nurses does not well represent Thai nurses who would participate in this study. After adjusting the questionnaire from the preliminary test with 8 PhD students, the researcher conducted a preliminary test with 30 Thai nurses by using the Thai version of questionnaire, translated by the researcher and a Thai PhD nursing student, and with 23 American nurses, who were taking Master's degree classes. In the preliminary testing in both doctoral students and in Thai nurses and American nurses, the researcher also attached a debriefing questionnaire. Following suggestions of Dr. Biemer about debriefing, the researcher asked these respondents to answer the following debriefing questions: 1). How long did it take you to complete the questionnaire? 2) Were there questions that were confusing? Which ones? 3) Were there questions that were offensive? 4) Were there questions that were sensitive that you really don't want to answer? 5) How was the organization of the questions? Was it logical? 6) Was it easy to navigate through the questionnaire? Did you get confused at any point as to where to go next? 7) Was the

questionnaire too long and burdensome? 8) Did the questions make sense? 9) Were there questions that you didn't know how to answer or didn't have the information required to answer? Which ones? 10) How did you respond to these questions?

After 8 doctoral students returned the completed proposed questionnaire and debriefing questionnaire, the researcher asked them again to probe certain problems and issues they had in completing the and issues they had in completing the questionnaire and that they had referred to in answering the questions in the debriefing questionnaire. In addition, the researcher made phone calls to have debriefing interviews with 8 Thai nurses, who responded to the preliminary-test questionnaire and answered the question allowing the researcher to have a phone interview with. In the phone interview, the researcher asked the respondents to clarify the questions that confused them as well as the questions that need special attentions such as questions with Liket scale format with neutral midpoint, "Neither agree nor disagree" and "No opinion." The researcher probed three main aspects: 1) how respondents interpreted terminology, questions, and instructions; 2) how they reacted or thought about some questions or a whole questionnaire during the questionnaire completion; and 3) which questions are missing or misreported (Martin, 2004). For example, the researcher asked the respondents if they could differentiate their answer of response choices of the question "What best describe the reason you USE this source THE MOST?" that include "available", "applicable and useful", "fast and easy to get", "easy to understand", and "reliable and truthful." Also, the researcher asked if the respondents have problems with instructions and what their suggestions were.

The results of preliminary testing from both Thai and American nurses were similar. Thai nurses spent time in completing the questionnaire from 30 minutes to 1 hour and 15

minutes. For American nurses, it took about 25 minutes to 1 hour to finish the questionnaire.

Both Thai and American respondents found that questionnaire Part I was somewhat

confusing because of the format, but the rest of the questionnaire was fine. In addition, the

questions in Part I created different interpretations. These questions asked "Which of the

following sources do you NEED MOST to answer questions, solve problems, and/or make

decisions about nursing care for this activity?" "Which of the following printed/electronic

sources do you USE MOST to answer questions, solve problems, and/or make decisions

about nursing care for this activity?" The response choices of the question asking about

information need include "Nurse colleagues", "Doctors", "Patient and family",

"Kardex/patient chart/record", "Printed/electronic information", and "Other,

specify………………." The response choices of the question asking about information use

include " Written standards/protocols", "Textbooks", " Nursing journals", "Journal

databases/Internet", "Hospital information system", and "Other, specify…………….."

With regards to these questions, some nurses responded to the debrief questions and

to the interviews that nursing care activities have different processes and nurses may need

and use different information sources for different processes of nursing care. Also, in each

nursing care activity, nurses may need and use different information sources for answering

question, for solving problems, and/or for making decisions.   Furthermore, both Thai nurses

and American nurses indicated that the questionnaire was rather long. Dr. Veena Jirapaet

also suggested some changes in the question wording and deleting unnecessary questions for

appropriate use with Thai nurse samples. Consequently, the researcher had adjusted the

questionnaire for its length, question wording, and navigational paths. Regarding the

question wording, the researcher adjusted the questions of Part I to be more specific yet

remaining and deserving the same expected answers. For example, the two questions above were changed to be "When you are not sure or do not know how to do this nursing care, which of the following sources do you NEED MOST?" and "When you are not sure or do not know how to do this nursing care, which of the following printed/electronic sources do you USE MOST?", respectively.

Another aspect of the questionnaire that can increase response rate is a whole questionnaire design or a look of the questionnaire. Based on suggestions by Dillman (2000), the researcher used the booklet questionnaire rather than one-side printed pages of sheets of paper with a staple on the top left. The questionnaire had clear and consistent navigational paths (e.g., START HERE). The questionnaire had an attractive and distinguish cover page with title and graphics representing what the survey is about. The name and address of researcher was included on the cover in order to allow respondents to contact the researcher or to return the completed questionnaire. Thus, if they lost returned envelope or preferred to return the completed questionnaire themselves rather than giving to the head nurse or questionnaire collector, they could still return it. Besides having words of thankful appreciations to respondents and a space provided for their comments and suggestions, the back cover is simple and no questions appear on the back.

As a result, the outcome at this stage was the draft of a 14-page questionnaire, in which its items derived, adapted, and constructed from the previous studies, literature, and preliminary tests. All items assessing the information needs and uses of nurses and factors influencing the needs and uses were consistent with the theoretical framework. This draft of questionnaire was composed of three parts. Part I: Information needs and uses for specific nursing care activities, which included 32 nursing activities, asked respondents to answer

what information they needed and used and what best described the reason of their information source used each nursing care activity. Part II: Information needs and uses in general was composed of 38 questions. Among these 38 questions, one question had 22 items in Likert scale format asking the respondents about their attitude towards information uses and research utilization. Part III: Personal information had 29 questions. Among these 29 items, 2 items asked respondents about their personal information (demographic data) (item 1-2), 13 items asked about respondents' education, including English skills and computer skills (item 3-15), 14 items asked about professional (item 16-28), and 1 additional item (29) allowed respondents to provide comments or suggestions.   The format and scaling varied from dichotomous Yes/No, rating scale (poor to very good), ranking scale, to Likert scale (agreement gradation) (Appendix A).

Assessing Content Validity

In order to assess the content validity of each item and the entire questionnaire, the draft of the questionnaires had been sent to be validated by content experts for reviewing and grading of item content, item style, and comprehensiveness (Grant & Davis, 1997). Lynn (1986) suggested that the content experts should be in between 3 to 10. This study had utilized 7 experts in the field: one faculty in the information and library science, one health science librarian, one psychometrician, two nursing faculty (one is interested in nursing informatics and the other is interested in information/research utilization), and two experienced nurses. Content validity of the questionnaire was determined and quantified by index of content validity (CVI), a proportion of agreement on items and on an entire instrument among content experts (Lynn, 1986). In the content validation, Tilden et al. (1990) suggested that the rating form for each of the dimensions or constructs should include

1) a brief statement describing the background and context of the concept, 2) the concept definition, and 3) the item statements or contents. In this study, for reviewing and grading the contents of the questionnaire, the content experts received a package containing a copy of actual questionnaire, a cover letter, which included an instruction of item evaluation, a description of the questionnaire being developed, the 4-point scale (see attachments), and two appendices. One appendix provided an overview of theories, concepts, and the conceptual framework of this study. The other appendix included explanations of item-relevance to theory, literature, Thai nurses' background, and gap in the literature.

Regarding the 4-point scale item grading, Lynn (1995) used "very relevant and succinct" = 4 points, "relevant, needs minor revision" =3 points, "unable to assess or in need of such revision it would be longer be relevant" = 2 points, and "not relevant" = 1 point. This study used 4 points = "very relevant", 3 points = "relevant, but needs minor revision", 2 points ="unable to assess", and 1 point = "not relevant". In addition, the experts were asked to suggest items that need revisions (Lynn, 1986; Grant & Davis, 1997) and suggesting ways and/or adding items to tap the phenomena that the researcher did not include (DeVellis, 2003; Grant & Davis, 1997; Imle & Atwood, 1988; Tilden et al., 1990).

The total proportion CVI of instrument, which was the proportion of all content-valid items correlation among the CVI of experts, should be higher than 0.7, as indicated by the proportions of CVI in most literature that are in between 0.7-0.8 (Grant &Davis, 1997). This correlation was measured by Cohen's kappa (for two or more inter-raters) (Brennan & Hays, 1992) and it was reported with percent agreement (used with kappa for inter-rater reliability) (Topf, 1989). Tilden et al. (1990) considered more than 89% agreement being adequate, 70-88% being questionable, and less than 69% being unacceptable. Toft (1986)

suggested that the percentage agreement of 70% is necessary, of 80% is adequate, and 90% is good.   As a result, this study considered the questionnaires being acceptable content valid if they have the CVI that has Cohen's kappa correlation and percentage agreement among experts more than 0.7 and higher than 80 %, respectively. If there were several items needing revision (3 point items), the same group of experts was utilized with a two week interval (Lynn, 1986). According to the content expert validation, more than 90 percent of question items were rated as 4 point-items. Few items needed minor revision. Question items in part I were revised for clarity and mutually exclusiveness of alternatives. The result of this stage was the first version of English questionnaire. Then, the first version of English questionnaire was generated.

<center>*Translating the Questionnaire*</center>

Most items assess event of occurrences. However, one question having 22 items, which are subjected to be psychometrically tested. All questions were double back translated to obtain semantic equivalence or equal meaning of each item between the English and the Thai versions.   According to Harkness (2003), translating questionnaire requires translators, translation reviewers, and translation adjudicators. Translators should be skilled translating practitioners who have received training on translating questionnaires. Translation reviewers need to have language abilities as well as those of the translator but also need to be familiar with the topic of the questionnaire and design principles. Translation adjudicators, who make decisions on final version of the questionnaires, can be experts in the topics or principal investigators. The translation should be a team approach in assessing and correcting the translation rather than an individual approach (Harkness, 2003). The translation should reach the goal of "asking the same question" (Harkness, Van de Vijver, & Johnson, 2003;

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Harkness, Pennell, & Schoua-Glusberg, 2004).   Meaning, forms, and formats should be the same as those in the original version. The meanings of questions should be focused more than that of words (Harkness et al., 2004). However, cultural equivalent and linguistic equality should be matters of high concern (Harkness, 2003; Harkness et al., 2003).

In the process of translation and back translation of care giving satisfaction scale in Korean, Son, Zauszniewski, Wykle, and Fulton-Picot (2000) employed three steps: (a) Two bilingual experts whose native language is English translated the English version into Korean; (b) two independent bilinguals, who had not been exposed to the English version, translated the Korean version into English; and (c) another native English expert and the researchers assessed semantic equivalence between the two versions of the English questionnaire. A three-point scale was used to rate semantic difference of each item between two versions: 3 points= "exactly the same meaning," 2= "almost the same meaning," and 1 = "different meaning" (Son, Zauszniewski, Wykle, & Fulton-Picot, 2000).

In the study, it was rather difficult to find a skilled and trained translating practitioner as suggested by Harkness (2003) or two bilingual native English experts as employed by Son et al. (2000). A one-to-one translation, which is commonly used (Harkness, 2003), was applied.   However, the researcher needed to be certain that the translator was qualified and experienced with translating questionnaires. As such, the researcher had selected a translator who is an American nurse, has been in Thailand for about 20 years, and has been translating many English-Thai questionnaires. After the questionnaire was translated from English to be Thai, the researcher and a Thai nursing informatics expert (Dr.Veena Jirapaet) translated it back to English. Then the Thai version of questionnaire was adjusted for the meaning and appropriate wording.

In conclusion, the questionnaire assessing information needs and uses and influencing factor of Thai nurses was derived and developed from empirical studies, related literature, and preliminary tests. The questionnaire was based on Principles and Practice in Nursing (Henderson & Nite, 1997), Dervin's Sense-Making metaphor, and the Wilson's 1996 model of information behavior. The questionnaire was constructed in English. Seven experts in the field of nursing education, information and library science, health science library, and clinical nursing had been utilized for content validity of the questionnaires. The content validity index (CVI), an agreement proportion among expert, was higher than more than 80 percent agreement. The English version questionnaire was translated into Thai, and then back-translated from Thai to English. Content validity of both original English version and second English version was more than 80 percent agreement as well.

Pilot Study

In order to assess applicability and reliability of the questionnaire used in the main study, the pilot study was carried out in a convenient sample of 30 nurses who have at least BSN, work at university, regional, provincial, or community hospitals, and agree to participate in the pilot study. After the approval of the Institutional Review Board (IRB), School of Nursing, University of North Carolina at Chapel Hill and the IRB of hospitals and related organizations in Thailand, the principal investigator chose convenient hospitals and convenient nurses from every hospital level to answer the questionnaire.

Research Procedure

Research procedure included protection of human subjects, subject recruitment and informed consent, and data collection and analysis.

Protection of Human Subjects

Both the pilot test and a survey of the main study were conducted with the approval of the Institutional Review Board (IRB) of the University of North Carolina at Chapel Hill (UNC-CH), School of Public Health and Nursing and the IRB of hospitals that required the approval from their IRB committee and the IRB of related organizations such as Boromarajchonnani Nursing College, Surat-Thani to assure the protection of human subjects. The identity of respondents was protected at all times. Respondents were provided a covering letter with frequently asked questions about the study. Based on the requirement by the IRB of UNC-CH for conducting a social-behavioral research study in human subjects (www.ohre.unc.edu), the covering letter informed an explanation of the research and its purpose, expectations of the respondents, an offer to answer queries arising, information on how to contact the research team, a statement outlining anonymity, confidentiality, and risks and benefits. In addition, in order to keep anonymity and confidentiality of respondents, an indication that returning of the completed questionnaire constituted consent to participate was included in the cover letter. The voluntary nature of completing the questionnaire was emphasized. The frequently asked questions were as follows: How was I selected to be in the sample?; What are the possible benefits, risks, or discomforts from being in this study?; Who see my answers?; How much time does the questionnaire take; What happens if I do not answer?; Why is this survey important?; and Can I see a report from the survey? (Appendix C). The Thai version questionnaire for the pilot tests were handed to the pilot subjects. In the

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main study, the copies of questionnaire for the main study were handed to nurse subjects in

university-affiliated, regional, and provincial hospitals and were mailed to nurse subjects in

community hospitals.

Subject Recruitment, Informed Consent, and Data Collection

After the study received the approval by Institutional Review Board (IRB), UNC-CH

(Appendix B) and related organizations in Thailand, the researcher distributed the copies of

questionnaire to nurse samples by mail at community and provincial hospitals and by hand at

university-affiliated and regional hospitals.

For each community and provincial hospital, the researcher sent a package of

documents to the hospital director to solicit their cooperation about data collection (Appendix

E). This document package was carbon copied (cc) to the head nurse. The documents in this

package included a) a letter soliciting the cooperation and permission to collect data in nurses

issued by the Director of Praboromarajchanok Institute for Health Workforce Development

(PBRI or PIHWD), Ministry of Public Health, which is a sponsor agency of the principal

investigator (Appendix F), and b) a questionnaire package, which includes included a copy of

questionnaire (Appendix A), an informed consent form, an information fact sheet (Appendix

C), a letter soliciting nurses' cooperation issued by the Director of Praboromarajchanok

Institute for Health Workforce Development (PBRI or PIHWD), Ministry of Public Health

(Appendix G), and a returned postcard asking a nurse participant if he/she wants to have a

copy of one of study publications (Appendix D).

After one week of sending the document package each selected community hospital,

the researcher made a telephone call to the head nurse to follow up about the cooperation and

permission from the hospital director (Appendix H). The researcher recalled about the letter

that was sent and asked if the researcher had got a permission to collect data. If the researcher got the permission, she briefly informed the head nurse about the objectives of the research study and data collection. She asked the head nurse's cooperation in a questionnaire distribution to convenient nurse samples of 4-5 nurses, who are interested in participating in this research study. If it was not convenient for the head nurse to do so, the researcher would ask if there was someone or a coordinator, who could help in distributing the questionnaires to nurses. Then, the researcher mailed the questionnaire packages to the head nurse or the coordinator. In this mail, the researcher attached an Oath of Confidentiality (Appendix I), in which the head nurse or nurse coordinator needed to sign and mail back with the returned questionnaire package to the researcher. This Oath of Confidentiality stated that the head nurse or nurse coordinator would keep the completed questionnaires confidential and he/she would not open the nurses' completed questionnaires. It also states that no coercion, penalty, or special treatment would be given to any nurse, who completed or did not complete the questionnaire. Additionally, this mail was included a letter informing the head nurse or coordinator about how to distribute and collect the questionnaire package to nurse subjects. The researcher included a souvenir worth about 40 Thai baths (~US 1.00) to the head nurse or the coordinator as a way of appreciation for his/her help.

Each questionnaire package that the head nurse or nurse coordinator at a community hospital handed to each nurse subject contains 1) a copy of questionnaire including a returned-envelope with researcher's name and address on the envelope, 2) a cover letter considered as an informed consent form, 3) information fact sheet or frequency asked questions for this research study, 4) a letter soliciting the nurses' cooperation from the Director of Praboromarajchanok Institute for Health Workforce Development (PBRI or

PIHWD), Ministry of Public Health 5) a returned postcard asking if a nurse wanted to have a copy of research study publication, 6) a money incentive of 50 Thai baths (~US $1.25). On the back cover of the questionnaire, nurses were instructed to return the completed questionnaire in a sealed envelope and gave it to the head nurse or nurse coordinator, who collected the questionnaire at their hospital. After two weeks of distributing the copies of questionnaire, the researcher had a telephone contact with the head nurse or nurse coordinator if she/he had collected the questionnaires and mailed the questionnaire package back to the researcher (Appendix H). If not, the researcher asked the head nurse or nurse coordinator to send it back as soon as possible. Then, at the fourth week after questionnaire distribution, the researcher had the last telephone contact to see if the package had been sent.

At the university-affiliated, regional, and provincial hospitals, after the researcher had sent a soliciting letter to the hospital director (similar to the letter sent to the hospital director of community hospitals) and an approval letter for data collection within the hospital from the research ethics committee of each university-affiliated hospital), the researcher had a telephone contact with the head nurse or a nurse coordinator of each hospital for his/her cooperation. When the researcher arrived at a hospital, she contacted with the head nurse or nurse coordinator at nursing department who knew that the researcher came to collect data within the hospital. The researcher asked the head nurse or the nurse coordinator to lead the researcher and to introduce the researcher to nurses at wards/units, where the researcher could hand questionnaire packages to nurse subjects. When the researcher distributed the copy of questionnaire to any nurse, the researcher told the nurse to complete the questionnaire when the nurse had a free time or when she or he was at home. The researcher asked the nurses to bring their completed questionnaire in a seal envelope to give it back to

the researcher at their ward/unit next day.   If the nurse subjects did not work at the day of

collecting the completed questionnaires, the researcher told the nurse subjects to give the

completed questionnaire in a sealed envelope to the head nurse or nurse coordinator. The

researcher provided a returned envelope with a prepaid postage to the head nurse or nurse

coordinator, who collected these questionnaire packages and mailed them within 1-2 weeks

to the researcher. Nurse subjects received the same package as those nurses at community

hospitals. Similar to community hospitals, each head nurses or nurse coordinator at the

university-affiliated, regional, and provincial hospitals was asked to sign the Oath of

Confidentiality as well. He or she received also a souvenir worth about 40 Thai baths

(~US$1.00) for his or her cooperation and help. Similarly to the telephone contacts made to

the head nurses or nurse coordinators at community hospitals, the telephone contact was

made to the head nurses or nurse coordinators at the second week and fourth week.

Data Analysis

The discussion of data analysis includes three topics: data processing, statistical

analysis, and statistical compensation for error compensation from estimates. In data

processing, the discussion was focused on how the researcher can reduce or prevent error

while preparing data for analysis. For the statistical analysis, the types of statistics used in

the data analyses were described. Regarding the statistical compensation used to adjust for

errors in the survey, an overview of each statistic that is adjusted by statistical procedures for

error compensation were given.

Data Processing

Before conducting data analysis*,* the researcher needed to prepare for data analysis.

The preparation is called data processing. Several steps were used in data processing to

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prevent and minimize errors due to data processing. The steps varied from mode to mode of

data collection. In the paper and pencil questionnaire, the errors can be reduced and

prevented through scan edit, data entry, editing, coding, file preparation, and data analysis

(Biemer & Lyberg, 2003). These steps can be explained by giving an example of the

questionnaire.

When the questionnaires were returned, the researcher needed to stamp the returned

date and scan or inspect for blank pages and omitted important items. If the omitted items or

blank pages cannot be remedied by statistically weighting compensation, the blank

questionnaires and omitted items are considered non-responses (Biemer & Lyberg, 2003).

During data entry, data were manually keyed and entered to a computer statistic program. In

this step, the researcher did double-data entry for the cases that needed confirmation of their

correct responses. Regarding data editing for analysis purposes and study purposes, editing

data such as combining four categories to be two may be done in some variables. For

instance, the question that asks "How often do you use email in the past month?" has 4

alternatives: daily, few times a week, few times, and none. If the researcher wanted to

estimate how many respondents used email in the past month and what factors influenced

their use, the alternatives of this question could be edited to "Yes" and "No." As a result, the

chi-square statistics could be used to analyze this dichotomous variable. In relation to

coding, the questionnaire has some open-ended questions that need to be prepared for

appropriate coding. The coding can be done automatically and manually. Regarding the data

file preparation step, it dealt with weighting compensation and imputation of missing data

(putting a value computed from statistic modeling of other response in the data file). Most

statistic programs can do these jobs well (Biemer & Lyberg, 2003). This step prepared the data for analysis, which was the last step.

Statistical Analysis

Determining which statistics was used to analyze which variables is dependent on levels of measurement or what kinds of data the scale produces. There were four levels of measurement: nominal scale, ordinal scale, interval scale, and ratio scale (Pedhazur & Schumelkin, 1991). The questionnaire has all of these levels. Most nominal questions in the questionnaire asked respondents to answer yes/no or to select the prelisted responses that cannot be ranked in order. For example, "Do you subscribe for a professional nursing or health journal?" and "What best describes the reason you use this source the most?" An example of the ordinal scale is "How many times have you attended a conference in the past year?" The categorical responses in this question are ranked in order (more than 5 times, 3-5 times, 1-2 times, and none). Examples of ratio scale items include "From a total of 100%, please specify the percentage of your weekly need for information"; and "Which year were you born?" The question about the born year was statistically programmed as ratio scale.

Both descriptive statistics and inferential statistics were used to describe and test some hypotheses. Each statistics was used correspondingly with type of data, research questions, and hypotheses. Descriptive statistics such as frequency, percentage, and mean were used to describe characteristics of nurse respondents and events of occurrence or facts of information needs and uses as well as parameter estimates (describing Thai nurse populations and their information needs and uses). These statistics were used to answer the research questions 1 and 2. Inferential statistics such as chi-square, and multiple logistic regressions were used to answer question 3.

Analysis of variance (ANOVA). ANOVA was used to assess the reliability of the questionnaire for the questions assessing attitudes and opinions about information needs and uses, including research utilization. In the reliability estimation, Cronbach's coefficient alpha for item correlations was used (Pedhazur & Schmelkin, 1991).

Chi-square. Chi-square was used for single independent variables and dependent variables involving nominal or ordinal data; for example, whether gender difference is related to information needs and uses (nominal variable and categorical variables).

Multiple logistic regressions. Multiple regressions were used to predict some variables; for example, to what degree the likelihood of being male or female predicts information needs and uses. Logistic regression has dependent variables (e.g., information use, information need) and the logarithm of the odds that a particular binary response occurs (e.g., printed information use and human information use). Regression-like coefficients derived from maximum likelihood estimation are explained as the change in the logarithm of the odds of dependent variable associated with a unit change in the predictor variable (e.g., gender), controlling for all other predictors in the equation (Tabachnic & Fidell, 2001). The regression-like coefficients were transformed into odds ratio (OR) by exponentiation for clearer explanation or for interpreting probability (Yarandi & Simpson, 1991).

In this study, multiple logistic regressions were utilized more than other statistics to explore relationships among factors influencing information needs and uses. There are a number of reasons for utilizing multiple logistic regressions. First, most dependent variables or criterion variables are discrete. These discrete variables can be treated as continuous variables used in multiple linear regressions by using dummy coding (Tabachnic & Fidell, 2001). Second, the use of multivariate statistical techniques can control for overall Type I

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error rate (e.g., 0.01, 0.05), no matter how many variables are included in the model. Third, complex interrelationships among variables can be revealed and assessed. If the univariate statistics such as ANOVA and bivariate statistics such as Chi-square are used, the Type I error rate cannot be controlled and complex interrelationships are not revealed and assessed (Tabachnick & Fidell, 2001).

Statistical Compensation

Mail surveys or self-administered surveys have been criticized for low response rates or non-response bias (Armstrong & Overton, 1977; Moore & Tarnai, 2001). Three major causes of non-responses are that respondents refusing to respond to the survey, researchers cannot contact selected subjects, and respondents respond the surveys incorrectly (Moore & Tarnai, 2001). According to Moore and Tarnai (2001), the main methods to deal with these non-response problems include a) improving response rate through survey design (Dillman, 2000), b) measuring magnitudes of non-response error and using weighting compensation (Biemer & Lyberg, 2003), c) statistically modeling to compensate for non-response error (Biemer & Stokes, 2004), and d) describing and comparing characteristics of non-respondents with respondents (Armstrong & Overton, 1977). The first method has been discussed. What follows will deal with the rest. However, statistic modeling will not be discussed in details here. For its application, most statistic programs can do these jobs well. The following paragraphs will discuss important aspects of statistics and methods related to b) and d), which will be used in the analysis. These statistics and methods can prevent or minimize errors that can be remedied in the step of analysis.

1. Establishing a power precision. The significant level of all referential statistics is set at 0.05 to accept type –I error. That is, 95 percent of the times that the estimates represent population parameters and only 5% do not.

2. Using multivariate analysis over univariate analysis to control overall type I error rate. As mentioned before, multivariate analysis can analyze many variables in the analysis at the same time so that type I error is computed at once. A type I error overate can happen when using univariate analysis such as ANOVA that analyze one variable at a time.

3. The approach of employing generalized estimating equations (GEE). Instead of using weighted least squared methodology (WLS), GEE, which is an extension of generalized linear models, was used. According to Stokes, Davis, and Koch (2000), similar to the general linear model for predicting linear predictors of continuous variables, the GEE method accounts for covariances of responses outcomes that are specified in the estimating process. The GEE can be used when the WLS cannot be applied well because there are a) categorical outcome variables, b) missing responses, c) non-normality distribution, and d) not large enough required sample size. GEE is available both in SAS and SPSS, and it is very easy to operate in SAS (M. Weaver, Personal communication, August 12, 2006).

4. Managing missing data with certain strategies. Tabachnick and Fidell (2001) recommended a number of strategies to manage missing data. These strategies include a) deleting cases/variables, b) substituting the missing data with mean, c) using regression equation of complete case to predict missing data case, d) using expectation maximization (EM), which uses maximum likelihood by forming correlation matrix or covariance matrix of missing data, e) employing multiple imputation with logistic regression to determine regression equation of missing data, f) treating missing data as existing data by using dummy

codes (case with complete data =0; case with missing data=1), and g) repeating analyses with and without missing data. Most statistic programs such as SAS, SPSS have the program features to handle these missing data. For example, survey mean procedure in SAS can adjust proportions, mean, and standard error very well (M. Weaver, Personal communication, August 12, 2006).

The consideration of which strategies to use depends on the data and statistical programs that can handle the missing data.   According to Tabachnick and Fidell (2001), data deletion may be acceptable if there are many missing values and if they are not critical to other variable analyses. A missing data correlation matrix can be analyzed by both SAS and SPSS. Mean substitutions should be avoided unless no other strategies are better and samples are small. The best solution is repeating analyses with and without missing data.

5. *Comparing respondents with non-respondents*. In order to be certain that non-respondents are not significantly different from respondents or non-response bias does not affect the results of study, a comparison between both should be made. The comparison can be conducted in a post-survey of non-respondents (Biemer & Lyberg, 2003). In addition, Armstrong and Overton (1977) suggested a few strategies such as a) estimating from known values of the population such as those from a study of national consensus (Biemer &Lyberg, 2003), b) using subjective estimates (people who return the questionnaires early tend to be more educated, have better socioeconomic backgrounds, and have more interest in answering the survey), and c) extrapolating that respondents who responded late are assumed as non-respondents (Armstrong & Overton, 1977; Moore & Tarnai, 2001).   In the study, the extrapolation method was appropriate because no studies have been conducted to assess the information needs and uses of Thai nurses. However, the characteristics or backgrounds of

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nurses and attitudes towards information needs, uses, and research utilization may be compared with those in the previous studies of Thai nurses, as mentioned above.

In summary, in conducting a survey study and testing for a new survey questionnaire, the researcher needed to focus on survey quality. The focus on survey quality emphasizes the accuracy of the survey in representing the phenomena and parameters of populations under study. The survey accuracy, revealed by having minimum total survey error, can be achieved through study design, sampling, survey instrumentation, and analysis. An appropriate design should be achievable with enough sample size, cost, and time efficiency. Sampling should guarantee equal probability. The instrument/questionnaire should be appropriately constructed and tested for validity and reliability. Statistical analysis should be suitable for the types of data collected, study purposes, and research questions. The analysis and certain related methods should be applied to compensate for and minimize errors after the data collection was finished.

Taken together, this study was designed as a survey study employing a researcher-developed questionnaire. The questionnaire was derived and developed from related theories, concepts, empirical studies, and relevant literature. The preliminary test had been conducted in 30 Thai nurses and 23 American nurses. The questionnaire was composed of three parts with about 14 pages long. The questionnaire had been validated for contents from experts in the field of information and library science, nursing education, nursing practice, and instrumentation. After getting the IRB approval, the pilot test for the questionnaire was carried out in Thai 30 nurse subjects. Approximately, 990 nurses from 86 hospitals were stratified random sampling to answer the questionnaire. Data were analyzed by using SPSS-X and SAS.

CHAPTER IV

RESULTS

The purpose of this research study was to assess what information Thai nurses need

and use for their nursing care and what factors influence their information needs and uses.

The presentation of this chapter starts with a brief report of the pilot study. The

chapter, then, continues with a description of sample and respondents in the main study,

followed by preparing data for analysis. General descriptive results are presented, afterwards.

Finally, the research questions are addressed through descriptive statistics, cross tabulations,

correlations, and multiple regressions.

Results of Pilot Study

After the approval from the IRB of the School of Nursing and Public Health at the

UNC and from the IRB in Thailand, the researcher conducted a pilot study to determine if the

developed questionnaire was appropriate. The subjects in this pilot study were 30 BSN

nurses (10 from a university hospital, 10 from two community hospitals, and 10 from a

regional hospital).

In general, pilot subjects had no difficulties understanding or answering questionnaire

items. The response patterns appeared to be consistent for all three parts of the questionnaire.

The time to complete the questionnaire ranged from 30 minutes to 1.15 hours. Correlations

and total correlation of the 22 questionnaire items assessing the opinions/attitudes towards

information needs and uses was run to examine the reliability regarding homogeneity of

these items. These 22 items showed a Cronbach's Alpha coefficient on standardized items of

0.64. Items which correlated with all other items less than 0.2 are candidates for exclusion.

As a result of pilot study, only 14 of 22 items were included in the reliability test yielding a

Cronbach's alpha correlation of 0.780. These fourteen items are listed in Table 2. However,

all 22 items were kept in the questionnaire because the excluded eight items can still be used

to describe opinions/attitudes about the information needs and uses. In addition, the

reliability of the 22 questionnaire items may change in the main study because of a larger

sample size. The final version of the questionnaire contains three parts, as described in

Chapter 3 (see Appendix A).

Table 2

Items and Item Correlations to Total Correlation from Pilot Study

Item statement	Corrected item to total correlation
Administrators at my hospital support the nurses' use of printed and/or electronic information	0.74
Supervisors at my hospital support the nurses' use of printed and/or electronic information	0.68
Doctors at my work place support the nurses' use of printed and/or electronic information	0.67
My nursing colleagues support me in using printed and/or electronic Information	0.72
It is very important for nurses to practice with sound information such as research evidence	0.52
If nurses used evidence from research more in their practice it would make a positive difference to patient care and outcomes	0.43

Table 2

Items and Item Correlations to Total Correlation from Pilot Study (Cont.)

Item statement	Corrected item to total correlation
Nursing research done in other countries cannot be applied to Thai nursing care/practice	0.29
I will read and use research more in my nursing care/practice if it is easy to access and available	0.40
My hospital provides enough computer and Internet access to nurses	0.38
My hospital provides enough printed/electronic and research information to nurses	0.34
The best information for my nursing practice does not need to be research information	-0.24
Seeking and reading information from nursing textbooks and Professional nursing and health journals are a part of my role as a nurse.	0.30
Using research in nursing care/practice puts another burden on me	0.29
I will seek and use printed information and research more if I have supports from my supervisors and colleagues	0.36

Main Study

Sample and Respondents

Sample

In Thailand 2005, approximately there were 84,000 BSN nurses. Among these nurses, 68.3% working at hospitals under the Ministry of Public Health (regional, provincial, and community hospitals), 12.9% working under other ministries, particularly the Ministry of Education (university hospitals), and the rest of nurses working at other organizations and

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private hospitals. In this research study, a stratified random sampling was applied to have a sample of 990 BSN (N= 56,323) nurses from 86 hospitals (N=797). This sample included 190 nurses from two university hospitals (95 each), 225 nurses from five regional hospitals (45 each), 244 nurses from ten provincial hospitals (24-25 each), and 331 nurses from 75 community hospitals (4-5 nurses each).

The data collection took place during April to July, 2007. For all selected community hospitals, all provincial hospitals, and one regional hospital, the data collection was done by mailing the packages of questionnaires to the head nurses or nurse coordinators. Within one month, the head nurses or nurse coordinators mailed the packages of questionnaires that were completed and individually sealed in envelopes by nurse respondents. At four regional hospitals and two university hospitals, in order to secure the response rate the researcher traveled to distribute the questionnaires to head nurses or nurse coordinators at the nursing department or units of each hospital. These head nurses or nurse coordinators distributed the questionnaires to and collected them back from nurses. Among these four regional hospitals, nurse coordinators of two hospitals sent the package of completed questionnaires in individually sealed envelopes back by postage mail. At the other two hospitals, the researcher collected the completed questionnaires in individually sealed envelopes either at the units or at the nursing department. For both university hospitals, the researcher distributed and collected the questionnaires to head nurses, who handed out the questionnaires to and collected the completed questionnaires in individually sealed envelopes back from nurses. However, at one hospital the researcher handed out the questionnaires to the head nurses at the units and asked the head nurses or coordinators to mail the packages of completed questionnaires in individually sealed envelopes back to the researcher.

Respondents

There were 769 returned questionnaires (77.7 % response rate). From 760 respondents indicating their hospital types, 120 respondents were from two university hospitals (63% response rate of university hospital nurses), 197 from five regional hospitals (88% response rate of regional hospital nurses), 241 from ten provincial or general hospitals (100% response rate of provincial or general nurses), and 202 from forty six community hospitals (61% response rate of community hospital nurses). The responses were from 63 hospitals, which accounted for 61.3 % hospital response rate. The community hospitals that did not have any nurse returning the survey included seven hospitals from the North, seven from the Central, two from the East, four from the Northeastern, and nine from the South. The questionnaire distributions and response rate are shown in Figure 5.

Figure 5

Sample and Respondents to the Survey
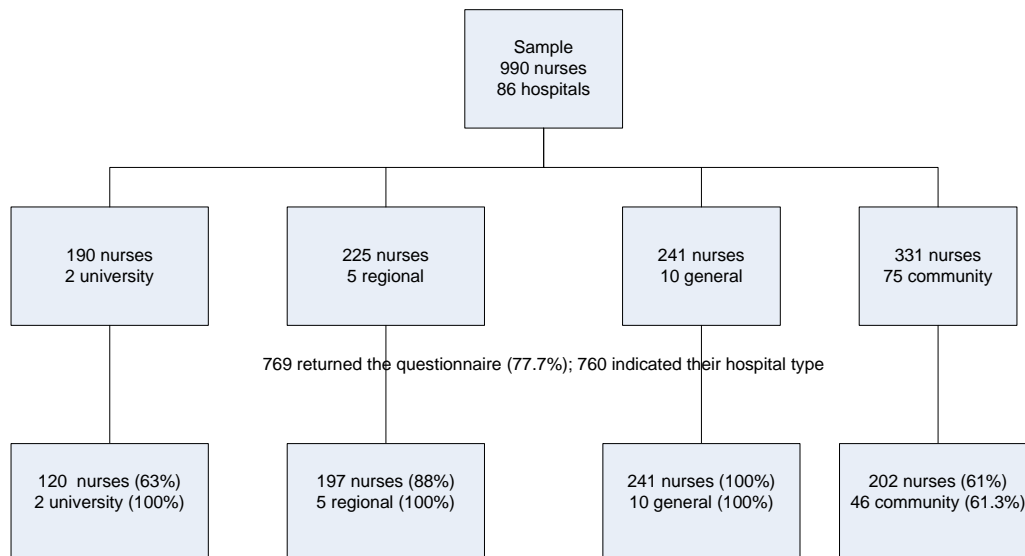
Preparing Data for Analysis

In the method chapter, data procession and analysis were generally discussed. In this chapter, a summary of preparing data for analysis was given. Preparing data for analysis took two steps: data recording and cleaning the data. Regarding data recording, after the researcher received the completed questionnaires back, the answers in the questionnaire were transformed for data analysis by coding and recoding using SPSS and SAS statistic programs.

In order to perform data analysis, cleaning data was performed. The data cleaning included the following strategies. First, skimming for the patterns of completing questionnaires was done to see the completeness of how respondents responded to questionnaire items. Second, checking for data distributions was conducted to see if discrete variables are in the range of assigned numbers; and if means and standard deviations of continuous variables are plausible. Third, normality, univariate outliers, plots for pairwise linearity, and residuals (for regression) were performed for continuous variables and in subsequent related analyses. The cleaning data left 763 cases for data analysis.

In order to take the study sample design into account, PROC SURVEYMEANS, PROC SURVEYFREQ, and PROC GENMOD procedures of SAS program were applied. PROC SURVEYMEAN procedure was used to describe or estimate the survey sample means and totals. There were clusters of hospitals in this study design. Based on this design, the SURVEYMEANS procedure estimated variance from the variation among the hospital clusters. According to SAS Institute Inc. (2004), for each variable the SURVEYMEANS procedure bases statistics only on observations that have non-missing values for that variable. If MISSING option is specified in the PROC SURVEYMEANS procedure, the procedure

will treat the missing values of categorical variables as a valid category. PROC SURVEYFREQ provides design-based tests of associations between variables. It computes variance estimates and standard errors that are appropriate to the complex sample design with stratification and clustering such as this study design. PROC GENMOD procedure can fit generalized linear models of correlated data such as binary and count data such as many data in this study. The procedure can fit the models to correlated responses by GEE method (SAS Institute Inc., 2004).

General Descriptive Results

Descriptive Analysis of Variables Related to Information Needs and Uses

Descriptive analysis of variables related to information needs and uses includes a description of a) demographic characteristics, which are gender, age, and educational backgrounds, including English skills and computer skills, and b) professional experiences.

Demographic Characteristics

Age, gender, and educational backgrounds. Approximately, 98 percent of respondents were female; the respondents' mean age was 36.7 years old (N=749). The mean of years after BSN graduation was 12.2 years. The gender, age, and mean of years after BSN graduation of sample in this study were similar to those in studies of Thai nurses' research utilization by Sindhu and Pookboonmee (1999), Tilokskulchai et al. (2000), and Assalee et al. (2004). Therefore, the sample in this study represented Thai nurses. Approximately, 17 percent (n=125) had a graduate degree and the mean of years after the graduate degree completion was 5.0 years. Roughly, one fourth (28.4%) of the respondents had a three- month or more formal training certification in nursing or related field after BSN. One third of respondents

were teaching nursing students either at the patient units as preceptors (27.6%) or at classroom as guest lecturers (1.6%) or both (2.6%). Only 9.7 percent of respondents were taking an educational course. The majority (87.4%) of respondents had completed a nursing research class before and more than a half of respondents were trained in information or database searching. These demographic characteristics are shown in Table 3.

Table 3

Descriptive Statistics of Demographic Characteristics

Variable		n	Percent	Mean	SE	Range
Gender	- male	17	2.2			
	-	739	97.8			
female						
Age		749		36.7	0.5	20-59
Years after completion of BSN		753		12.2	0.5	0-33
Graduate degree	- yes	125	16.7			
	- no	624	83.3			
Years after completion of a graduate degree		106		5.0	0.4	1-26
Highest degree						
- BSN		618	82.8			
- MSN or MN		71	9.5			
- MS or MA (not in nursing)		48	6.5			
- PhD (not in nursing)		8	1.1			
Having been in a three month or more formal training course in nursing or related						
	- yes	213	28.4			
	- no	537	71.6			
Teaching nursing students	- yes	276	36.7			
	- no	474	63.2			

Table 3

Descriptive Statistics of Demographic Characteristics (Cont.)

Variable		n	Percent	Mean	SE	Range
Teaching location						
- Unit / ward as preceptor		203	27.6			
- Academic / health care institution as lecturer		12	1.6			
- Both		16	2.2			
Taking a course or studying	- yes	72	9.7			
	- no	669	90.3			
Being trained in nursing research	- yes	660	87.4			
	- no	95	12.6			
Having been trained in information/database search	- yes	420	55.8			
	- no	333	44.2			

    English skills and computer skills. With regards to English skills and computer skills, more than 50 % rated their writing, reading, and listening skill as fair; 46 % rated their speaking skill as fair. The respondents tended to rate their computer skills as poor or fair. Compared with percent of email rating, a higher percent of respondents rated their Internet search skill as fair and good (Table 4).

Table 4

English Skills and Computer Skills (N = 763)

Skills	Poor		Fair		Good		Very Good	
	n	%	n	%	n	%	n	%
English skills								
-Reading	128	16.9	407	53.8	206	27.3	15	2.0
-Writing	221	29.2	399	52.7	133	17.6	4	0.5
-Listening	287	37.1	388	51.3	80	10.6	2	0.3
-Speaking	338	45.0	346	46.0	67	8.9	1	0.1
Computer skills								
-Word processing	133	17.6	311	41.2	238	31.6	72	9.5
-Spread Sheet such as Excel	254	33.6	322	42.6	148	19.6	31	4.1
-Database such as Access	504	67.0	203	26.9	43	5.7	2	0.2
-Computer Assisted Instruction	327	43.7	294	39.4	116	15.5	10	1.3
-Hospital Information System	201	26.7	355	47.2	180	23.9	16	2.1
-Presentation Graphics	236	3.1	248	32.0	201	26.7	69	9.2
-Electronic Mail	284	37.6	258	34.2	150	19.9	63	8.3
-Internet	140	18.6	304	40.4	245	32.5	64	8.5

Professional Experiences

On the average, respondents had been working as a nurse for 14.7 years. More than

90% described themselves as registered nurses (RN-BSN), 1.8% as advanced nurse

practitioners, and 7% as nurse specialists. Approximately, 81% identified their main practice

role as nursing care/practice, 3.2 % as nursing education, 13% as nursing administration, and

3% as other roles such as infectious control, quality control, etc. The majority of the

respondents were nursing staff; One third was head or subhead nurses. The average working

hours was 47 hours per week (SE =0.9; Range=20-90). Over 90 percent provided direct

nursing care. Most of respondents worked at inpatient units, in which more than 30% of

them were assigned to intensive care unit, medical, and surgical units. Approximately, 15

BSN nurses worked at a nursing unit (SE = 0.3; Range=1-120). The numbers of patients at

the units where nurses work were various. In general, nurse respondents worked at a unit that

has about 44 patients (SE =6.0; Range =0-1600). Some units did not have a patient. These

units were units in which the respondents worked on non-directed patient care such as

infectious control or quality control. The units that had more than 100 patients per day were

out-patient or emergency departments. Roughly, 79 percent of respondents (n=598) working

at in-patient units. Thirty three percent of respondents indicated that they had a part-time job

and the mean hour of part-time job was about 6 hours a week (SE=0.6; Range 0-80). These

professional experience data are shown as in Table 5.

Table 5

Descriptive Statistics of Professional Experience

Variable		n	Percent	Mean	SE	Range
BSN role						
- RN, BSN		692	91.2			
- RN, certified advanced nurse practitioner		14	1.8			
- RN, nurse specialist		53	7.0			
Professional role						
- Practice / nursing care		612	80.6			
- Education		25	3.2			
- Administration		99	13.0			
- Other		23	3.0			
Professional position						
- Head / subhead nurse		229	30.2			
- Staff nurse		508	66.9			
- Other		22	2.9			
Working hours per week		747		47.0	0.9	20-90
Work shift	- Morning	418	55.1			
	- Afternoon	50	6.5			
	- Night	32	4.2			
	- Each shift equally	258	34.0			
Direct patient care	- yes	682	91.2			
	- no	66	8.8			
Years of experience as a nurse		756		14.7	0.5	0-39
Type of hospital						
- University		120	15.8			
- Regional		197	25.9			
- General		241	31.7			
-Community		202	26.6			

Table 5

Descriptive Statistics of Professional Experience (Cont.)

Variable	n	Percent	Mean	SE	Range
Type of primary work unit					
- Emergency department	57	7.5			
- Outpatient department	47	6.2			
- Inpatient department	598	78.9			
- No separated unit/ward at this hospital	18	2.4			
- Other	38	5.0			
Type of primary inpatient unit					
- Not primarily on inpatient department	159	21.1			
- Pediatric	54	7.2			
- Labor / delivery	61	8.1			
- Gynecology / post partum	45	6.0			
- Operating room	47	6.2			
- Intensive care unit	81	10.7			
- Medical	88	11.7			
- Surgical	96	12.7			
- Orthopedic	6	0.8			
- Eye / Ear / Nose / Throat	18	2.4			
- Psychological	1	0.1			
- Special unit	44	6.0			
- Multiple units	49	6.4			
- Not specified	5	0.7			
Number of nursing staff at the workplace or unit					
- BSN nurses	711		15.3	0.3	1-120
- Technical nurses	615		1.2	0.2	0-24
- Practical nurses	584		2.3	0.8	0-20
- Other staff such as nurse aids	539		2.4	0.6	0-40
Number of patients at the workplace ward/unit*	695		44.1	6.0	0-1600
Part-time work - yes	248	32.8			
- no	509	67.2			
Hours of part-time work	754		5.9	0.6	0-80

Note. * Special units such as infectious control units do not have a patient whereas out patient units of regional hospitals have more than 1,000 patients a day.

In summary, 98 percent of Thai BSN nurses were female. The BSN Thai nurses had a mean age of 37 years old and graduated with BSN degree 12 years ago. They had been working as a nurse for about 15 years. Their English skills were poor to fair; their computer skills were fair to good. Ninety one percent were working as staff nurses and provided direct patient care. Approximately, Thai BSN nurses worked 47 hours for full time per week.

Demographic characteristics and professional experiences of sample have been described. What follows are a descriptive analysis and inferential statistic analysis of information needs and uses, based on research questions.

Descriptive Analysis of Information Needs and Uses

Analysis of information needs and uses of Thai nurses was done to answer the following research questions.

Research Question 1: *What information do Thai nurses need and use in their clinical practice in general and in their specific nursing care activities?*

 Research Question 2: *To what degree do Thai nurses need and use information in their clinical practice in general and specific nursing care activities?*

Research Question 3.4: *Are information needs and uses of Thai nurses associated with nursing care activities?*

In order to answer these research questions, the analysis was conducted to answer the questions regarding the information needs and uses for a) specific nursing care activities and b) clinical practice in general.

Information Needs and Uses for Specific Nursing Care Activities

Regarding information needs for specific nursing care activities, which were assessed through the questionnaire part I, nurses were asked to answer two related questions in each nursing care activity. First, nurses were asked if they provided nursing care activity and they needed information for that activity. Second, they were asked what information sources did they need for that activity, "Usually when you are not sure or do not know how to do this nursing care activity, which of the following information sources do you NEED MOST?" Regarding information uses for specific nursing care activities, nurses also were asked to answer two related questions in each nursing care. One question is "Usually, which of the following printed/electronic sources for information and knowledge do you USE MOST for your nursing care of this activity?" The other one is "What best describes the reason you USE this source THE MOST?" In each question, the alternative sources of information needs, sources of information uses, and reasons for using the information sources were provided for nurse respondents to select.

According to data analysis using PROC SURVEYMEANS of SAS, the information needs and uses for specific nursing care activities of respondents varied according to the activities. These information needs and uses are shown by the main categories of nursing care activities in Table 6, 7, 8 and Table 9.

Nursing Care for Health Evaluation, Planning for Patient Care, and Health Promotion

With regards to the information needs, seventy five to ninety percent of respondents did these nursing care activities and indicated the needs for information. Among these respondents, most respondents indicated the needs of information from nurse colleagues as their first source of information (most rated) when they provided the following types of

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nursing care: 1) examining patient health (42.2%, n=268), 2) measuring and monitoring patients' vital signs (48.4%, n=256), 3) admitting and discharging patients, and 4) terminating care (45%, n=275). Most respondents (34%, n=220) indicated the needs of information from printed/electronic information sources the most (most rated) when they did nursing care on planning for patient care and rehabilitation.

Regarding the information uses, most respondents indicated using printed standards/protocols the most (most rated) for their 1) examining of patient health (44%, n=279), 2) measuring and monitoring patient's vital signs (51%, n=252), 3) admitting/discharging patients and terminating care (67%, n=406), and 4) planning for patient care and rehabilitation (51%, n=324). Most respondents used printed textbooks the most (most rated) for providing health education, promotion, and prevention (42%, n=284). For every nursing care activity, the primary reason of using these information sources the most was that it was available and easy to get.

Fundamentals of Nursing Care - Helping Patients with Their Basic Needs

In relation to information needs, majority of all respondents (59%, n=439) did nursing care and also indicated the information needs in providing basic nursing care for daily body function such as bathing, general hygiene care. Majority of respondents (83%, n=611) did nursing care and indicated information needs in providing basic nursing care for psychosocial/spiritual care and support. Most of these respondents (43%, n= 191) indicated the needs of information from nurse colleagues the most (most rated) when providing basic nursing care for daily body function. Most of these respondents (42%, n=257) indicated the needs for information from printed/electronic sources the most (most rated) when providing basic psychological/spiritual care and support.

Regarding the information uses, the source these respondents used the most was printed standards/protocols (most rated) for both nursing care activities. Being available and easy to get was the highest rated as their best reason for using these sources for both activities.

Therapeutic Measures, Procedures, or Techniques That Nurses Perform or Help Others Perform such as Patients, Their Families, and Medical Workers.

With regards to the information needs, 50 to 80 percent of respondents did nursing care activities and indicated their information needs. Only two activities (suturing minor lacerations and delivering babies in normal case) were performed and indicated information needs for less than 50% by respondents. Most of these 50 percent respondents indicated the sources of information needs from three major sources (nurse colleagues, doctors, and printed/electronic information), which ranged from 20-43%.

Regarding to information uses, most of these respondents (who indicated providing nursing care and needed the information) indicated using printed standards/protocols the most (first rated), followed by printed textbooks (second rated) for most nursing activities. Most of these respondents indicated using printed textbooks the most (first rated), followed by printed standards/protocols (second rated) for suturing minor laceration and delivering babies in normal care. Reasons for using the first rated information sources were similarly in almost every nursing care activity. Their best reason (first rated) was that they were available and easy to get for every activity, followed by being reliable and truthful (second rated). The reason for the information source for suturing minor lacerations was rated equally between available/easy to get and reliable and truthful.

Symptomatic Nursing Care Given to Patients with Symptoms

In relation to information needs, about 70 to 86 % of respondents indicated that they provided nursing care activities and also had information needs for their nursing care. Only 58 % of respondents indicated providing care and having information needs when they cared for patients having disorders of communications attributable to impairments of sight, hearing, and speech. Most of respondents, who indicated providing nursing care and having information needs, indicated doctors as their first source (first rated) of information needs and printed/electronic information as their second sources (second rated) in 4 out of 14 activities. They indicated the information needs from printed/electronic information the most (first rated) for all other activities, followed by from doctors (second rated). However, in providing care for patients in pre- and postoperative states, patients having pain, and dying patients and postpartum care, most respondents indicated nurse colleagues as their second source (second rated) of information.

Regarding the information uses, nurse respondents, who indicated providing symptomatic nursing care activities and having information needs for these activities, used printed textbooks the most (first rated), followed by printed standards/protocols (second rated) in 9 activities. Printed standards/protocols were used the most (first rated), followed by printed textbooks (second rated) in 5 activities. These five include providing care to 1) patients having hypo- or hyperthermia, 2) patients having local injury or wounds with infection, 3) patients in pre- or postoperative state, 4) patients in pain, and 5) dying patients and postpartum care. They indicated availability and ease of access as the primary reason (first rated) to use their first source; the reliability and truthfulness of information sources as their secondary reason (second rated) in 9 activities. Reliable and truthful was rated the most

(first rated) as the best reason, followed by available and easy (second rated) in providing care for patients having shock or collapse-with or without hemorrhage. In providing care to patients having systemic infection and patients having disorders of communications attributable to impairments of sight, hearing, and speech, the respondents rated their best reason as available and easy to get and reliable as equally as truthful of the information sources they used the most.

In summary, Thai nurses had rather high percent of information needs and uses for their specific nursing care activities. These needs and uses varied according to the activities and availability of information sources for uses. Regarding the information needs, for those nursing care activities which nurses can perform independently and those activities that are not complicated, nurse respondents needed information from their nurse colleagues the most. If the activities are complicated and nurses cannot perform the activities independently, nurse respondents required information more from doctors as well as from their nurse colleagues. These needs were compared with the needs of information for uncomplicated nursing care activities that nurses can perform dependently. With regards to the information uses, nurse respondents used standards and protocols the most for their nursing care. They used printed textbooks more for the dependent and complicated nursing care activities. The reasons of using the information sources were being available and easy to get and being trustful and reliable of information sources.

Table 6

Nursing Care for Health Evaluation, Planning for Patient Care, and Health Promotion

	Examining patient health	Measuring and monitoring patients' vital signs	Admitting/ discharging patients and terminating care	Planning for patient care and rehabilitation	Providing health education, promotion, and prevention
Do activity /need information					
Yes/need information	636 (85.4)	540 (75.0)	616 (82.1)	648 (89.1)	679 (90.4)
Yes/ do not need information	43(5.8)	146 (20.3)	77(10.3)	39 (5.4)	31 (4.1)
Do not do activity	66(8.9)	34 (4.7)	57(7.6)	40 (5.5)	41 (5.5)
Information source needed					
Nurse colleagues	268 (42.2)	256 (48.4)	275 (45.1)	220 (34.3)	153 (22.7)
Doctors	115 (18.1)	45 (8.5)	77 (12.6)	48 (7.5)	26 (3.9)
Patients/families	40 (6.3)	11 (2.1)	50 (8.2)	76 (11.8)	75 (11.1)
Kardex/ patient charts/records	28 (4.4)	53 (10.0)	48 (7.9)	43 (6.7)	12 (1.8)
Printed/electronic information	176 (27.7)	162 (30.6)	149 (24.4)	247 (38.5)	397 (58.8)
Others	8 (1.3)	2 (0.4)	11 (1.8)	8 (12)	12 (1.8)
Information source used					
Printed standards/protocols	279 (44.1)	252 (51.4)	406 (66.6)	324 (50.6)	174 (25.9)
Printed nursing textbooks	223 (35.2)	166 (33.9)	74 (12.1)	193 (30.2)	284 (42.2)
Printed nursing journals	22 (3.5)	16 (3.3)	18 (3.0)	27 (4.2)	50 (7.4)
Journal databases	11 (1.7)	9 (1.8)	9 (1.5)	23 (3.6)	38 (5.6)
Internet/world wide web	64 (10.1)	23 (4.7)	31 (5.1)	38 (5.9)	98 (14.6)
Hospital information system	23 (3.6)	8 (1.6)	36 (5.9)	17 (2.7)	14 (2.1)
Do not use any of these sources	11 (1.7)	16 (3.3)	36 (5.9)	18 (2.8)	15 (2.2)
Reason for using source					
Available and easy to get	304 (49.0)	245 (48.3)	278 (48.7)	284 (45.9)	260 (39.8)
Applicable and useful	90 (14.5)	54 (10.7)	125 (21.9)	176 (28.4)	207 (31.7)
Easy to understand	47 (7.6)	46 (9.1)	50 (8.8)	33 (5.3)	64 (9.8)
Reliable and trustful	179 (28.9)	162 (32.0)	118 (20.7)	126 (20.4)	122 (18.7)

Note. The numbers in parentheses may not be combined to be 100 percent due to rounding.

Table 7

Fundamentals of Nursing Care – Helping Patients with Their Basic Needs

	Providing basic nursing care for daily body function such as bathing, general hygiene care	Providing basic nursing care for psychosocial/ spiritual care and supports
Do activity /need information		
Yes/need information	439 (58.7)	611 (83.2)
Yes/ do not need information	222 (29.7)	88 (12.0)
Do not do activity	87 (11.6)	35 (4.8)
Information source needed		
Nurse colleagues	191 (43.7)	153 (25.1)
Doctors	5 (1.1)	17 (2.8)
Patients/families	67 (15.3)	165 (27.0)
Kardex/ patient charts/records	18 (4.1)	11 (1.8)
Printed/electronic information	153 (35.0)	257 (42.1)
Others	3 (0.7)	7 (1.1)
Information source used		
Printed standards/protocols	244 (56.0)	206 (34.0)
Printed nursing textbooks	112 (25.7)	202 (33.4)
Printed nursing journals	22 (5.0)	73 (12.1)
Journal databases	12 (2.8)	27 (4.5)
Internet/world wide web	20 (4.6)	51 (8.4)
Hospital information system	2 (0.5)	4 (0.7)
Do not use any of these sources	24 (5.5)	42 (6.9)
Reason for using source		
Available and easy to get	173 (42.2)	219 (39.0)
Applicable and useful	107 (26.1)	187 (33.3)
Easy to understand	45 (11.0)	50 (8.9)
Reliable and trustful	85 (20.7)	106 (18.9)

Note. The numbers in parentheses may not be combined to be 100 percent due to rounding.

Table 8

Therapeutic Measures, or Techniques that Nurses Perform or Help Patients, their Families, and Medical Workers (other than nurses) Perform

	Administrating oxygen and other gases and using ventilators (respirators)	Administrating oral and parenteral food, fluids, and medications	Performing/helping in intubation of the alimentary tract for medication, irrigation, and drainage, and dialysis	Performing/helping in irrigation of vulva, perineum, and vaginal canal for cleaning and medication	Performing/helping in incision and puncture of body cavities for drainage and medication
Do activity /need information					
Yes/need information	644 (86.1)	625 (85.9)	556 (74.4)	387 (53.4)	569 (76.2)
Yes/ do not need information	33 (4.4)	39 (5.4)	69 (9.2)	60 (8.3)	35 (4.7)
Do not do activity	71 (9.5)	63 (8.7)	122 (16.3)	277 (38.3)	143 (19.1)
Information source needed					
Nurse colleagues	178 (27.8)	163 (26.2)	218 (39.4)	171 (45.0)	121 (21.5)
Doctors	180 (28.1)	160 (25.8)	77 (13.9)	47 (12.4)	226 (40.1)
Patients/families	2 (0.3)	5 (0.8)	6 (1.1)	2 (0.5)	3 (0.5)
Kardex/ patient charts/records	9 (1.4)	26 (4.2)	12 (2.2)	13 (3.4)	4 (0.7)
Printed/electronic information	254 (39.7)	236 (38.0)	237 (42.9)	144 (37.9)	207 (36.7)
Others	17 (2.7)	31 (5.0)	3 (0.5)	3 (0.8)	3 (0.5)
Information source used					
Printed standards/protocols	260 (40.7)	290 (46.8)	316 (57.4)	245 (63.8)	272 (48.1)
Printed nursing textbooks	267 (41.8)	221 (35.7)	166 (30.1)	97 (25.3)	230 (40.6)
Printed nursing journals	27 (4.2)	25 (4.0)	19 (3.4)	11 (2.9)	18 (3.2)
Journal databases	17 (2.7)	15 (2.4)	14 (2.5)	9 (2.3)	12 (2.1)
Internet/world wide web	39 (6.1)	28 (4.5)	21 (3.8)	9 (2.3)	23 (4.1)
Hospital information system	11 (1.7)	15 (2.4)	5 (0.9)	5 (1.3)	2 (0.4)
Do not use any of these sources	18 (2.8)	25 (4.0)	10 (1.8)	8 (2.1)	9 (1.6)
Reason for using source					
Available and easy to get	233 (37.9)	239 (40.4)	228 (42.5)	171 (45.8)	224 (40.3)
Applicable and useful	111 (18.0)	119 (20.1)	94 (17.5)	55 (14.7)	86 (15.5)
Easy to understand	60 (9.8)	44 (7.4)	43 (8.0)	38 (10.2)	43 (7.7)
Reliable and trustful	211 (34.3)	189 (32.0)	172 (32.0)	109 (29.2)	203 (36.5)

Table 8

Therapeutic Measures, or Techniques that Nurses Perform or Help Patients, their Families, and Medical Workers (other than nurses) Perform (Cont.)

	Performing/helping in irrigation and medication of the eye, ear, nose, and throat and removal of foreign bodies	Performing/helping in baths, packs, massage, and therapeutic exercise for circulatory and sedative effects and improvement of muscle tone	Performing/helping in radiation energies and therapeutic applications such as x-ray, iodine isotope, ultrasound, laser	Applying surgical dressings	Performing/helping in application of restraints, splints, casts, and traction for protection and support
Do activity /need information					
Yes/need information	432 (59.8)	429 (57.8)	503 (68.9)	603 (80.4)	444 (61.2)
Yes/ do not need information	43 (5.9)	67 (9.0)	55 (7.5)	77 (10.3)	46 (6.3)
Do not do activity	248 (34.3)	246 (33.2)	172 (23.6)	70 (9.3)	236 (32.5)
Information source needed					
Nurse colleagues	122 (28.6)	142 (33.1)	104 (20.8)	225 (37.4)	133 (30.2)
Doctors	168 (39.3)	40 (9.3)	164 (32.9)	135 (22.5)	148 (33.6)
Patients/families	1 (0.2)	8 (1.9)	4 (0.8)	4 (0.7)	5 (1.1)
Kardex/ patient charts/records	5 (1.2)	4 (0.9)	6 (1.2)	13 (2.2)	2 (0.5)
Printed/electronic information	126 (29.5)	199 (46.4)	196 (39.3)	219 (26.4)	145 (33.0)
Others	5 (1.2)	36 (8.4)	25 (5.0)	5 (0.8)	7 (1.6)
Information source used					
Printed standards/protocols	201 (47.0)	163 (38.1)	221 (44.1)	352 (58.5)	219 (49.8)
Printed nursing textbooks	167 (39.0)	151 (35.3)	173 (34.5)	155 (25.7)	170 (38.6)
Printed nursing journals	13 (3.0)	38 (8.9)	24 (4.8)	24 (4.0)	15 (3.4)
Journal databases	12 (2.8)	23 (5.4)	18 (3.6)	21 (3.5)	10 (2.3)
Internet/world wide web	18 (4.2)	41 (9.6)	36 (7.2)	30 (5.0)	8 (1.8)
Hospital information system	1 (0.2)	1 (0.2)	8 (1.6)	5 (0.8)	4 (0.9)
Do not use any of these sources	16 (3.7)	11 (2.6)	21 (4.2)	15 (2.5)	14 (3.2)
Reason for using source					
Available and easy to get	182 (44.4)	153 (37.0)	205 (43.0)	248 (42.6)	180 (42.4)
Applicable and useful	55 (13.4)	113 (27.3)	85 (17.8)	115 (19.8)	71 (16.7)
Easy to understand	31 (7.6)	43 (10.4)	50 (10.5)	48 (8.2)	32 (7.5)
Reliable and trustful	142 (34.6)	105 (25.4)	137 (28.7)	171 (29.4)	142 (33.4)

Table 8

Therapeutic Measures, or Techniques that Nurses Perform or Help Patients, their Families, and Medical Workers (other than nurses) Perform (Cont.)

	Suturing minor lacerations	Delivering babies in normal case
Do activity /need information		
Yes/need information	320 (43.2)	259 (35.6)
Yes/ do not need information	49 (6.6)	27 (3.7)
Do not do activity	371 (50.2)	441 (60.7)
Information source needed		
Nurse colleagues	102 (32.2)	92 (35.5)
Doctors	115 (36.3)	76 (29.3)
Patients/families	3 (0.9)	1 (0.4)
Kardex/ patient charts/records	4 (1.3)	6 (2.3)
Printed/electronic information	91 (28.7)	81 (31.3)
Others	2 (0.6)	3 (1.2)
Information source used		
Printed standards/protocols	133 (41.8)	115 (44.2)
Printed nursing textbooks	144 (45.3)	125 (48.1)
Printed nursing journals	11 (3.5)	5 (1.9)
Journal databases	9 (2.8)	5 (1.9)
Internet/world wide web	10 (3.1)	0 (0.0)
Hospital information system	1 (0.3)	9 (3.5)
Do not use any of these sources	10 (3.1)	1 (0.4)
Reason for using source		
Available and easy to get	111 (36.3)	105 (40.7)
Applicable and useful	53 (17.3)	41 (15.9)
Easy to understand	33 (10.8)	18 (7.0)
Reliable and trustful	109 (35.6)	94 (36.4)

Note. The numbers in parentheses may not be combined to be 100 percent due to rounding.

Table 9

Symptomatic Nursing Care Given to Patients with Following Symptoms

	Providing care to patients having marked disturbance of intake and output of gases demanding medical intervention	Providing care to patients having marked disturbance of nutrition, fluid and electrolyte balance –starvation, undernutrition, obesity, vomiting	Providing care to patients having marked disturbance of elimination – constipation, diarrhea, retention or suppression of urine, incontinence of urine or feces	Providing care to patients having motor disturbances – hypoactivity, immobilization, and hyperactivity	Providing care to patients having disturbances of consciousness and orientation
Do activity /need information					
Yes/need information	600 (80.3)	593 (81.3)	561 (75.3)	516 (70.6)	550 (74.2)
Yes/ do not need information	23 (3.1)	31 (4.3)	76 (10.2)	61 (8.3)	40 (5.4)
Do not do activity	124 (16.6)	105 (14.4)	108 (14.5)	154 (21.1)	151 (20.4)
Information source needed					
Nurse colleagues	105 (17.7)	85 (14.4)	137 (24.3)	127 (24.9)	118 (21.7)
Doctors	296 (49.9)	240 (40.6)	170 (30.2)	138 (27.0)	181 (33.2)
Patients/families	3 (0.5)	7 (1.2)	13 (2.3)	25 (4.9)	29 (5.3)
Kardex/ patient charts/records	7 (1.2)	25 (4.2)	17 (3.0)	9 (1.8)	16 (2.9)
Printed/electronic information	176 (29.7)	229 (38.7)	224 (39.8)	192 (37.6)	199 (36.5)
Others	6 (10)	5 (0.8)	2 (0.4)	30 (3.9)	3 (0.4)
Information source used					
Printed standards/protocols	229 (38.5)	205 (34.7)	232 (41.2)	202 (39.2)	199 (36.6)
Printed nursing textbooks	290 (48.7)	286 (48.5)	237 (42.1)	232 (45.0)	257 (47.3)
Printed nursing journals	23 (3.9)	28 (4.7)	23 (4.1)	19 (3.7)	19 (3.5)
Journal databases	8 (1.3)	22 (3.7)	16 (2.8)	13 (2.5)	25 (4.6)
Internet/world wide web	30 (5.0)	31 (5.3)	34 (6.0)	25 (4.9)	26 (4.8)
Hospital information system	4 (0.7)	2 (0.3)	2 (0.4)	2 (0.4)	1 (0.2)
Do not use any of these sources	11 (1.8)	16 (2.7)	19 (3.4)	22 (4.3)	16 (2.9)
Reason for using source					
Available and easy to get	228 (39.2)	225 (39.5)	232 (42.8)	205 (42.0)	204 (39.0)
Applicable and useful	88 (15.1)	100 (17.6)	96 (17.7)	91 (18.6)	96 (18.4)
Easy to understand	45 (7.7)	31 (5.4)	33 (6.1)	36 (7.4)	38 (7.3)
Reliable and trustful	220 (37.9)	213 (37.4)	181 (33.4)	156 (32.0)	185 (35.4)

Table 9

Symptomatic Nursing Care Given to Patients with Following Symptoms (Cont.)

	Providing care to patients having anxiety, depression, insomnia	Providing care to patients having hyperthermia or hypothermia	Providing patients having local injury or wound with infection	Providing care to patients having systemic infection-a communicable condition transmitted by various channels.	Providing care to patients having shock or collapse- with or without hemorrhage
Do activity /need information					
Yes/need information	525 (72.0)	579 (77.5)	601 (82.1)	577 (77.8)	630 (86.0)
Yes/ do not need information	63 (8.6)	103 (13.8)	52 (7.1)	19 (2.6)	22 (3.0)
Do not do activity	141 (19.4)	65 (8.7)	79 (10.8)	145 (19.6)	80 (11.0)
Information source needed					
Nurse colleagues	125 (26.4)	285 (42.2)	137 (22.9)	165 (22.3)	96 (15.3)
Doctors	149 (31.5)	108 (16.0)	205 (34.3)	98 (13.2)	309 (49.2)
Patients/families	60 (12.7)	7 (1.0)	9 (1.5)	227 (30.7)	2 (0.3)
Kardex/ patient charts/records	13 (2.7)	27 (4.0)	19 (3.2)	4 (0.5)	6 (1.0)
Printed/electronic information	108 (22.8)	239 (35.4)	223 (37.3)	15 (2.0)	210 (33.4)
Others	18 (3.8)	9 (1.3)	5 (0.8)	231 (31.3)	5 (0.8)
Information source used					
Printed standards/protocols	166 (32.0)	271 (47.4)	295 (49.2)	212 (36.6)	241 (38.4)
Printed nursing textbooks	238 (45.9)	215 (37.6)	198 (33.1)	267 (46.1)	310 (49.4)
Printed nursing journals	30 (5.8)	23 (4.0)	24 (4.0)	16 (2.8)	16 (2.6)
Journal databases	21 (4.0)	19 (3.3)	24 (4.0)	21 (3.6)	19 (3.0)
Internet/world wide web	30 (5.8)	29 (5.1)	41 (6.9)	46 (7.9)	27 (4.3)
Hospital information system	2 (0.4)	1 (0.2)	1 (0.2)	8 (1.4)	3 (0.5)
Do not use any of these sources	32 (6.2)	14 (2.4)	16 (2.7)	9 (1.6)	11 (1.8)
Reason for using source					
Available and easy to get	177 (36.5)	225 (40.3)	246 (42.3)	207 (36.8)	237 (37.9)
Applicable and useful	122 (25.2)	103 (18.5)	102 (17.6)	106 (18.9)	102 (16.3)
Easy to understand	45 (9.3)	45 (8.1)	33 (5.7)	33 (5.9)	29 (4.6)
Reliable and trustful	141 (29.1)	185 (33.2)	200 (34.4)	216 (38.4)	257 (41.1)

Table 9

Symptomatic Nursing Care Given to Patients with Following Symptoms (Cont.)

	Providing care to patients having disorders of communications attributable to impairments of sight, hearing, and speech	Providing care to patients having the preoperative state and postoperative state	Providing care to patient having pain	Providing care to dying patients and postpartum care
Do activity /need information				
Yes/need information	427 (57.9)	581 (79.1)	651 (86.9)	533 (73.0)
Yes/ do not need information	68 (9.2)	54 (7.3)	58 (7.8)	63 (8.6)
Do not do activity	243 (32.9)	100 (13.6)	40 (5.3)	134 (18.4)
Information source needed				
Nurse colleagues	109 (25.5)	212 (36.8)	167 (25.9)	193 (36.3)
Doctors	98 (23.0)	104 (18.1)	148 (22.9)	48 (9.0)
Patients/families	60 (14.1)	9 (1.6)	41 (6.3)	101 (19.0)
Kardex/ patient charts/records	9 (2.1)	23 (4.0)	17 (2.6)	4 (0.8)
Printed/electronic information	147 (34.4)	221 (38.4)	269 (41.6)	181 (34.1)
Others	4 (0.9)	7 (1.3)	4 (0.6)	4 (0.8)
Information source used				
Printed standards/protocols	131 (30.8)	349 (60.6)	278 (43.2)	252 (47.5)
Printed nursing textbooks	195 (45.9)	151 (26.2)	196 (30.4)	140 (26.4)
Printed nursing journals	28 (6.6)	25 (4.3)	57 (8.9)	58 (10.9)
Journal databases	17 (4.0)	16 (2.8)	29 (4.5)	18 (3.4)
Internet/world wide web	28 (6.6)	23 (4.0)	62 (9.6)	32 (6.0)
Hospital information system	1 (0.2)	4 (0.7)	4 (0.6)	6 (1.1)
Do not use any of these sources	25 (5.9)	8 (1.4)	18 (2.8)	24 (4.5)
Reason for using source				
Available and easy to get	137 (34.3)	262 (46.3)	242 (38.7)	203 (40.3)
Applicable and useful	91 (22.8)	99 (17.5)	164 (26.2)	156 (31.0)
Easy to understand	36 (9.0)	45 (8.0)	43 (6.9)	44 (8.7)
Reliable and trustful	136 (34.0)	160 (28.3)	176 (28.2)	101 (20.0)

Information Needs and Uses for Nursing Care and Practice in General

Based on the questionnaire part II, the information needs and uses in general were assessed by asking nurse respondents to answer questions regarding their information needs and uses in general, not specific to any nursing care activity. For example, in assessing the information needs for nursing care and practice for clinical practice in general, nurse respondents were asked to indicate the frequency of their information needs from different sources by answering the question "Nurses need information to answer questions, solve problems, make decisions, and/or fulfill nurses' desire to have information for nursing care and practice. In your working day, how often do you need information for your nursing care and practice, patient education and/or for your practice at administration unit, education unit, or other units?" For another example, in order to assess nurses' information uses, nurse respondents were asked to select the prelisted information sources in answering the question "Usually, when you are looking for information to answer questions, solve problems, make a decision, and/or enhance knowledge for your nursing care, which of the following printed/electronic information source would you USE the LEAST?"

What follows are the descriptive statistics of the information needs and uses in general that include a) the information needs and uses for nursing care and practice in general from person and printed/electronic sources, b) the uses of experiences in nursing care and the percent of weekly information needs, c) the needs and uses of other printed and electronic information sources, d) the needs of education, training, and supports for information needs and uses, and e) the opinions/attitudes about the information needs and uses for nursing care in general. All of these descriptive statistics were done by using PROC SURVEYMEANS.

Information Needs and Uses for Nursing Care and Practice in General from Person and

Printed/Electronic Sources

Regarding information needs for nursing care and practice in general from person and from printed/electronic sources, nurses were asked to indicate the frequency of their information needs from persons and printed/electronic sources as "Nurses need information to answer questions, solve problems, make decisions, and/or fulfill nurses' desire to have information for nursing care and practice. In your working day, how often do you need information for your nursing care and practice, patient education and/or for your practice at administration unit, education unit, or other units?" The percent of respondents indicating the frequency of their information needs from the information sources varied. The respondents indicated high percent of information needs as once or more a day from person information sources and from other available information sources at their nursing unit. The majority of respondents indicated information needs once or more a day from patients and family, nurse colleagues, doctors, electronic patient record (EPR), and printed kardex, patient charts, and records. The majority of the respondents indicated the information needs as once or more a week from Internet, other colleagues, hospital information system (excluding EPR), drug/lab manuals, and printed standards/protocols. The needs for information from printed nursing journals and journal databases were most rated as once or less a month (Table 10).

Table 10

The Frequency of Information Needs for Nursing Care and Practice in General from Person and Printed/Electronic Information Sources

Information sources	N	Information needs							
		Once or more a day		Once or more a week		Once or less a month		Do not need	
		n	%	n	%	n	%	n	%
Patients and family	744	425	57.0	175	23.5	126	16.9	18	2.4
Nurse colleagues	750	473	63.0	205	27.3	70	9.3	2	0.3
Doctors	746	386	51.7	230	30.8	124	16.6	6	0.9
Other colleagues	747	161	21.6	338	45.2	224	30.0	24	3.2
Printed text books	747	185	24.8	340	45.5	218	29.2	4	0.5
Printed nursing journals	700	104	14.9	260	37.1	323	46.1	13	1.9
Journal databases	747	55	7.3	187	25.0	465	62.2	40	5.4
Internet search/World Wide Web	751	153	20.4	314	41.8	247	32.9	37	4.9
Electronic patient record (EPR).	746	428	57.4	197	26.4	108	14.5	13	1.7
Hospital information system (excluding EPR)	747	168	22.5	275	36.8	266	35.6	38	5.1
Drug/lab manual	746	246	33.0	277	37.1	213	28.6	10	1.3
Printed standards/ protocols	748	220	29.4	299	40.0	223	29.8	6	0.8
Printed kardex/ patient chart/record	747	475	63.6	153	20.5	98	13.1	21	2.8

With regards to the information uses, nurses were asked about the printed/electronic information sources they used the least when they were looking for information to answer questions, solve problems, make a decision, and/or enhance knowledge for their nursing care. These information sources were journal databases (n=324; 43.2%), followed by hospital information system (n=169; 22.5%) and Internet/WWW (n= 158; 21.1%). The primary reasons (most rated) for using these sources the least included a) not available and easy to get (n=408; 55.1%), followed by b) difficult to understand (n=154; 20.8%), and c) not necessary to use (n=112; 15.1%).

The Uses of Experiences and Percent of Weekly information Needs

In assessing the uses of experiences and percent of weekly information-needs, nurses respondents were asked to answer the questions "Nurses use their own experiences as well as others' experiences for their nursing care and practice. For your nursing care and practice, what source of experience is USED MOST?" and "From a total of 100%, please specify the percentage of your weekly needs for information." The results showed that about 60% (n=448) of respondents indicated using their own experience and experience of others the most, followed by using their own experience (35.6%, n=265), and by using others' experience (4.3%, n= 32). Regarding the 100% of weekly information needs, nurse respondents indicated the information needs for patient care and patient education (N= 740, mean = 51.5; SE ±1.06) higher than for personal development (N =738; mean = 44.1; SE = 1.03), and higher than for other reasons (N=725; mean =4.5; SE = 0.27).

The Needs and Uses of Other Printed and Electronic Information Sources

According to the needs and uses of other printed and electronic information sources, nurse respondents were asked to select the prelisted alternatives of the questions regarding a)

hearing about research databases, b) the needs and uses of library and printed information, c) the needs and uses of electronic-related information sources such as hospital information system and Internet search/www, d) the search and application of information and research, e) the uses of other forms of information as communication strategies, and d) the needs for education, training, and supports for information needs and uses. What follows are results of the needs and uses of these information sources.

Hearing about the research databases. Nurse respondents were asked if they have heard about the research databases (as those in Table 11). Compared between the hearing about Thai research databases and other databases, a higher percent of respondents heard about Thai research databases whereas fewer percent of respondents heard about other research databases such as CINAHL, MEDLINE/Pubmed, and Cochrane databases (Table 11).

Table 11

Having Heard About Research Databases

Database	Heard			
	Yes		No	
	N	%	N	%
Thai databases	502	67.5	242	32.5
CINAHL	306	41.1	439	58.9
MEDLINE/PUBMED	286	38.9	450	61.1
The Cochrane Library	146	19.7	596	81.3

The needs and uses of library and printed information. Regarding the needs and uses of printed information and library, nurse respondents were asked the questions related to the needs and uses of library/book rooms at the unit/hospital and at a university or nursing college, library search, and the uses of nursing and health related journals. With regards to the needs and uses of library/book rooms at the unit/hospital, nurses were asked "Does your UNIT/WARD have a reference/book room or book area?," "Does your HOSPITAL have a library or a book room?," "If "Yes", how often do you use the library/book room at your hospital in the last year for your nursing care and practice (not for education degree obtainment?," "If you answered "Once of less a month" or "Not at all" to Question 9a, please put a "1" next to the most important reason, you do NOT use more, a "2" next to the second most important reason and a "3" next to the third most important reason."

Ninety two percent (n= 695) of respondents answered that their unit had a book or reference room or area. However, 40.3 % of respondents used it once or more a week and 35.6% used it once or less a month. On average, eight percent (n= 61) of respondents indicated that their unit did not have it and 99 % of them needed to have it. Ninety percent (n=683) of respondents indicated that their hospital had a library or book room. Approximately, 8.5% (n=71) indicated that their hospital did not have a library room and 91% of these respondents indicated their need to have it. Among those whose hospital had a library or book room, only 2.6 % of them used it every day, 22.0 % used it one or more a week, 56.6% used it once or less a month, and 11.6% never used it.

Among those who used it once or less a month and never used it, their primary reason (most often rated) of their rare uses or no use was that they had no time, followed by that they obtained information from other sources, and that there were few nursing information

sources in the library. Their second reason (most often rated) was that there were few nursing

information sources in the library, followed by that they obtained information from other

sources, and that the books were out of date. The third reason (most often rated) was that

there were few nursing information sources, followed by that they obtained information from

other sources, and that the books were out of date (Table 12).

Table 12

Reasons for Rare Using or Not Using a Hospital Library or Book Room

Reasons for not using the hospital library	First		Second		Third	
	n	%	n	%	n	%
There are few nursing printed						
information sources	92	12.5	142	19.3	124	16.9
The books are out of date	52	7.0	116	15.8	93	12.6
It is for doctors	10	1.4	11	1.5	24	3.3
I have no time	217	29.5	70	9.5	76	10.3
I have no need to use it	13	1.8	35	4.8	45	6.1
I obtain information from other sources	126	17.1	118	16.1	116	15,8
The hospital does not have a library	71	9.3				

In addition, when nurses were asked "How often did you use the library at the

university or nursing college in the past year for your nursing care and practice (not for

obtaining educational degree)?", 55% (n=365) of respondents indicated that they never used

it, 33.7% used it once or less a month, 9.7 % used it once or more a week, and 1.5 % used it

every day. The first reason (most often rated) was that the library was far from work or far to

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commute, followed by that they had no time, and that they obtained information from other sources. Their second rated reason (most often rated) was that they had no time, followed by that they obtained information from other sources, and that it was far from work or far to commute. Their third reason (most often rated) was that they obtained information from other sources, that they had no time, and that the library required membership (Table 13).

Table 13

Reasons for Not Using a University or Nursing College Library

Reason not using a university or nursing college library	First		Second		Third	
	n	%	n	%	n	%
It is far from my work or far to commute	240	38.7	87	14	42	6.8
There are few printed nursing information sources	20	3.2	62	10	46	7.4
Books are out of date	17	2.8	30	4.8	33	5.3
It is for students, instructors, and researchers	6	1.0	19	3.07	34	5.5
I have no time	129	20.8	124	20	106	17.1
It requires membership	9	1.5	45	7.3	56	9.1
I have no need to use it	12	1.9	42	6.8	47	7.6
I obtain information from other sources	115	18.6	120	19.5	146	23.7

Regarding searching information from a library and using nursing/health related journals, nurses were asked "Usually when you use a library, what is the search strategy you use THE MOST for searching information from the library?," "How often do you read Thai professional nursing and health journals?," "How often do you read professional nursing and

health journals published in English?," and "Do you personally subscribe to a professional nursing or health journal (s)?."

Majority of respondents (54.8%, n=407) went directly to the shelves of subject areas; about 12.4% (n=92) asked a librarian; and less than 10% used the card catalog, or the online library catalog, or journal databases, or Internet/world wild web. The majority (78.2%, n=589) of respondents read Thai nursing journals once or less a month. Approximately, 57 % (n=427) of the respondents never read English nursing journals. More than 80% (n=610) of respondents did not personally subscribe to a professional nursing/health journal.

The needs and uses of electronic-related information sources such as hospital information system and Internet search/www. In relation to the needs and uses of electronic-related information sources, nurse respondents were asked the following questions: 1) "Does your UNIT/WARD have a hospital information system including electronic patient record (HIS or EPR)?", 2) "Does your unit/ward or hospital have research databases such as CINAHL, MEDLINE, Thai health care databases?," 3) "How often do you use the databases such as CINAHL, Pubmed/MEDLINE?", 4) "How often do you use Thai health care databases?," 5) "Does your UNIT/WARD have a computer connected to the Internet?," 6) "Does your HOSPITAL have a computer connected to

the Internet?," 7) "Does your HOME/DOMITORY have a computer connected to the Internet?," 8) "How often do you use the Internet/World Wide Web to search for information?," 9) Do you search for nursing and health-related information from the Internet/World Wide Web?," 10) "When you search for nursing and health-related information, which search engine or website do you use THE MOST?," 11) "Usually, when you search for general and/or nursing and health related information from Internet/World

Wide Web and databases, which search strategies do you use the MOST?," and 12) "If you do not search for information from the Internet/World Wide Web, what reason best describes why you do not search information from the Internet?,"

If they answered "no" to any of the questions asking whether they had those information sources, they were asked if they wanted to have those information sources.

The answers to the above questions showed that the majority (85.2%, n=643) of respondents indicated that their unit/ward had a hospital information system, including electronic patient records. On average, 60% (n=447) of respondents indicated no research databases at their unit/hospital and 48.7 % of respondents wanted to have such databases. Roughly, 66 % (n=496) never used research databases and 45 % (n=335) never used Thai research databases.

With regards to the uses of Internet/www, 78.8% (n=595) of respondents indicated that their unit had a computer connected to the Internet and 98% (n=741) of respondents indicated that their hospital had such a computer. Approximately, 55% (n=415) of respondents indicated that their house or dormitory room had a computer connected to the Internet and 36 % (n=271) did not have and they wanted to have it. Forty two percent (n=317) of respondents used Internet/www to search for information. Only 8.7% (n=66) never used it. Among respondents who used the Internet, 82% (n=619) used it to search for information about nursing and health. The majority (68.5%, n=491) of the Internet users searching for nursing and health related information used Google or a general search engine the most, followed by nursing and health care organization's websites such as the website of the Ministry of Public Health (11.2%, n=84) and only

3.9 % (n=29) used Pubmed, CINAHL. Basic search (typing the words/subjects) was the first strategy that was used the most (68.5%, n=516) and less than 10% indicated using prelisted subject domain/menu and medical subject heading as the most use of search strategies. Few percent used Boolean operators (1.2%, n=13) and advanced search strategies (1.9, n=15%). The reasons the respondents did not search information from the Internet included no time (20.1, n=225%), followed by most websites were in English or other languages, not Thai, (12.9%, n=98), and not having it at home (11.9, n=90%) and not knowing how to use the Internet (8.2%, n=62).

The search and application of the retrieved information and research. With regards to the search and application of the retrieved information and research, nurses were asked two questions. One is "When was the last time that you applied your retrieved printed/electronic information, which is not information from a research study, to solve your clinical problem and/or nursing care/work problem?" The other is "When was the last time that you sought for information from a research study and applied it into your practice/nursing care and/or work problem?"

Twenty three percent (n=174) of respondents answered that the last time they applied their retrieved printed/electronic information was last month. Similarly, the last time that most respondents sought and applied research information into their clinical/nursing care or work practice was last month (21%, n=159). However, the percent of respondents who indicated that they never did a search nor applied information from a research study (13.6%, n=102) was higher than those who performed a searched but did not apply the retrieved information (8.9%, n=67).

The uses of other forms of information as communication strategies. Regarding the used of other forms of information as communication strategies, nurses were asked three related questions: 1)"To what extent does your unit/ward/hospital use the following strategies to communicate or inform about the practice or work among its members (both administrative staff and nursing care/practice staff)?," 2) "Do you have a cell phone?," 3) "Do you have an electronic mail address (Email address)?," 4) How often did you use email in the past month?," and 5) " How many times have you attended a conference in the past year?"

In order to communicate or inform about the practice or work among its members, the unit/ward/hospital used one-to-one communication once or more a day (25.2%, n=178) the most, followed by memo/note once or more a week (37.8%, n=271), meeting once or more a month (56.2%, n=415). Approximately, 60 % (n=397) of respondents answered that their unit/ward or hospital never used email for communication.

Ninety eight percent of respondents (n=741) had a cell phone; and 54 % (n=411) had email address. However, only 7.8 % (n=59) used it every day; 22% (n=165) used it every week; 17 % (n=131) used it once or less a month; and 8.4% (n=63) never used it in the past month. Forty five percent (n=340) of respondents indicated joining a conference more than 5 times in the past year; only 2.3% (n=18) indicated never did in the past year.

The needs for education, training, and supports for information needs and uses. Regarding to the needs for education, training, and supports for information needs and uses, nurses were asked to answer two questions. First, they were asked "Please check the following continuing education or training you want to have THE MOST in order to improve your practice and nursing care based on information/research" Second, they were asked

"What following supports do you want THE MOST from your hospital or related organizations such as the Ministry of Public Health to provide or support the nurses' needs and uses of information and research?"

The continuing education/training the respondents needed the most was literature search (36.4%, n=273), followed by English skills (23.8%, n=179), computer skills (18.9%, n=142) and research knowledge and method (18.2%, n=137). The first three supports the respondents needed the most from their hospitals or health care organizations were 1) having electronic health system that allows accessing to major hospitals and universities for information/research databases (33.3%, n=251),

2) providing more time to nurses for taking educational courses and training for information uses (22.8, n=172), and 3) having more information/databases available in Thai (16.3%, n=123).

Opinions about the Information Needs and Uses for Nursing Care in General

With regard to the opinions/attitudes on the information needs and uses for nursing care and practice in general, nurses were asked to rated to what extend they agreed or disagreed with statements assessing their information needs and uses. The percentage agreements are shown as in Table 14.

Table 14

Percentage Agreements of Opinions/Attitudes about the Information Needs and Uses

Statements	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree	No Opinion
Administrators at my hospital support the nurses' use of printed and/or electronic information	170 (22.5)	372 (49.2)	139 (18.4)	53 (7.0)	17 (2.2)	5 (0.7)
Supervisors at my hospital support the nurses' use of printed and/or electronic information	159 (21.1)	391 (51.9)	132 (17.5)	49 (6.5)	16 (2.1)	7 (0.9)
Doctors at my work place support the nurses' use of printed and/or electronic information	112 (14.8)	334 (44.4)	183 (24.3)	85 (11.3)	18 (2.4)	21 (2.7)
My nursing colleagues support me in using printed and/or electronic information	120 (16.0)	399 (53.1)	169 (22.5)	49 (6.5)	8 (1.1)	7 (0.9)
I trust my own experience in making decision about my nursing care/practice more than other sources	8 (1.1)	138 (18.3)	366 (48.6)	190 (25.2)	43 (5.7)	8 (1.1)
My own experience is more helpful in making decision about my nursing care/practice more than other sources	20 (2.7)	191 (25.3)	341 (45.3)	164 (21.8)	30 (4.0)	6 (0.8)
My nursing colleagues believe that their own experience is more helpful in making decision about their nursing care/practice than other information sources	14 (1.9)	167 (22.1)	368 (48.8)	165 (21.9)	24 (3.1)	16 (2.1)
Information from my colleagues/patient/family and/or others is more helpful in making decision about my nursing care/practice than from printed and/or electronic information	30 (3.9)	186 (24.7)	345 (45.8)	165 (21.9)	23 (3.1)	3 (0.4)

Table 14

Percentage Agreements of Opinions/Attitudes about the Information Needs and Uses (Cont.)

Statements	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree	No Opinion
I trust information from my colleagues/patient/family and/or others in making a decision about my nursing care/practice more than from printed and/or electronic information	15 (2.0)	128 (17.0)	347 (46.1)	217 (28.8)	41 (5.4)	5 (0.7)
It is very important for nurses to practice with sound information such as research evidence	218 (28.9)	393 (52.0)	122 (16.2)	16 (2.1)	3 (0.4)	2 (0.3)
If nurses used evidence from research more in their practice it would make a positive difference to patient care and outcomes	264 (35.1)	400 (53.2)	80 (10.6)	5 (0.7)	1 (1.3)	2 (0.3)
Nursing research done in other countries cannot be applied to Thai nursing care/practice	5 (0.7)	51 (67.7)	339 (45.0)	297 (39.4)	53 (0.7)	8 (1.1)
I do not use information/research published in English because of my limited English skills	65 (8.6)	255 (34.0)	193 (25.6)	204 (27.1)	30 (4.0)	6 (0.8)
My limited knowledge about electronic information search prevents me from using information/research from electronic information sources and Internet/World Wide Web	41 (5.5)	260 (34.6)	202 (26.9)	194 (25.8)	52 (6.9)	2 (0.3)
My limited computer skills prevent me from using information/research from electronic information sources and Internet/World Wide Web	41 (5.5)	236 (31.6)	169 (22.6)	245 (32.8)	54 (7.2)	3 (0.4)

Table 14

Percentage Agreements of Opinions/Attitudes about the Information Needs and Uses (Cont.)

Statements	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree	No Opinion
I will read and use research more in my nursing care/practice if it is easy to access and available	215 (28.7)	427 (57.0)	87 (11.6)	14 (1.9)	4 (0.5)	2 (0.3)
My hospital provides enough computer and Internet access to nurses	86 (11.4)	225 (29.9)	112 (14.9)	228 (30.3)	98 (13.0)	3 (0.4)
My hospital provides enough printed/electronic and research information to nurses	39 (5.2)	153 (20.4)	173 (23.1)	287 (38.3)	92 (12.3)	5 (0.7)
The best information for my nursing practice does not need to be research information	26 (3.4)	215 (28.8)	266 (35.7)	178 (23.9)	57 (7.6)	4 (0.5)
Seeking and reading information from nursing textbooks and professional nursing and health journals are a part of my role as a nurse	129 (17.2)	483 (64.3)	111 (14.8)	20 (2.7)	6 (0.8)	2 (0.3)
Using research in nursing care/practice puts another burden on me	13 (1.7)	89 (11.8)	238 (31.6)	337 (44.7)	72 (9.5)	4 (0.5)
I will seek and use printed information and research more if I have supports from my supervisors and colleagues	131 (17.4)	373 (49.6)	165 (21.9)	65 (8.6)	10 (1.3)	8 (1.1)

Note. The sum of percentage numbers in parenthesis for each statement may not be 100 percent due to the rounded numbers.

Regarding to the opinions/attitudes about the information needs and uses for nursing care and practice in general, nurse respondents were assessed about their opinions/attitudes towards a) the supports from persons in using information, b) the uses of experiences and persons as information, c) the uses of sound information and research, d) a provision of information by organization, and e) individual factors (English and computer skills and electronic knowledge) affecting information uses.

The supports from persons in using information. Most respondents rather had positive opinions about the supports of persons in using printed/electronic information. Most respondents (49%-53%) agreed with the statements indicating that their administrators, supervisors, doctors, and their colleagues supported their printed/electronic information uses.

The uses of experiences and persons as information. For the opinions about the uses of experiences and persons as information sources, most respondents (45.3%-48.8%) neither agreed nor disagreed in the statements of 1) "I trust my own experience in making decision about my nursing care/practice more than other sources," 2) "My own experience is more helpful in making decision about my nursing care/practice more than other sources," 3) "My nursing colleagues believe that their own experience is more helpful in making decisions about their nursing care/practice than other information source," 4) "Information from my colleagues/patient/family and/or others is more helpful in making decision about my nursing care/practice than from printed and/or electronic information.," and 5) "I trust information from my colleagues/patient/family and/or others in making a decision about my nursing care/practice more than from printed and/or electronic information." However, more percent of respondents who disagreed than the percent of respondents who agreed (25.2% versus 18.3%) that they trusted their own experiences and information from their colleagues and

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patients/families more than printed/electronic information. The respondents tended to agree that these kinds of information were more helpful in making decision about their nursing care and practice than printed/electronic information.

The uses of sound information and research. Pertaining to the opinions about the uses of sound information and research, majority of respondents agreed with these three statements: 1) "It is very important for nurses to practice with sound information such as research evidence," 2) "If nurses used evidence from research more in their practice it would make a positive difference to patient care and outcomes," and 3)"Seeking and reading information from nursing textbooks and professional nursing and health journals are a part of my role as a nurse." Most respondents (35.7%) neither agreed nor disagreed with the statement of "The best information for my nursing practice does not need to be research information." However, more percent of respondents agreed with this statement than those who disagreed (28.8 versus 23.9). Majority of respondents (67.7%) agreed with "Nursing research done in other countries cannot be applied to Thai nursing care/practice." Most respondent s (44.7%) disagreed with the statement of "Using research in nursing care/practice puts another burden on me." Majority of respondents (57.0%) agreed with the statement of "I will read and use research more in my nursing care/practice if it is easy to access and available." Most respondents (49.6%) agreed with the statement of " I will seek and use printed information and research more if I have supports from my supervisors and colleagues."

A provision of information by organization. With regards to a provision of information by the organization, the percent of respondents who agreed was similar to that of respondents who disagreed on the statement of "My hospital provides enough computer and Internet

access to nurses" (29.9 % versus 30.0%). However, more percent of respondents disagreed

that their hospital provided enough printed/electronic information to nurses (Agree=20.4%

versus Disagree 38.3%).

Individual factors affecting information uses. Based on the percentage opinions about

the individual factors, which were the computer/electronic skills and English skills, most

respondents agreed that the English skills and knowledge about electronic information

prevented them from using electronic information. However, the percent of agreement was

almost the same as that of disagreement on "My limited computer skills prevent me from

using information/research from electronic information sources and Internet/World Wide

Web."

In summary, nurse respondents needed and used information from person and printed

information more than from electronic or computer-related information for their nursing care

and practice in general. They used their own experiences and others' experiences the most

when providing nursing care. They needed information for nursing care and practice more

than for personal development. Majority of them never heard about research databases such

as CINAHL, MEDLINE/PUBMED, and the Cochrane Library. Even though more than 90

percent of respondents indicated that their hospital had a library/book room, majority of them

used it once or less a month. No time was the first reason for not using it. More than 85

percent of respondents indicated that their hospital had a hospital information system and 98

percent indicated that their hospital had a computer connected to Internet. More than 60

percent indicated that their hospital did not have research databases available at the

unit/hospital. Majority of respondents indicated that no email communication among

hospital's members at their hospital. Training and supports most respondents needed was the

training about literature search. Most respondents had rather positive opinions about the information needs and uses for their nursing care and practice in general.

The research question 1 and question 2, regarding what information Thai nurses need and use for specific nursing care activities and for nursing care and practice in general, have been answered by using descriptive statistics. What follows are the answers of primary research question 3, which includes three secondary research questions. These research questions can be answered by using both descriptive and inferential statistics.

Factors Influencing Information Needs and Uses

Research Question 3: *What factors influence information needs and uses of Thai nurses?*

In order to answer this question, regression models (GEE through PROC GENMOD) and cross-tabulations (through PROC SURVEYFREQ) were run to find associations of information needs and uses and different factors as stated in each secondary question.

For better results and interpretation, the four rating categorical questions asking the respondents to rate how frequently they needed and used information sources were recoded to be only two categories. Either the needs for or uses of information "once or more a day" and "once or more a week" were recoded to be "1", which represented more often needs or more often uses. Either the needs for or uses of information "once or less a month" and "do not need" to be "2," which represented less often needs or less often uses. The models were

run accordingly to strata (the hospital type and region) to see if the strata account for the different in the information needs and uses of Thai nurses.

Originally, hospitals were classified into 84 strata, based on their region and type of hospitals. However, this original classification causes some difficulties in data analysis because not every stratum did have nurses responding to the survey. Nurses from 54 strata out of 84 strata responded to the survey. Additionally, some strata, particularly community hospitals, had only one nurse respondent. This few respondent strata may not or cannot yield significant results because of the lack of a clustering response. Thus, analysis strata for data analysis were created by region and type of hospital. By creating analysis strata, it yielded 5 strata of community hospitals (a stratum of community hospitals in the North, a stratum in the Central, a stratum in the East, a stratum in the Northeast, and a stratum in the South). The stratum of university hospitals, the strata of regional hospitals, and provincial/general hospitals were kept as their originally classified strata. Therefore, the analysis strata consisted of 5 community hospital strata, 5 regional strata of regional hospitals, 5 regional strata of provincial/general hospitals, and 1 national stratum of university hospitals.

What follows are the results of regression modeling employing PROC GENMOD, controlled for hospital respondents (hospital identification). The results are shown according to the secondary research questions. Please note that the results shown in the following tables were significant at p-value <0.05.

Research Question 3.1*: Are information needs and uses of Thai nurses associated with certain individual nurse factors such as a) psychological factors (attitudes/opinions toward information needs and uses), b) demographic factors (age, years of nursing experience, level of English skills, computer skills, and education), and c) role-related interpersonal factors such as nurses' roles and related tasks ?*

Regarding to this question, information needs were assessed in two different questions. In one question, the respondents were to indicate their percent of weekly information needs for nursing care, for professional development, and other purposes. For another question, the respondents were asked to answer the frequency of information needs for nursing care and practice from different sources. These sources include patient and family, nurse colleagues, doctors, health care teams, printed textbooks, printed journals, electronic journal databases, Internet/www, electronic patient record, hospital information system, lab/drug manuals, printed standards/protocols, printed kardex, patient charts/records (as above mentioned and please see Appendix A).

The uses of information sources were assessed in several questions. The respondents were asked to answer the questions about a) the uses of experience in nursing care, b) printed/electronic information sources that were used the least for nursing care, c) the availability and uses of unit/hospital library, d) the availability, accessibility, and uses of computer/Internet/electronic databases, e) library/information search strategies, and e) the search and uses of nursing/health information (as above mentioned and please see Appendix A).

Psychological Factor

With regards to psychological factor, opinions/attitudes about information needs and uses were assessed. The respondents were asked to rate their opinions/attitudes on 22 statements about information needs and uses (Table 14). The statements had six-rating scales in agreement or disagreement format. The high total score of included item statements reflected a positive attitude/opinion. Based on 725 valid subjects (94.3%) [after listwise deletion of 44 cases (5.7%), in which the cases with missing scores on one or more variables are excluded in the analysis], the reliability, indicated by the total correlation of the questionnaire items, was slightly different from the one in the pilot study, based on 30 subjects. As mentioned earlier, the total correlation of the included 14 questionnaire items in pilot study was 0.749. The correlation of 22 items in the main study was 0.628. However, in this main study the total correlation of 15 items that had more than 0.2, measured by Cronbach's alpha coefficient study was 0.725. Some correlated items that were included in the reliability analysis were different from the ones in the pilot study. The difference of reliability and of items in the pilot and main study was a result of a number of samples that were different (30 versus 725). The included items are shown in table 15.

Table 15

Included Items and Item Correlations to Total Correlation from Main Study

Item Statement	Corrected item-total correlation
Administrators at my hospital support the nurses' use of printed and/or electronic information	0.35
Supervisors at my hospital support the nurses' use of printed and/or electronic information	0.41
Doctors at my work place support the nurses' use of printed and/or electronic information	0.32
My nursing colleagues support me in using printed and/or electronic information	0.36
I trust my own experience in making decision about my nursing care/practice more than other sources	0.32
My own experience is more helpful in making decision about my nursing care/practice than other information sources	0.39
My nursing colleagues believe that their own experience is more helpful in making decision about their nursing care/practice than other information sources	0.33
Information from my colleagues/patient/family and/or others is more helpful in making decision about my nursing care/practice than from printed and/or electronic information	0.24
I trust information from my colleagues/patient/family and/or others in making a decision about my nursing care/practice more than from printed and/or electronic information	0.26
It is very important for nurses to practice with sound information such as research evidence	0.35
If nurses used evidence from research more in their practice it would make a positive difference to patient care and outcomes	0.38
Nursing research done in other countries cannot be applied to Thai nursing care/practice	0.31
I will read and use research more in my nursing care/practice if it is easy to access and available	0.32
Seeking and reading information from nursing textbooks and professional nursing and health journals are a part of my role as a nurse	0.32
Using research in nursing care/practice puts another burden on me	0.30

The GEE (through PROC GENMOD) was run for each variable of information needs and uses to examine if a total score of attitude/opinion of these 15 items associated with the information needs and uses. It is expected that the respondents within strata who have a high total score of opinion/attitude about printed/electronic information needs and uses will have a higher frequency of information needs and uses of printed/electronic information.

The results revealed positive associations between a total score of attitudes/opinions and information needs from doctors, other colleagues, journal databases, and from Internet/www search. There was no difference of information needs from patients and family, nurse colleagues, printed textbooks, printed nursing journals, electronic patient records, hospital information systems, drug/lab manuals, printed standards/protocols, printed kardex, patient charts/patient records. The higher positive attitudes towards information needs and uses nurses had, the more they needed information from doctors, other colleagues, journal databases, and Internet search/www (Table 16). In addition, the higher attitude nurses had, the greater percent of weekly information needs for patient care and practice they had. There was no association of total score of attitudes and percent of information needs for personal development and for other reasons among nurses. As a total score of attitudes/opinions increased 1 score, the needs of information from doctors, other colleagues, journal databases, and Internet search/www increased by 1-3 percent. As a total score of attitudes/opinions increased 1 score, the percent of weekly information needs for patient care and practice increased by 29 percent (1.286-1).

 Regarding the uses of information sources, there was no difference for the uses of 1) the experiences (using nurses' own experience, experiences of others, both sources of experiences), 2) printed/electronic information source , 3) hospital library, 4) Internet/World

Wide Web, 5) searching for nursing and health related information from Internet/ World

Wide Web, 6) databases such as CINAHL, Pubmed/Medline, 7) Thai health care databases,

8) university/college library, 9) reading Thai professional nursing/health journals, 10) reading

professional and health journals published in English. However, the higher total score of

attitudes nurses had, the more recently last time that they applied retrieved information (not

research) and the more recently last time that they searched and applied research information

into their nursing care and practice (Table 17).

Table 16

Associations of the Information Needs and Total Score of Attitudes

Information source needed	Total score of attitude				Odd ratio			
	B coefficient	SE	95% CI		Estimate	SE	95% CI	
Doctors	0.024	0.011	0.002	0.046	1.024	0.012	1.002	0.047
Other colleagues	0.031	0.011	0.010	0.051	1.031	0.011	1.010	1.053
Journal databases	0.023	0.013	-0.002	0.048	1.014	0.013	0.989	1.040
Internet search/www	0.030	0.016	-0.002	0.062	1.030	0.017	0.998	1.064
Percent of weekly-information need for patient care and practice*	0.252	0.096	0.063	0.440	1.286	0.124	1.065	1.553

Note. * The high percent indicates high information needs

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Table 17

Associations of the Information Uses and Total Score of Attitudes

Information use	Total score of attitude			Odd ratio		
	B coefficient	SE	95% CI	Estimate	SE	95% CI
More recent of last time applying retrieved information (not research)	0.07	0.01	0.05 0.09	1.07	0.01	1.05 1.10
More recent of last time searching and applying research information (more recent)	0.03	0.01	0.01 0.05	1.03	0.01	1.01 1.06

Demographic Factors

The demographic factors included gender, age, years after BSN graduation, having a graduate degree, type of a graduate degree, years after graduate graduation, having a training certification in nursing or related field that lasted more than 3 months long, status of teaching nursing students, working on a graduate degree, having done a nursing research class, and having been trained in information/database search. Additionally, in order to assess if English skills and computer skills were associated with information needs and uses, the associations of these skills and information needs and uses were run separately from other demographic factors.   The significant results of these associations ($p<0.05$) are shown in Table 18 to Table 21.

Table 18

Associations of Information Needs and Demographic Factors

Information need/demographic factor	B coefficient	SE	95% CI	Odd ratio Estimate	SE	95% CI
Patients and family						
-Years after BSN graduation	-0.03	0.01	-0.05 -0.01	0.97	0.01	0.95 1.00
Printed textbooks						
-Age	-0.06	0.01	-0.08 -0.03	0.94	0.01	0.92 0.97
Journal databases						
-Age	-0.05	0.01	-0.08 -0.03	0.95	0.01	0.93 0.97
-Having been trained in information/database search	0.51	0.19	0.14 0.87	1.66	0.31	1.15 2.38
Internet search/www						
-Years after BSN graduation	-0.05	0.01	-0.07 -0.03	0.952	0.010	0.93 0.97
-Having been trained in information/database search	0.56	0.15	0.26 0.86	1.75	0.27	1.29 2.36
Electronic patient record						
-Age	-0.04	0.01	-0.07-0.01	0.96	0.01	0.94 0.99
-Having been trained in information/database search	0.78	0.23	0.34 1.22	2.18	0.49	1.40 3.38

Table 18

Associations of Information Needs and Demographic Factors (Cont.)

Information need/demographic factor	B coefficient	SE	95% CI	Odd ratio Estimate	SE	95% CI
Hospital information system						
-Age	-0.04	0.01	0.06 -0.01	0.96	0.01	0.94 0.98
-Having been trained in information/database search	0.39	0.14	0.11 0.67	1.48	0.21	1.12 1.95
Drug/lab manual						
-Years after BSN graduation	-0.06	0.02	-0.09 -0.03	0.94	0.01	0.91 0.97
-Having a graduate degree	-0.78	0.24	-1.25 -0.32	0.46	0.18	0.29 0.72
-Having been trained in information/database search	0.50	0.22	0.07 0.93	1.65	0.36	1.07 2.54
Printed standards/protocols						
-Age	-0.06	0.01	-0.08 -0.04	0.94	0.01	0.92 0.97
-Having been trained in information/database search	0.46	0.20	0.07 0.84	1.58	0.31	1.07 2.33
Percent of weekly information need for personal development						
-Age	-0.36	0.10	-0.54 -0.17	0.70	0.07	0.58 0.85

According to Table 18, the information needs from different sources were associated with years after BSN graduation, age, having been trained in information/database search, and having a graduate degree. The more years after BSN graduation nurses had, the less information needs from patients and family they did have. The older nurses were, the less information needs from printed textbooks they had. Nurses who had been trained in information/database search and were at younger age had information needs from journal databases, electronic patient records, hospital information systems, and printed standards/protocols more than did those who had not been trained and were older age. Nurses, who had fewer years after BSN graduation and had been trained in information/database search, needed information from Internet/www more than did those who had more years after BSN graduation and had not been trained in information/database search. Nurses who had fewer years after BSN graduation, did not have a graduate degree, and had been trained in information/database search needed information from printed standards/protocols more than did those who had more years after BSN graduation, had a graduate degree, and had not been trained in information/database search. Age predicted many percent of the needs of information for personal development. If the age increased one year, the need of information for personal development decreased by 30 percent (1-0.701). Age predicted small changes in odd ratio of information needs from printed textbooks, journal databases, electronic patient records, hospital information systems, and printed standards and protocols. Similarly, years after BSN graduation predicted small changes in odd ratios of information needs from patients and family, Internet search/World Wide Web, and from drug/lab manuals. For example, for each year after BSN graduation, the odd of information needs from patients and family decreased by 3% (1-0.973). However, for each

10 years in BSN after graduation, the odd of information needs from patients and family

decreased by 25% (exponential (10 x -0.028).

Table 19

Associations of Information Uses and Demographic Factors

Information use/demographic factor	B coefficient	SE	95% CI	Odd ratio Estimate	SE	95% CI
The use of own experience*						
-Having a formal training certification	0.46	0.18	0.10 0.81	1.58	0.29	1.11 2.25
-Years after BSN graduation	0.03	0.01	0.01 0.05	1.03	0.01	1.0 1.05

Note. *The use of own experience was run against the use of others experience that was combined with the use of both experiences

(own and others).

According to Table 19, compared to nurses who have not had the formal training certification in nursing or related to nursing at least three months long and had fewer years after BSN graduation, nurses who had a formal training and had higher years after BSN graduation used their own experiences more than others' experience and both experiences (their own and others) for nursing care and practice. The nurses who had had the certification training used their own experience as 1.5 times as of nurses who had not had the training. Each year after nurses' BSN graduation increased the use of nurses' own experiences by 3 percent.

Information needs and uses and English skills and computer skills. Variables of English skills and computer skills included the total score of English skills and total score of computer skills. The associations among these variables and information needs and uses are given in the Table 20 and Table 21.

Table 20

Associations of Information Needs and English Skills and Computer Skills

Information needs/	B	SE	95% CI	Odd ratio		
English and computer skills	coefficient			Estimate	SE	95% CI
Journal databases						
-Computer skills	0.08	0.02	0.04 0.13	1.09	0.02	1.04 1.13
Internet search/www						
-Computer skills	0.12	0.02	0.08 0.15	1.12	0.02	1.08 1.16
Hospital information system						
-Computer skills	0.04	0.02	0.02 0.07	1.04	0.02	1.01 1.07

Note. There is no significant association of total English skills and information needs.

Table 21

Associations of Information Uses and English Skills and Computer Skills

Information uses/ English and computer skills	B coefficient	SE	95% CI	Odd ratio Estimate	SE	95% CI
The use of Internet/WWW						
-Computer skills	0.19	0.02	0.15 0.22	1.21	0.02	1.17 1.25
More recent apply the retrieved information						
-Computer skills	0.04	0.014	0.01 0.06	1.04	0.02	1.01 1.07
More recent search and apply information/ research						
-Computer skills	0.07	0.02	0.03 0.10	1.07	0.02	1.03 1.11
More email uses						
-Computer skills	0.16	0.03	0.10 0.29	1.17	0.04	1.10 1.24

Note. There is no significant association of total English skills and information uses.

According to Table 20 and Table 21, English skills were not associated with printed/electronic information needs and uses. Computer skills were associated with the information needs and uses from some electronic information sources. The higher score of computer skills nurses had, the more needs of information from journal databases, Internet search/www, and from hospital information system they did have. The higher score of computer skills nurses had, the more uses of Internet/www to search for information, the more recent applications of the retrieved printed/electronic information and the more recent search for research information to solve clinical or work problems, and the more email uses they did have. Each score of total score of computer skills predicted an increase of information needs and uses from these sources from four to seventeen percent.

Role-related Task Factors

Variables of role-related task factors included a) years of experience as a nurse, b) role as a registered nurse, c) nurse role (practice, education, administration), d) work position (head nurse, staff, other), e) providing direct or indirect nursing care, f) hospital type (university, regional, provincial, and community), and g) working unit type (emergency, outpatient, inpatient, no separated unit, and other). In order to assess these factors, nurses were asked to answer the following questions. 1) In which year did you begin to work as a nurse?, 2) Which term is best describes you?, 3) Which practice role is best described your job?, 4) At the department/unit where you work, what is your position?, 5) Do you provide direct patient care?, 6) Which department/unit/ward do you primarily work at this hospital?, and, 7) How many hours per week do you work for your part-time job?

The significant associations between information needs and uses and role-related task factors are shown in Table 22.

Table 22

Associations of Information Needs and Role-related Tasks

Information needs/role-related task factors	B coefficient	SE	95% CI	Odd ratio Estimate	SE	95% CI
Patients and family*						
-Providing direct patient care	0.88	0.27	0.36 1.40	2.40	0.64	1.43 4.04
-Years of experience as a nurse	-0.03	0.01	-0.05 -0.02	0.98	0.01	0.95 0.10
Other colleagues*						
-Providing direct patient care	0.96	0.23	0.50 1.41	2.60	0.60	1.65 4.09
-Years of experience as a nurse	-0.03	0.13	-0.05 -0.00	0.97	0.01	0.95 1.00
Printed textbooks						
-Years of experience as a nurse	-0.05	0.01	-0.07-0.02	0.95	0.01	0.93 0.98
Journal databases*						
-Years of experience as a nurse	-0.06	0.02	-0.09-0.03	0.95	0.01	0.92 0.97
-Providing direct patient care	0.60	0.27	0.08 1.12	1.83	0.49	1.09 3.08

Table 22

Associations of Information Needs and Role-related Tasks (Cont.)

Information needs/role-related task factors	B coefficient	SE	95% CI	Odd ratio Estimate	SE	95% CI
Internet search/WWW	-0.04	0.01	-0.07-0.02	0.96	0.010	0.94 0.98
-Years of experience as a nurse						
Electronic patient records						
-Years of experience as a nurse	-0.04	0.01	-0.06-0.02	0.96	0.01	0.94 0.99
Hospital information systems						
-Years of experience as a nurse	-0.04	0.02	-0.05-0.02	0.97	0.01	0.95 0.98
Drug/lab manuals*						
-Years of experience as a nurse	-0.07	0.01	-0.09-0.04	0.94	0.01	0.92 0.96
-Providing direct patient care	0.96	0.34	0.32 1.60	2.61	0.85	1.37 4.96
Printed standards/protocols*						
-Years of experience as a nurse	-0.05	0.01	-0.08-0.03	0.95	0.01	0.93 0.97
-Providing direct patient care	0.91	0.31	0.30 1.51	2.48	0.77	1.35 4.54

Table 22

Associations of Information Needs and Role-related Tasks (Cont.)

Information needs/role-related task factors	B coefficient	SE	95% CI	Odd ratio		
				Estimate	SE	95% CI
Printed kardex, patient chart/records*						
-Years of experience as a nurse	-0.04	0.02	-0.07-0.01	0.96	0.02	0.93 0.99
-Providing direct patient care	0.68	0.29	0.12 1.24	1.98	0.57	1.12 3.47
Percent of weekly information need for personal development						
-Years of experience as a nurse	-0.32	0.09	-0.49 -0.14	0.73	0.06	0.61 0.87

Note. * These factors are significant when running each variable separately at a time in the model. There is no interaction between these factors.

According to Table 22, information needs were associated with providing patient care, years of experience as a nurse, hours of full-time work per week, and hours of part-time work per week. Nurses who provided direct nursing care needed information from patients and family, other colleagues, journal databases, drug/lab manuals, printed standards/protocols, and printed karder, patient chart/records more than those who did not provide direct care. Nurses who had more years of experience as a nurse had information needs from patients and family, other colleagues, printed textbooks, journal databases, Internet search/www, electronic patient records, hospital information systems, drug/lab manuals, printed standards and protocols, and printed kardex, patient chart/records less than those who had fewer years of experience as a nurse. Providing direct patient care accounted for the information needs from these sources as about 2 times to 2.5 times as for non-providing direct patient care. Each year of experience nurses had decreased the information needs from these sources by three to six percent.

Regarding Table 22, percent of weekly information need for personal development was associated with years of experience as a nurse. The more years of experience, the fewer percent of weekly information needs for personal development they did have. Each year of experience nurses had, their weekly information needs increased by 27 percent.

Table 23

Associations of Information Uses and Role-related Tasks

Information uses/role-related task factors	B coefficient	SE	95% CI	Odd ratio Estimate	SE	95% CI
The use of own experience						
-Years of experience as a nurse	0.03	0.01	0.01 0.05	1.03	0.01	1.01 1.05
More recent use of Internet/ www to search for information						
-Years of experience as a nurse	-0.04	0.01	-0.07-0.02	0.96	0.01	0.94 0.98
More recent apply the retrieved information						
-Years of experience as a nurse	-0.02	0.01	-0.05-0.00	0.98	0.01	0.96 0.99

With regards to Table 23, years of experience as a nurse were associated with the use of own experience, more recent use of Internet/www to search for information, and more recent application the retrieved information to solve clinical or work problems. Nurses, who had more years of experience as a nurse, had more use of their own experience, had less recent information search from Internet, and had less recent applications of retrieved information to solve their clinical practice or work problems than those, who had fewer years of experience as nurses.

In summary, information needs and uses of Thai nurses were associated with total attitudes/opinions about information needs and uses, years after BSN graduation, age, having been trained in information/database search, having a graduate degree, having a formal

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training certification in nursing or related field, computer skills, providing direct patient care, and years of experience as a nurse.

The research question regarding if information needs and uses were associated with certain individual nurse factors, psychological factors, demographic factors, and role-related interpersonal factors has been answered. Next, the research question 3.2 will be answered.

Research Question 3.2: *Are information needs and uses of Thai nurses associated with certain environmental characteristics and culture such as time provided by nurses' work place, information provision by health care organizations, nurse-patient ratio, and nurses' uses of certain communication sources such as mobile phones?*

Environmental or Cultural Factors

The environment or cultural factors included a) working shift (morning, afternoon, evening, and working each shift equally), b) hours of full-time work per week, c) hours of part-time work per week, d) hospital type, e) a number of patients at the unit, f) a number of BSN nurses at the unit, g) the uses of communication strategies to inform or communicate among members of hospitals/units, h) nurses' email uses in the past month, and i) a number of conference nurses had attended in the past year. In assessing these factors, nurse respondents were asked the following questions. 1) What shift do you normally work more in this position?, 2) "How many hours per week do you work in this position?," 3) "How many hours per week do you work for your part-time job?," 4) Which type of hospital do you work as a government servant or government employee?, 5) How many professional, technical, practical nurses and other personnel does your unit have?, 6) How many patients does your

unit/ward normally have?, 7) To what extent does your unit/ward/hospital use the following strategies to communicate or inform about the practice or work among its members (both administrative staff and nursing care/practice staff)?, 8) How often did you use email in the past month?, and 9) How many times have you attended a conference in the past year?

For better results, the alternative answers of the nurses' email uses in the past month and communication strategies that included the uses of leaflet/letter, memo/note, email, one-to-one instruction, meeting, and the uses of training classes, were recoded. That is, "once or more a day" and "once or more a week" were recoded as 1; "once or less a month" and "never" or "not at all" were recoded as 2. In addition, the four alterative answers of the question asking how many times the nurse respondents had attended in the past years were recorded as 1 for " more than 5 times" and "3 -5 times" and as 2 for "1-2 times" and "never." The significant associations are shown in Table 24 and Table 25.

Table 24

Information Needs and Environmental Factors

Information needs/environmental factors	B coefficient	SE	95% CI	Odd ratio Estimate	SE	95% CI
Patient/family						
-Hours of part time work per week	-0.02	0.01	-0.04 -0.01	0.98	0.01	0.97 0.99
-More uses of memo/note at the unit/hospital	0.61	0.20	0.22 0.99	1.83	0.36	1.24 2.70
Doctors						
-More uses of memo/note at the unit/hospital	0.66	0.27	0.20 1.19	1.93	0.53	1.13 3.29
Other colleagues						
-More uses of memo/note at the unit/hospital	0.67	0.19	0.29 1.04	1.94	0.37	1.33 2.84
Printed textbooks						
- Hours of full time work per week	0.02	0.01	0.01 0.03	1.02	0.01	1.01 1.03
-More unit/hospital meetings	0.71	0.12	0.48 0.93	2.03	0.23	1.62 2.54
Printed nursing journals						
-Hours of full time work per week	0.02	0.01	0.01 0.04	0.52	0.15	0.23 0.81
-More unit/hospital meetings	0.52	0.15	0.24 0.81	1.69	0.25	1.27 2.24
Internet search/WWW						
-More uses of personal email	0.54	0.26	0.03 1.06	1.72	0.45	2.30 2.87

Table 24

Information Needs and Environmental Factors (Cont.)

Information needs/environmental factors	B coefficient	SE	95% CI	Odd ratio Estimate	SE	95% CI
Electronic patient record (EPR)						
-More uses or memo/note at the unit/hospital	0.495	0.190	0.12 0.87	1.64	0.31	1.13 2.38
Hospital information system						
-More uses of memo/note at the unit/hospital	0.49	0.18	0.14 0.84	1.63	0.29	1.15 2.31
-More uses of training class at the unit/hospital	0.32	0.16	0.02 0.63	1.38	0.27	1.02 1.88
Drug/lab manual						
-More use of memo/note at the unit/hospital	0.57	0.17	0.25 0.90	1.78	0.30	1.28 2.47
-More training classes at the unit/hospital	-0.54	0.24	-1.01-0.06	0.59	0.14	0.37 0.94
-Working shift*						
Morning vs Afternoon	-1.36	0.47	-2.28-0.44	0.28	0.12	0.10 0.64
Morning vs Working each shift equally	-0.67	0.17	-1.01-0.33	0.51	0.09	0.37 0.72
Printed standards/protocols						
-More training classes at the unit/hospital	0.57	0.16	0.26 0.89	1.77	0.29	1.29 2.43

Table 24

Information Needs and Environmental Factors (Cont.)

Information needs/environmental factors	B coefficient	SE	95% CI	Odd ratio		
				Estimate	SE	95% CI
Printed kardex/patient chart/patient record						
-Working shift**						
Morning vs Afternoon	-1.10	0.50	-2.08-0.11	0.33	0.17	0.12 0.90
Morning vs Night	-1.96	1.03	-4.00 0.06	0.14	0.15	0.20 1.06
Morning vs Working each shift equally	-0.56	0.26	-1.07-0.05	0.57	0.15	0.34 0.95
-Hours of part time work per week	-0.02	0.01	-0.03 0.00	0.99	0.01	0.97 1.00
-More use of memo/note at the unit/hospital	0.86	0.23	0.41 1.31	2.34	0.54	1.50 3.70
Percent of weekly information need for personal development						
-Hours of full time work per week						
-Hours of part time work per week	0.14	0.04	0.06 0.22	1.15	0.05	1.06 1.24
-More use of one-to-one instruction at the unit/hospital	0.24	0.06	0.12 0.35	1.27	0.08	1.13 1.42
-More training classes at the unit/hospital	-2.59	1.10	-4.75 -0.43	0.08	0.08	0.01 0.65
-Attending more conferences	3.70	1.50	0.76 6.64	40.36	60.51	2.14 767.7
	-3.20	1.50	-6.14 -0.26	0.04	0.06	0.002 0.78

Table 24

Information Needs and Environmental Factors (Cont.)

Information needs/environmental factors	B coefficient	SE	95% CI	Odd ratio Estimate	SE	95% CI
Percent of weekly information need for nursing care						
-Hours of part time work per week	-0.22	0.05	0.32 -0.12	0.81	0.04	0.73 0.89
-More use of letter/leaflet at the unit/hospital	2.35	1.07	0.26 4.45	10.56	11.24	1.29 85.51
-More training classes at the unit/hospital	-5.37	1.39	-8.10 -2.63	0.01	0.01	0.001 0.07
-Attending more conferences	3.94	1.35	1.29 6.59	51.35	69.38	3.63 725.6

Note. *There were only two different associations. The information need from drug/lab manual in morning shift was significantly different from the need in the afternoon shift. The need in the morning shift was significantly different from the need in the working shift equally.

* * There is no difference between the need in morning shift and that in night shift.

According to Table 24, information needs were associated with hours of part-time work per week, hours of full-time work per week, uses of memo/note for communication at the unit/hospital, uses of letter/leaflet at the unit/hospital, uses of training classes at unit/hospital, uses of one-to-one instruction at unit/hospital, working shift, uses of personal email, and attending conferences. These associations can be described as below.

Nurses, whose unit/hospital had more uses of memo/notes to communicate or inform about work and practice among its members, needed information from doctors, other colleagues, and electronic patient records more than did those, whose unit/hospital had less uses of memo/notes to communicate or inform about work and practice among its members.

Nurses, who had fewer hours of part-time work per week and whose unit/hospital had more uses of memo/note to communicate or inform about work and practice among its members, needed information from patients/family more than did those, who had more hours of part-time work per week and whose unit/hospital had fewer uses of memo/note.

Nurses, who had more hours of full-time work per week and whose unit/hospital had more meetings to communicate or inform about work and practice among its members, had more information needs from printed textbooks and printed nursing journals than did those, who had fewer hours of full-time work per week and whose unit/hospital had fewer meetings.

The more nurses used email, the more they needed information from Internet/www.

Nurses a) who worked in morning shift, b) whose unit/hospital had less uses of memo/note, and c) whose unit/hospital had more training classes to communicate or inform about work and practice among its members, had information needs from drug/lab manuals less than did those a) who worked in afternoon shift or each shift equally, b) whose

unit/hospital had more uses of memo/note, and c) whose unit/hospital had fewer training classes.

Nurses, whose unit/hospital had more training classes to communicate or inform about work and practice among its members, had information needs from printed standards/protocols more than did those, whose unit/hospital had fewer training classes.

Nurses, a) who worked in morning shift, b) who had less hours of part-time work per week, and c) whose unit/hospital used more memo/note to communicate or inform about work and practice among its members, had less information needs from printed kardex/patient chart/patient records than did those , a) who worked in afternoon, night, or each shift equally, b) who had more hours of part-time work per week, and c) whose unit/hospital used less memo/note.

Nurses, a) who had more hours of full-time work per week, more hours of part-time work per week, and attended less conferences and b) whose unit/hospital had less uses of one-to-one instruction and had more training classes to communicate or inform about work and practice among its members, had percent of weekly information need for personal development more than did those, a) who had fewer hours of full-time work per week, fewer hours of part-time work per week, and attended more conferences and b) whose unit/hospital had more uses of one-to-one instruction and had fewer training classes.

Nurses, a) who had less hours of part-time work per week and attended more conferences and b) whose unit/hospital had more uses of letter/leaflet and fewer training classes at the unit/hospital to communicate or inform about work and practice among its members had more percent of weekly information need for nursing care than did those, a) who had more hours of part-time work per week and attended fewer conferences and b)

whose unit/hospital had less uses of letter/leaflet and had more training classes at the

unit/hospital.

Table 25

Associations of Information Uses and Environmental Factors

Information uses/	B	SE	95% CI	Odd ratio		
Environmental factors	coefficient			Estimate	SE	95% CI
The use of own experience						
-Hours of part time work	0.003	0.00	0.00 0.01	1.00	0.001	1.00 1.01
per week						
-Attending more conferences	-0.08	0.04	-0.15 -0.01	0.92	0.03	0.86 0.99
Reading more Thai nursing						
journals						
-Attending more conferences	-0.07	0.03	-0.13 -0.01	0.93	0.03	0.88 0.99

With regards to Table 25, nurses, who worked more hours of part-time work/week and

attended fewer conferences in the past year, used their own experience alone more than do

those who worked fewer hours of part-time work per week and attended more conferences.

Nurses, who attended fewer conferences in the past year, read Thai nursing journals more

than do those who attended more conferences.

The associations of information needs and uses and environment and cultural factors

have been answered. Next section is the answers to research question 3.3.

Research Question 3.3: *Are information uses of Thai nurses associated with certain characteristics of information such as availability and accessibility, applicability and usefulness, ease of understanding, and reliability and truthfulness?*

In order to answer this question, cross-tabulations using PROC SERVEYFREQ were run on information uses for specific nursing care activities and of information sources used in general. What follows are the associations of information uses (sources used) and characteristics of information sources.

Associations of Information Sources Used for Specific Nursing Care and Characteristics of Information Sources

The information uses and the characteristics of information were assessed in two different questions of each specific nursing care activity. First question asked nurses about their uses of information sources. The question asked "Usually, which of the following printed/electronic sources for information and knowledge do you USE MOST for your nursing care of this activity?" There were seven alternatives of information sources provided for nurses to select only one source. These seven alternatives included 1) printed standards/protocols, 2) printed textbooks, 3) printed nursing journals, 4) journal databases, 5) Internet/World Wide Web, 6) hospital information system, and 7) I do not use any of these printed electronic information sources for this activity (please skip to next activity). Second question asked nurses about the reasons of using the information source they had answered that they used it the most. This question asked "What best describes the reason you USE this source THE MOST?" There were four alternatives of reasons provided for nurses to select

only one reason. These four alternatives included 1) available and easy to get, 2) applicable and useful, 3) easy to understand, and 4) reliable and trustful.

By referring to Table 6 to Table 9, for every nursing care activity printed standards/protocols and printed textbooks were the first two most often rated of information sources nurses used the most and available and easy to get and reliable and trustful were the first two most often rated of the best reasons nurses used the sources the most. Therefore, the results of the first two most often rated information sources that were used the most for nursing care and the first two most often rated reasons of using these two sources the most are not presented here. Unless, there were equal rating of sources and reasons, the results of sources used and reasons of using the sources are presented. Please refer to Table 6, 7, 8, and 9 for complete results of information uses.

Nursing care for health evaluation, planning for patient care, and health promotion activities. For nursing care activities of 1) examining patient health, 2) measuring and monitoring patients' vital signs, and 3) admitting/ discharging patients and terminating care, the first most often rated of the sources used the most was printed standards and protocols. The first most often rated reason for using the standards/protocols the most was that they were available and easy to get, followed by they were reliable and trustful. For these three activities, the second most often rated of the sources nurses used the most was printed textbooks. The first two reasons (most often rated) of using the printed textbooks the most was the same as those for using the printed standards and protocols.

For nursing care activities of admitting/ discharging patients and terminating care, the first two most often rated sources nurse respondents used the most and the first most often rated best reason for using the first source for this nursing care similarly to those for the first

three activities. However, the reasons of using the second most often rated sources were slightly different. Nurse respondents considered being applicable and useful as the best reason as being reliable and trustful for using the second most often rated source.

Regarding providing health education, promotion, and prevention, nurse respondents used printed textbooks the most because the printed textbooks were available and easy to get, followed by they were reliable and trustful, and applicable and useful (Table 26).

Table 26

Information Sources Used and Reasons of Using the Sources for Nursing Care for Health Evaluation, Planning for Patient Care, and

Health Promotion (Equally or Closely Rated Reasons of Using Sources for Activities)

Activity	Source used the most for activity	Reason of using this source the most				
	Most rated source used	Most rated reason	n	%	SE	Design effect
Planning for patient care and rehabilitation	1st Printed standards/protocols	1st Available and easy to get	173	27.9	1.6	0.80
		2nd Applicable and useful	71	11.5	1.4	1.20
		3rd Reliable and trustful	64	10.4	1.3	1.20
	2nd Printed textbooks	1st Available and easy to get	74	12.0	1.0	0.60
		2nd Reliable and trustful	53	8.6	1.1	0.92
		3rd Applicable and useful	51	8.2	1.2	1.20
Providing health education, promotion, and prevention	1st Printed textbooks	1st Available and easy to get	104	15.9	1.3	0.86
		2nd Applicable and useful	82	11.9	1.4	0.58
		3rd Reliable and trustful	73	11.2	1.0	0.70
	2nd Printed standards/protocols	1st Available and easy to get	86	13.2	1.0	0.60
		2nd Applicable and useful	37	5.7	0.8	0.70

Fundamentals of nursing care—helping patients with their basic needs.   For providing basic

nursing care for daily body function such as bathing general hygiene care, nurse respondents

used printed standards/protocols the most (most often rated), followed by printed textbooks.

The reason of using printed standards/protocols was available and easy to get (28.3%),

followed by reliable and trustful (12.9%) as same as applicable and useful (11.7%).

For providing basic nursing care for psychosocial/spiritual care and supports, nurse

respondents used printed standards and protocols as same as printed textbooks the most

(36.7% versus 36.1%). The first reason (most often rated) of using printed standards and

protocols the most was that they were available and easy to get (19.6%), followed by they

were applicable and useful (8.0%). However, the reasons for using printed textbooks the

most were rated the same of being available and easy to get and applicable and useful (Table

27).

Table 27

Information Sources Used and Reasons of Using the Sources for Fundamentals of Nursing Care – Helping Patients with Their Basic Needs (Equally or Closely Rated Reasons of Using Sources for Activities)

Activity	Source used the most for activity	Reason of using this source the most			
	Most rated source used	Most rated reason	n	%	SE	Design effect
Providing basic nursing care for daily body function such as bathing, general hygiene care	1st Printed standards/protocols	1st Available and easy to get	116	28.3	2.1	0.88
		2nd Reliable and trustful	53	12.9	2.0	1.43
		3rd Applicable and useful	48	11.7	1.1	0.52
	2nd Printed textbooks	1st Available and easy to get	47	11.5	1.6	1.02
		2nd Applicable and useful	29	7.1	1.3	0.98
		3rd Reliable and trustful	26	6.3	1.2	0.98
Providing nursing care for psychological/spiritual care and supports	1st Printed standards/protocols (36.7%)	1st Available and easy to get	110	19.6	1.0	0.37
		2nd Applicable and useful	45	8.0	1.3	1.2
	2nd Printed textbooks (36.1%)	1st Available and easy to get	67	12.0	1.4	1.03
		2nd Applicable and useful	62	11.1	1.0	0.61

Therapeutic measures, procedures, or techniques that nurses perform or help patients, their families, and medical workers (other than nurses) perform. Printed standards and protocols were the most often rated of information sources used the most in nine nursing care activities out of 12 activities, followed by printed textbooks. The first rated reason for using the printed standards and protocols the most in all nine activities was being available and easy to get, followed by being reliable and trustful. For the other three nursing care activities, which included 1) administering oxygen and other gases and using ventilators (respirators), 2) suturing minor lacerations, and 3) delivering normal babies, nurse respondents used printed standards and protocols as most as printed textbooks. For these three nursing care activities, the best reason for using the printed standards/protocols the most was availability and easiness to get, followed by reliable and trustful. The best reason for using printed textbooks was that they were reliable and trustful, followed by that they were available and trustful (Table 28).

Table 28

Information Sources Used and Reasons of Using the Sources for Therapeutic Measures, Procedures, or Techniques That Nurses Perform or Help Patients, Their Families, and Medical Workers (Other Than Nurses) Perform (Equally or Closely Rated Reasons of Using Sources for Activities)

Activity	Source used the most for activity	Reason of using this source the most			
	Most rated source used	Most rated reasons	n	%	SE	Design effect
Administrating oxygen and other gases and using ventilators (respirators)	1st Printed textbooks (43.1%)	1st Reliable and trustful	119	19.4	1.2	0.59
		2nd Available and easy to get	87	14.1	1.0	0.54
	2nd Printed standards/protocols (41.9%)	1st Available and easy to get	121	19.7	1.8	1.25
		2nd Reliable and trustful	65	10.6	0.9	0.50
Suturing minor laceration	1st Printed textbooks (46.1%)	1st Reliable and trustful	63	20.6	2.0	0.74
		2nd Available and easy to get	40	13.1	1.4	0.56
	2nd Printed standards/protocols (43.5%)	1st Available and easy to get	63	20.6	2.9	1.54
		2nd Reliable and trustful	40	13.1	1.4	0.51
Delivering babies in normal cases	1st Printed textbooks (47.9%)	1st Reliable and trustful	52	20.2	2.6	1.08
		2nd Available and easy to get	44	17.1	2.1	0.80
	2nd Printed standards/protocols (44.7%)	1st Available and easy to get	53	20.6	2.6	1.02
		2nd Reliable and trustful	37	14.4	1.6	0.53

Symptomatic nursing care activities. In eight symptomatic nursing care activities, printed textbooks were used the most (most often rated), followed by printed standards and protocols. For all eight activities, the best reason of using printed textbooks the most was that the textbooks were reliable and trustful, followed by available and easy to get. The best reason for using printed standards/protocols was that they were available and easy to get, followed by they were reliable and trustful. These eight activities included 1) providing care to patients having marked disturbance of intake and output of gases demanding medical intervention or first aid, 2) providing care to patients having marked disturbance of nutrition, fluid, and electrolyte balance, 3) providing care to patients having marked disturbance of elimination—constipation, diarrhea, retention or suppression of urine, incontinence of urine or feces, 4) providing care to patients having motor disturbances -- hypoactivity, immobilization, and hyperactivity, 5) providing care to patients having disturbances of consciousness and orientation, 6) providing care to patients having anxiety, depression, insomnia, 7) providing care to patients having systemic infection, and 8) providing care to patients having shock or collapse.

For all other six activities, printed standards/protocols were used the most in six activities, followed by printed textbooks. The best reason of using printed standards and protocols the most was that they were available and easy to get, followed by reliable and trustful.

In summary, nurse respondents used printed standards and protocols the most, followed by printed textbooks for the nursing care activities in a) nursing care for health evaluation, planning for patient care, and health promotion, b) fundamental of nursing care, and c) therapeutic measure, procedures, or techniques for specific nursing care and

characteristics of information sources. The reason of using the printed standards and protocols the most for nursing care activities in these three activities was that the printed standards and protocols were available and easy to get. The reason of using the printed textbooks the most for nursing care activities in these three activities was that the printed textbooks were reliable and trustful.

Nurse respondents used printed textbooks the most, followed by standards and protocols for most of nursing care activities in symptomatic nursing care. The reason of using printed textbooks the most for these nursing care activities was that the printed textbooks were reliable and trustful, followed by available and easy to get. The reason of using printed standards and protocols the most for the nursing care activities in symptomatic nursing care was that the printed standards and protocols were available and easy to get.

Therefore, it can be summarized that the uses of information sources were associated with the quality of information source characteristics. Being available and easy to get of printed standards and protocols was the best reason that nurse respondents used them for most nursing care activities that nurses can perform independently and the activities that are not complicated. Being reliable and trustful of printed textbooks was the best reason that nurse respondents used them for most nursing care activities that nurses can perform dependently and that are complicated.

Associations of Information Sources Used for Nursing Care in General and Characteristics of Information Sources

The associations of information sources used and characteristics of information sources used for nursing care and practice in general were assessed by two questionnaire items. First, nurse respondents were asked "Usually, when you are looking for information

to answer questions, solve problems, make a decision, and/or enhance knowledge for your nursing care, which of the following printed/electronic information source would you use the least?," There were seven alternative sources provided for nurse respondents to select. Second, they were asked "According to your answer in 3, which of the following best describes the reason you would USE this source the LEAST?" There were five alternative characteristics of information source provided for nurse respondents to select.

According to the cross-tabulation using PROC SURVEYFREQ, the three sources used the least included journal databases, followed by Internet/world wide web, and by hospital information system (excluding electronic patient record). The most often rated reason of using these sources the least was the same for all these three sources. Being unavailable and difficult to get was that reason. Additionally, more than 14 percent of respondents considered journal databases as being difficult to understand (second most rated) for the reason of not using journal databases or using them the least.

The research questions were answered in this result chapter. In next chapter, the discussion of the results will be presented.

CHAPTER V

DISCUSSION

This chapter presents a summary of findings from chapter four and a discussion of the overall meaning of the major findings. Issues in instruments are discussed. The limitations and strengths of this study are considered. Finally, implications for nursing practice, education, and administration and future research are presented.

Major Findings

The discussion of major findings is presented by answering the research questions.

Research Question 1: *What information do Thai nurses need and use in their clinical practice in general and in their specific nursing care activities?*

Research Question 3.4: *Are information needs and uses of Thai nurses associated with nursing care activities?*

Information Needs and Uses of Thai Nurses for Nursing Care and Practice in General

For nursing care and practice in general, Thai nurses needed information from persons and information that was tied to their daily nursing care and practice more than other sources. Thai nurses used printed information sources more than computer-based information sources. Thai nurses needed information from their nurse colleagues, patients and family, doctors, electronic patient records (EPR), and printed kardex and patient charts/records daily. They needed information from Internet, other colleagues, hospital information systems (excluding

EPR), drug/lab manuals, and printed standards/protocols weekly. They needed information from printed nursing journals and journal databases monthly. Thai nurses used printed standards and protocols the most, followed by printed textbooks, and by printed nursing journals. The least used source was journal databases, followed by hospital information system (excluding EPR), and by Internet/www. The reason of using journal databases the least was that the journal databases were not available and difficult to get, followed by difficult to understand. The reason of using hospital information systems and of Internet/www the least were the same in that these information sources were not available and difficult to get, followed by they were unreliable and trustful.

This study findings were supported by several studies (Bawden &Robinson, 1997; Dee and Stanley, 2005 ; McKnight, 2004; Pravikoff et al., 2005; Royle et al, 2002;). Dee and Stanley (2005) found that nurses and graduate nursing students used human-information sources daily and printed information sources weekly. In an observational study by McKnight (2004), nurses used human-information sources more than printed/electronic information sources even though the printed/electronic information sources were available for use. No time to read while they were on duty of multitasking job as a nurse in critical intensive care unit was a major reason.

Information Needs and Uses of Thai Nurses for Specific Nursing Care Activities

With regards to information needs and uses for specific nursing care activities, the needs and uses of information for specific nursing care activities depend on two major factors: nursing care activities and characteristics of information.

Nurses needed information from their nurse colleagues the most for the uncomplicated, independent, and routine nursing care activities. They needed doctors and

printed/electronic information the most for complicated, dependent, and non-routine nursing care activities. For most activities, Thai nurses used printed standards and protocols, followed by printed textbooks. Printed standards/protocols and printed textbooks contain information about nursing care protocols and procedures and other information. The reason of using the printed standards was that the printed standards and protocols were available and easy to get, followed by reliable and trustful. The reason of using printed textbooks was that the printed textbooks were reliable and trustful, followed by available and easy to get. These findings were supported by the observations in several other studies. In stead of seeking for choices of drugs or cause of symptoms as doctors normally do, protocols and procedures were usually sought by nurses in acute care settings (Xu et al., 2005). Nurses preferred to use information that was accessible, convenient, easy to get, and fast (Thompson et al. 2001a; 2001b; Bawden &Robinson, 1997; Dee & Stanley, 2005; Royle et al., 2000; Urquhart & Davis 1997).

Therefore, it can be summarized that the information that was available, easy to get, reliable, and truthful as well as appropriate for specific nursing care activities was the information Thai nurses needed and used primarily for their specific nursing care activities. Availability and easiness to get were the same major reasons for using information sources for both nursing care activities and nursing care in general. To Thai nurses, quantity of information was matter more than quality.

Thompson (1999) and Thompson et al, (2001a) reported that the nursing care activities or nursing care contexts specified the needs and uses of information.   This study supported their reports. By applying nursing care activities from *Principles and Practice of Nursing* (Henderson & Nite, 1999) and Dervin's *Sense-Making* (2004; 1999) as situational contexts in

assessing information needs and uses, what information Thai nurses needed and used for specific nursing care activities had been revealed.

Research Question 2*: To what degree do Thai nurses need and use information in their clinical practice in general and specific nursing care activities?*

The degrees of information needs and uses of Thai nurses for their nursing care activities and nursing care in general vary.

Degrees of Information Needs and Uses for Nursing Care and Practice in General

The degrees of information needs and uses for nursing care in general vary according to types of information sources.

Degrees of Information Needs and Uses from Persons and Printed/Electronic Information Sources

For nursing care in general, Thai nurses had a high degree of information needs from persons and printed kardex, and patient chart/records. However, they had a low degree of information uses for Internet/www search, and other electronic information.

Nurses indicated the most frequent needs for information from printed kardex, patient chart/record, followed by their nurse colleagues, electronic patient record, patients and family, doctors, and printed standards/protocols. The least frequent needs were printed journals, journal databases, Internet/www, and hospital information systems. These least needs of information sources were paralleled with the least uses of information sources. Thai nurses indicated the least uses of journal databases, hospital information system, and Internet/www.   The findings of these least used-sources were similar to the findings of many other researchers (Bawden & Robinson, 1997; Chan et al., 2004; Morris-Docker et al., 2004;

Royle et al., 2000; Royle et al., 2002; Secco et al., 2006). Compared with the uses of other sources, nurses in a study by Secco et al. (2006) used computer-based information the least.

Degrees of Using Nurses' Own Experiences and Others' Experience and the Percent of Information Needs

Thai nurses used both of their own experiences and other experiences for their nursing care and practice. Thai nurses used their own experiences more than other experiences. Even though this study did not compare between the uses of experiences with the uses of other information sources, more percent of Thai nurses who agreed than the percent of those who disagreed (25.3% versus 21,8%) that their own experience was more helpful in making decision about their nursing care/practice than other sources. This finding was supported by some studies which found that nurses used their own experiences more than other information sources (Mc Caughan et al., 2002; 2005; Thompson et al., 2001a; 2001b; 2004; Teekman, 1997; Secco et al., 2006).

Regarding the percent of information needs, Thai nurses indicated a higher percent of information needs for nursing care and practice than that for personal development. This finding was similar to the reports of Blythe and Royle (1993) and of Royle et al. (2000).

Degrees of Library Uses and Other Printed/Electronic Information Sources

Similarly to some studies showing that nurses rarely used a library (Cheng & Lam, 1996; Pravikoff et al., 2005; Royle et al., 2004; Tanner, 2000), Thai nurses were not library users. The majority of Thai nurses used a hospital library or book room once or less than once a month. More than half of Thai nurses never used a university library or nursing college library. Few reasons supported this finding. These reasons included no time, inaccessibility and unavailability of information sources, and using other information sources rather than using the library. Thai nurses indicated no time as their first reason (most often

rated) of not using the hospital library, followed by they obtained information from other sources, by there were few nursing printed-information sources. The university's and nursing college's libraries were not physically accessible. The first reason nurses did not use the university's or college's library was that the library at university or nursing college was far from nurses' work place or far to commute (most often rated), followed by that they had no time, and by that they obtained information from other sources.

No time was the most important factor resulting in the low uses of libraries by Thai nurses. This finding is supported by some studies in that nurses indicated a lack of time as a barrier to information uses and research utilization (Gosling et al., 2004; McCaughan et al., 2002; Royle et al., 2000; 2002). Even information sources were available at the unit/ward, nurses had no time to read while they were on duty. They still used their peers and other human information sources more than the available printed/electronic sources (McKnight, 2004).

Similarly to others' findings in that nurses rarely used electronic information, particularly research databases (Pravikoff et al., 2005; Tanner, 2004), less than 50% of Thai nurses used Internet. Among those, who used the Internet, the majority of them used it to search for health and nursing related information and they used simple search or general search engines such as Google. Hospital information systems, including electronic patient records, became common to Thai nurses because more than 85% of nurses indicated that their hospital had it. However, more than 60% of nurses indicated that their hospital did not have a research database. Even though a large fraction of respondents had heard about the databases, only a minority used the databases (about 40% heard about Pubmed and CINAHL, but only 3.9 % used them).

This finding indicated that awareness to information did not result in using information. This discrepancy may be from few reasons. First, they did not have research databases at their hospitals. Second, nurses did not know how to search for electronic information. Approximately, 34 % of nurse respondents agreed that their limited knowledge about electronic information search prevented them from using information/research from electronic information sources and Internet/www. Nurse respondents indicated the need for literature search the most for education, training, and supports for their information needs and uses from their organization. Third, Thai nurses had limited English skills. Beside no time to search for information from Internet, the reason of not using Internet included most websites published in English, followed by not having it at home, and by not knowing how to use the Internet. Thai nurses also indicated the needs for English skills support as the second most rated for continuing education/training they needed from their organization. The low uses as a result of limited English skills were supported by some studies' findings. Finnish nurses and Swedish nurses considered research published in foreign language (English) as a barrier to use research.

Even though Thai nurses rather had positive attitudes/opinions about the uses of information/research for their clinical practice, Thai nurses did not search and apply information and research into their clinical practice on a regular basis. A few percent of Thai nurses used Pubmed and CINAHL. This finding is supported by the findings of Pravikoff et al. (2005) and Tanner 2004) in that more than 50 % of American nurses did not use research to support their practice. Few reasons explain Thai nurses' low uses of research. First, the information/research databases were not available. Second, they had limited knowledge about information/database search, as explained above. Third, they did not value the use of

research in practice. According to their rating, Thai nurses did not use research databases because research information/databases were not available nor easy to get, followed by difficult to understand, and not necessary to use it. This founding is supported a study by McCaughan et al. (2002) in that some nurses did not use/utilize information/research because they had a lack of knowledge in how to use or evaluate the research.

Electronic mail communication was not commonly used among Thai nurses for their work. Few reasons can explain this uncommon use. First, cell phones were commonly used. Ninety eight percent of Thai nurses used a cell-phone. Second, even though nearly 100% of respondents indicated that their hospital or unit provided computers with Internet access to nurses, they did not use it. They considered it was not necessary to use (as they used Internet/www the third least source) and they did not have it at their dormitory or at their house (46%) when they had free time from work.

Degrees of Information Needs and Uses for Specific Nursing Care Activities

Thai nurses showed rather high information needs and uses for specific nursing care activities. More than 70% of respondents indicated providing nursing care and needed information in 24 nursing care activities. More than 10% of nurse respondents indicated no need for information for nursing care activities that are routinely provided and are not complicated to them. These activities included a) measuring and monitoring patients' vital signs, b) admitting/discharging patients and terminating care, c) providing basic nursing care for daily body function such as bathing, d) general hygiene care, e) providing basic nursing care for psychosocial/spiritual care and supports, f) applying surgical dressing, g) providing care to patients having marked disturbance of elimination—constipation, diarrhea, retention

or suppression of urine, h) incontinence of urine or feces, and i) providing care to patients having hyperthermia or hypothermia.

There are only five nursing care activities for which more than 5% of nurse respondents indicated not using printed/electronic information sources specified in the questionnaire. These nursing care activities included a) admitting/discharging patients and terminating care, b) providing basic nursing care for daily body function such as bathing, c) general hygiene care, d) providing basic nursing care for psychosocial spiritual care and supports, and e) providing care to patient having anxiety, depression, and insomnia. These nursing care activities tend to be routine nursing care and also not complicated nursing care. More than 10% of respondents indicated no need for information for these nursing care activities.

In general, these findings suggest that Thai nurses had high degrees of information needs and uses for specific nursing care activities. Thai nurses had high degrees of information needs and uses from persons and printed sources that are available, easy to understand, reliable and trustful, and necessary for their nursing care.

Research Question 3: *What factors influence information needs and uses of Thai nurses?*

Research Question 3.1 *Are information needs and uses of Thai nurses associated with certain individual nurse factors such as a) psychological factors (attitudes/opinions toward information needs and uses), b) demographic factors (age, years of nursing experience, level of English skills, computer skills, and education), and c) role-related interpersonal factors such as nurses' roles and related tasks ?*

Factors Influencing Information Needs and Uses of Thai Nurses

Individual Factors

Several individual nurse factors influenced information needs and uses of Thai nurses. These factors included attitudes/opinions towards information needs and uses, age, experience (years after BSN graduation/years of experience as a nurse), education and training, computer skills, and providing direct patient care.

Attitudes/opinions towards information needs and uses. In this study, nurses with a higher score of attitudes/opinions had more information needs from doctor, other colleagues, journal databases, Internet/www, more percent of weekly information needs for patient care and practice, more recent of last time application of retrieved information into their practice, and more recent of last time search and application of information/research into their practice more than did nurses who had a lower score of attitudes/opinions. These positive results are similar to the results of some studies. Nurses with positive attitudes had more uses of information and research than did nurses who had negative attitudes (Gosling et al., 2004). Nurses who had negative attitudes to some information sources such as research databases and research had less uses of these databases and research than did nurses who had positive attitudes (Bawden & Robinson, 1997; McCaughan et al., 2002; Pravikoff et al., 2005).

Age. As expected, age influences the information needs and uses of Thai nurses. Older nurses needed information from printed/electronic information sources less than did younger nurses. Compared with younger nurses, older nurses also had less uses of a university/college library and of Internet/www to search for information. Few existing studies showed the relationships between age and the information needs and uses. A study by Chan et al. (2004) revealed that older nurses had lower self-confidence in using electronic information sources

than did the younger ones. The finding in this study can explain that when nurses are older they are more experienced in nursing care and practice than younger ones.

Experience. Nurses who had more years of experience (as measured by years after BSN graduation and years of experience as a nurse) had less information needs and uses from several printed and electronic information sources than did nurses who had fewer years of experience. These needed sources included patients/family, other colleagues, printed textbooks, journal databases, Internet/www, electronic patient records, hospital information system, drug/lab manuals, printed standards/protocols, and printed kardex, patient charts/records. Additionally, more experienced nurses had less percent of weekly information needs for personal development than did less experienced nurses. Compared to less experienced nurses, more experienced nurses used their own experience more than using both of their own and others' experiences in their nursing care and practice. Also, more experienced nurses had less recent application of retrieved information and less recent search and application of information, including research, to their clinical practice than did less experienced nurses.

The findings in this study clarify and support the findings of some studies. Experienced nurses valued their own experiences as well as others' experiences more than information from printed/electronic information sources (McCaughan et al., 2002; 2005; Thompson et al., 2001a; 2001b). However, McCaughan et al. (2004) suggested that experience was a weak predictor of information needs and uses. In this study, each year of experience as a nurse predicts an increase of information needs and of information uses from the information sources above by two to five percent. Therefore, nurses with 10 years of experiences can have less information needs and uses by 20 to 50 percent. As experience

increases one year, weekly information needs for personal development decreased by 21 percent.

Experience is an important individual nurse factor affecting information needs and uses. Nurses who have more years of experiences know how to provide nursing care and solve work problems better than do nurses with fewer experiences. Experienced nurses have "knowing how" knowledge or practical knowledge that comes from their experiences whereas inexperienced nurses have "knowing that" knowledge which comes from other information sources rather than their own experiences (Benner, 1984).

Education and training. Education and training in relation to training in information/database search, having a graduate degree, and having a formal training certification in nursing or related field affect information needs and uses in this study.

Similar to the findings in many studies in that training in information and database search affected information needs and uses of nurses (Cogdill, 2003; Gosling et al., 2004; Rasch & Cogdill, 1999; Royle et al., 2002), training in information and database search affected information needs of Thai nurses, particularly from printed/electronic information sources such as journal databases, Internet search/www, electronic patient record, and hospital information system. However, training in information and database search did not affect the uses of information. Training can bring awareness of information needs to nurses, but cannot make nurses use the printed/electronic information sources. That is, the needs and uses of information were not paralleled. Rasch and Cogdill (1999) and Cogdill (2003) found that nurse practitioners had information uses less than information needs. Nurses realized their needs for information, but they did not use it because other factors affecting their needs

such as time and availability of information (Gosling et al., 2004; McCaughan et al., 2002; Royle et al., 2000; Royle at al., 2002; Thompson et al., 2001a).

This study did not find the association of having a graduate degree and the uses of electronic information like other studies did (Gosling et al., 2004; Griffith & Riddington, 2001). Having a graduate degree affected the need of information from drug/lab manuals. Having a graduate degree is negatively associated with the need of information from drug/lab manuals. Having a formal training certification in nursing or related field is positively associated with the uses of own experiences.

Computer skills. Similarly to many studies, computer skills affect information uses, particularly electronic information (Gosling et al., 2004; Royle et al., 2000; 2002; Secco et al., 2006; Thompson et al., 2001a; 2001b). Thai nurses with better computer skills (having a higher score of computer skills) needed information from journal databases, Internet/www, and hospital information system as well as used information from Internet/www, had more recent search and application of information/research to solve practice problems, and had more email uses than those who had poorer computer skills.

Providing direct patient care. Nurses who provided direct patient care needed more information from patient and family, other colleagues, journal databases, drug/lab manuals, printed standards/protocols, and printed kardex, patient charts/records than did nurses who did not provide direct patient care. Nurses, whose role and related task is providing direct patient care, needed information related to their role (cogdill, 2003; Leckie et al., 1996; Royle et al., 2002).

Research Question 3.2. *Are information needs and uses of Thai nurses associated with certain environmental characteristics and culture such as time provided by nurses' work place, information provision by health care organizations, nurse-patient ratio, and nurses' uses of certain communication sources such as mobile phones?*

Environmental Factors

Environmental factors affecting information needs and uses included a) hours of full-time work per week, b) hours of part-time work per week, c) the uses of communication strategies to inform or communicate among members of hospital/units, d) the uses of personal email, h) attending conferences, and f) working shift.

Hours of full-time work per week. Hours of full-time work per week was positively related to the information needs from printed textbooks, printed nursing journals, percent of weekly information needs for personal development.

Hours of part-time work per week. Hours of part-time work per week was negatively associated with information needs from patients/family, and printed kardex, patient charts/record. The hours of part-time work per week was positively associated with percent of weekly information needs for personal development, but negatively associated with percent of weekly information needs for patient care. The hours of part-time per week was positively associated with the use of own experience.

The uses of communication strategies to inform or communicate among members of hospitals/units. The information needs were associated with the uses of a) letter/leaflet at the unit/hospital b) memos/notes at the unit/hospital, c) one-to-one instruction at the unit/hospital d) unit/hospital meetings, and e) training classes at the unit/hospital.

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The use of letter/leaflet at the unit/hospital was positively associated with percent of weekly information needs for nursing care. The use of memos/notes was positively associated with the information needs from patients/family, doctors, other colleagues, electronic patient records, hospital information system, drug/lab manuals, printed kardex, patient charts/records. The use of one-to-one instruction at the unit/hospital was negatively associated with the percent of weekly-information needs for personal development. The use of unit/hospital meeting was positively associated with the information needs from printed nursing journals. The use of training classes at unit/hospitals was positively associated with the information needs from hospital information system, from drug/lab manuals, and printed standards/protocols. The use of training classes at unit/hospitals was negatively associated with percent of weekly information needs for patient care, but positively associated with percent of weekly information needs for personal development.

In general, the more uses of communication strategies at units/hospitals, the more information needs nurses had. These communication strategies stimulate nurses' awareness of their information needs.

The use of personal email. The more use of personal email was positively associated with the information needs from Internet. Nurses who knew how to use email knew how to use Internet as well. The email use increases the needs for information from Internet.

Attending conferences. A number of attending conferences in the past year was positively associated with percent of weekly information needs for patient care, but negatively associated with percent of weekly information needs for personal development. One reason can explain these associations. Since 2003 Thai nurses have been required to attend the conferences or meetings to earn credits as their nursing continuing education in

order to keep their nursing license active (Thai Nursing Council, 2003). Most conferences are related to patient care and practice.

Working shift. Nurses who worked in morning shift had less information needs from drug/lab manuals and from printed kardex, patient charts/records than did nurses who worked in other shifts. Morning shift is the busiest shift for Thai nurses. At morning shift, person sources such as their nurse colleagues and doctors are more available for nurses if they needed information than other shifts.

Research Question 3.3 *Are information uses of Thai nurses associated with certain characteristics of information such as availability and accessibility, applicability and usefulness, ease of understanding, and reliability and truthfulness?*

Characteristics of Information Sources

Only availability and accessibility and reliability and trustfulness of information sources affect the information uses of Thai nurses.

Availability and accessibility. Nurses used printed standards/protocols for their nursing care activities because these information sources were available and accessible, followed by they were reliable and trustful. For both specific nursing care activities and nursing care and practice in general, Thai nurses rarely used or did not use electronic information, particularly journal databases, because these information sources were not available and difficult to understand. Many studies found that nurses used certain information sources such as persons more than other sources because persons were more available and accessible than other sources (Bawden &Robinson, 1997; Dee & Stanley, 2005; Urquhart & Crane, 1994). In

Thailand, it is common for every nursing unit/hospital to have printed standards/protocols, and printed textbooks available for nurses.

Reliability and truthfulness. Nurses used printed textbooks for their nursing care activities because these information sources were reliable and trustful, followed by they were available and accessible. That is, Thai nurses trusted information from printed textbooks.

A summary of findings from chapter four and a discussion of the overall meaning of the major findings have been presented. What follows are a discussion of issues in instrument, the limitations and strengths of this study, and implications for nursing practice, education, and administration and future research are presented.

Issues in Instrument

This study employed a newly developed questionnaire. The questionnaire had few limitations. First, there were many question items in the questionnaire. More than 250 variables were coded for each questionnaire. Having many questions in the questionnaire led to a subjects' burden in answering the survey. This burden resulted in patterns of answering to some questions. For example, some respondents tended to check "agree" to all the questions asking if they agreed or disagree with attitude question statements. Some respondents left some questionnaire items blank. Second, the original survey questionnaire was constructed in English and then was translated to Thai. There was a lost in meaning from the translation. Few respondents showed that they did not answer or understand what the questions were intended to ask. For example, the question asking "Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST?" The alternative answers included a) nurse colleagues, b) doctors, c)

patient and family, d) kardex/patient chart/record, e) printed/electronic information, and f) other, specify…. The printed/electronic information was translated to Thai as printed documents and electronic information. Some nurses considered that books were excluded in the printed/electronic information because they selected "other" and wrote books after "specify." Even though this problem could be corrected in the process of data recording, the issue of the questionnaire translation should not be overlooked. Third, few question styles were confused to Thai nurses. For example, few nurse respondents put "1" for more than one reason for the question asking "If you answered "Once or less a month" or "Not at all" to Question 9a, please put a "1" next to the most important reason you do NOT use more, a "2" next to the second most important reason and a "3" next to the third most important reason." Fourth, a pilot test was conducted in 30 nurse subjects; however, the retest was not conducted due to time limitation. Therefore, the reliability in relation to consistency of questionnaire was not assessed.

Limitations and Strengths

This study showed few limitations and strengths.

Limitations

1. Limitation of sampling and selection. Few limitations regarding sampling and selection presented. First, even though the hospitals were stratified randomly selected, nurses were conveniently selected. Regarding a time frame limitation, it was inconvenient to send the questionnaire directly to selected nurses. There was no name list database of Thai nurses working at each hospital. If the researcher wanted to obtain the name list of selected hospital, she needed to formally send the letter to the hospital directors. The researcher had no time to

wait for each selected hospital to provide the list of its nurses. It is a normal practice of research studies in Thai nurses for a researcher to hand the questionnaires to a head nurse of selected unit or hospital and the head nurse distributes and collects the questionnaires back from nurse respondents. The distribution and collection of the questionnaires in this study was similar to ones that Sindhu and Pookboonmee did in their study (2001). Second, this study included only similar nurses' backgrounds, possible and easy accessible population in the sampling frame. Only nurses from university hospitals under the ministry of education and hospitals under the ministry of public health were included in the sampling frame. These hospitals are public and they provide similar health care services to general population. The survey excluded nurses working at private hospitals and other organizations such as veteran hospitals. The excluded nurses account for about 20 percent of Thai nurses.

2. *Survey study with some survey errors and over reporting.* As most survey studies have, this study had some survey errors. For example, respondents skipped answering some questions (not asking them to skip). A self-reporting questionnaire in this survey study may cause some respondents to over report their information needs and uses.

Strength

This study had some strength.

1. The survey received a high response rate (78%).

2. The study employed a nice survey-sampling and design. Using stratified random sampling guaranteed representativeness of samples in the survey.

3. Statistical analysis using PROC SURVEYMEANS, PROC SURVEYFREQ, and PROC GENMOD of SAS accounted for estimating means and for variance adjustment not

only in each stratum, but also in all combined strata. These statistical procedures can remedy some survey errors such as missing data.

Implications

The results of this study can imply nursing care and practice, nursing education, nursing administration and policy application, and future research.

Nursing Care and Practice

English skills do not exert a major influence on information needs and uses for English published information. Time provided for using information and database search, training of information/database search, and availability of information matter to Thai nurses. Thai nurses used the standards/protocols and printed textbooks available at the point of care as a regular basis (more than 40 percent indicated that they used a book room or reference room at their unit once or more than once a day). For their specific nursing care, Thai nurses need information from printed standards/protocols, followed by printed textbooks. Thai nurses commonly need and use information from standards/protocols and kardex, patient charts and records for their general nursing care. For Thai nurses, the printed standards/protocols and printed textbooks are available and easy to get and they are reliable and trustful. These information sources are not difficult to understand. Therefore, these information sources, particularly standards and protocols, should be written with evidence-based practice or sound information. In addition, Thai nurses have high work load and multi-tasking job. They sometimes work for not only nursing care, but all other kinds of jobs related to patient care such as billing and blood drawing. They cannot leave patients needing care and attentions to look for information. Therefore, if we want to incorporate knowledge-based information and

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research-evidence based practice into nursing care, we should find a way to suit nurses'

information needs and uses (McKnight, 2004). For example, each hospital should have a

nurse who is an information expert or information consultant, who can look for and summary

information from research and literature for applications by nurses. Research information that

is already translated for better understanding should be attached to patient charts for nurses to

read.

Nursing Education

English skills did not show a significant association with nurses' information needs

and uses; only computer skills did. However, thirty four percent of nurses agreed that they

did not use information/research published in English because their limited English skills.

Thirty five percent of nurses agreed that their limited knowledge about electronic information

search prevent them from using information/research from electronic information sources

and Internet/www. Therefore, Thai nurses should be well taught for their English skills in

order to use English published information related to nursing care and practice. More English

published information should be translated into Thai and available for nurses. Institutions

involving in nursing education should prepare nurses with knowledge about electronic

information and research database search. Nursing education curriculums should be

integrated more of what information sources should be used in each nursing care activity.

The curriculums should be evidence-based nursing care ones. The teaching should emphasize

the important of nursing care practice with knowledge-based information and evidence-based

or research information on patient care outcomes and practice outcomes.

Nursing Administration and Policy Application

The organization should consider equipping more information sources and supplies for the needs and uses of information by nurses. The provision of information by organization needs to be based on nursing care activities and to promote for evidence-based practice. The hospitals and units should provide more information sources that are easy to understand and written with evidence-based practice information/research. Thai nurses have high work load and multi-tasking job. They sometimes work for not only nursing care, but all other kinds of jobs related to patient care such as billing and blood drawing. They cannot leave patients needing care and attentions to look for information. The organizations also should provide more times from working shift to nurses to use information sources and be trained in information/database search or electronic information uses. Nursing accreditation system should incorporate employing evidence-based practice as another key of nursing practice as a standard of nursing care.

Future Research

Future research regarding information needs and uses should be conducted in the following areas.

1. Protocols and standards are commonly used in Thai nurses for many nursing care activities. As we are promoting the evidence-based practice, a future research should examine to what degree the protocols and standards of nursing care are written with research evidence and sound information.

2. Nurses indicated a high percentage of information needs, but fewer percent of information uses in this survey study. Over reporting of information needs and uses may present. A future study of Thai nurses' information needs and uses may be taken in a real

time clinical practice like a study by McKnight (2004) observing information needs and uses of nurses in acute care settings and a study by Xu et al. (2005) monitoring information uses of nurses by using an information retriever tool (web-based tool).

3. A comparison of information needs and uses by nurses who are in nursing care roles as clinical nurses and by nurses who are in teaching roles as nurse instructors at nursing schools or colleges may be done.

4. This study does not address unknown information needs. Future research should look at unknown information needs and unmet information needs or gaps of information needs and uses. The future study should apply research methods such as Dervin's *Sense-Making* approach to address the unknown information needs in nurses. The nurse respondents should be asked why they do not use information that they need.

Conclusions

Many studies had assessed what information nurses need and use in general or in nurses' role-related tasks. No single study had investigated information needs and uses for specific nursing-care activities such as care for patients dying or experiencing pain. This original study aimed to describe and explore these missing aspects by employing Henderson and Nite's *Principles and Practice in Nursing* to describe nursing-care activities and Dervin's *Sense-Making Theory* and Wilson's *Model of Information Behavior* to explore Thai nurses' information needs and uses and the factors influencing them. Stratified sampling, with proportional allocation, was applied to survey 990 baccalaureate-degree nurses at 86 public hospitals, drawn from 56,323 target nurses at 834 target hospitals throughout Thailand. The study employed a researcher-developed questionnaire, preliminarily tested with 30 Thai and

23 American nurses, validated by 7 content experts after refinement, and pilot-tested with a convenient sample of 30 Thai nurses. Data collection was done from April to July 2007. Analysis included both descriptive and inferential statistics such as generalized estimating equations (GEE). With 769 returned questionnaires (77.7 % response rate), the results revealed that Thai nurses had rather high degrees of information needs and uses for specific nursing care activities. They needed information from their nurse colleges for nursing care activities that are not complicated and they can perform the nursing care activities independently. They needed doctors and printed/electronic information sources for nursing care activities that are complicated and they cannot perform the activities independently. The printed/electronic information sources they used the most were printed standards and protocols, followed by printed textbooks. The reasons of using them were being available and easy to get and reliable and trustful of these sources. With regards to information needs and uses for nursing care and practice in general, Thai nurses needed and used their colleagues, patients/ family, doctors, printed kardex, patient charts/records, and printed textbooks the most because these sources were available, easy to get, not difficult to understand, and tied to their nursing care and practice. Even though they had rather positive attitudes towards information needs and uses, they rarely used libraries, did not read research, and did not use research databases. No time to use, unavailability of research databases, and research being difficult to understand were the reasons of not using. Therefore, in order to adopt evidence-based practice into nursing, research information should be integrated in the printed standards/protocols and textbooks and made available at hand.

APPENDICES

Appendix A

Questionnaire

Information Needs and Uses of Thai Nurses: A National Sample Survey

Your response is confidential. We will use it to produce statistical summaries from which no one may identify any particular person. Your response is entirely voluntary, and failure to provide some or all of the requested information will not in any way adversely affect you.

Conducted by:

Wiriya Phokhwang
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The University of North Carolina at Chapel Hill North Carolina, USA

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- The questionnaire contains three parts
  Part I: Information Needs and Uses for Specific Nursing Care
  Part II: Information Needs and Uses in General
  Part III: Personal Information
- If you do not directly provide nursing care to patients, please skip Part I and go to answer Part II and Part III

Instructions for answering the questionnaire Part I

- Please read nursing care activities in column 1 and choose the best answer to you in column 2, 3, and 4.
- If you provide any nursing care activity in column 1 and you need information, please choose the best answer to you in column 2, 3, and 4.
- For any nursing care activity in column 1, if you answer "I do this activity, but do not need information for this activity" or if you answer "I do not do this activity", please skip to answer the following nursing care activity.
- Please notice that questions in column 2, 3, and 4 are the same for every nursing care activity in column 1.

Example:

Nursing Care Activity (Start here) (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
A. Observing and writing nurses' not ☒ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to B** □ I do not do this activity → **Please Skip to B**	☒ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	☒ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to B**	☒ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
B. Reporting about nursing care and signs and symptoms of patients to colleagues and doctors …	□ Nurse colleagues …	□ Printed standards/protocols …	□ Available and easy to get …

Part I: Information Needs and Uses for Specific Nursing Care
Please read instructions for answering the questionnaire Part I before you start to complete the questionnaire

1. Nursing Care for Health Evaluation, Planning for Patient Care, and Health Promotion

Nursing Care Activity **(Start here)** (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
1.1 Examining patient health □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity ➔**Please Skip to 1.2** □ I do not do this activity ➔ **Please Skip to 1.2**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity ➔ **Please Skip to 1.2**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
1.2 Measuring and monitoring patients' vital signs □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity ➔**Please Skip to 1.3** □ I do not do this activity ➔ **Please Skip to 1.3**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity ➔ **Please Skip to 1.3**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

1. Nursing Care for Health Evaluation, Planning for Patient Care, and Health Promotion (cont.)

Nursing Care Activity **(Start here)** (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
1.3 Admitting/ discharging patients and terminating care □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 1.4** □ I do not do this activity → **Please Skip to 1.4**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 1.4**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
1.4 Planning for patient care and rehabilitation □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 1.5** □ I do not do this activity → **Please Skip to 1.5**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 1.5**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

1. Nursing Care for Health Evaluation, Planning for Patient Care, and Health Promotion (cont.)

Nursing Care Activity (Start here) (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
1.5. Providing health education, promotion, and prevention □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity **→Please Skip to 2.1** □ I do not do this activity **→ Please Skip to 2.1**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… ………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity **→ Please Skip to 2.1**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

2. Fundamentals of Nursing Care – Helping Patients with Their Basic Needs

Nursing Care Activity (Start here) (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
2.1 Providing basic nursing care for daily body function such as bathing, general hygiene care □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 2.2** □ I do not do this activity → **Please Skip to 2.2**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 2.2**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
2.2. Providing basic nursing care for psychosocial/ spiritual care and supports ☞ □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 3.1** □ I do not do this activity → **Please Skip to 3.1**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 3.1**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

3. Therapeutic Measures, Procedures, or Techniques that Nurses Perform or Help Patients, their Families, and Medical Workers (other than nurses) perform

Nursing Care Activity **(Start here)** (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
3.1 Administrating oxygen and other gases and using ventilators (respirators) □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 3.2** □ I do not do this activity → **Please Skip to 3.2**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… ………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 3.2**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
3.2 Administrating oral and parenteral food, fluids, and medications □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 3.3** □ I do not do this activity → **Please Skip to 3.3**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… ………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 3.3**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

3. Therapeutic Measures, Procedures, or Techniques that Nurses Perform or Help Patients, their Families, and Medical Workers (other than nurses) perform (cont.)

Nursing Care Activity **(Start here)** (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
3.3 Performing/ helping in intubation of the alimentary tract for medication, irrigation, and drainage, and dialysis □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity **→Please Skip to 3.4** □ I do not do this activity **→ Please Skip to 3.4**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity **→ Please Skip to 3.4**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
3.4 Performing/ helping in irrigation of vulva, perineum, and vaginal canal for cleaning and medication □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity **→Please Skip to 3.5** □ I do not do this activity **→ Please Skip to 3.5**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity **→ Please Skip to 3.5**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

3. Therapeutic Measures, Procedures, or Techniques that Nurses Perform or Help Patients, their Families, and Medical Workers (other than nurses) perform (cont.)

Nursing Care Activity **(Start here)** (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
3.5 Performing/ helping in incision and puncture of body cavities for drainage and medication □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →Please Skip to 3.6 □ I do not do this activity → Please Skip to 3.6	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 3.6**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
3.6 Performing/ helping in irrigation and medication of the eye, ear, nose, and throat and removal of foreign bodies □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →Please Skip to 3.7 □ I do not do this activity → Please Skip to 3.7	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 3.7**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

3. Therapeutic Measures, Procedures, or Techniques that Nurses Perform or Help Patients, their Families, and Medical Workers (other than nurses) perform (cont.)

Nursing Care Activity **(Start here)** (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
3.7 Performing/ helping in baths, packs, massage, and therapeutic exercise for circulatory and sedative effects and improvement of muscle tone □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 3.8** □ I do not do this activity → **Please Skip to 3.8**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 3.8**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
3.8 Performing/ helping in radiation energies and therapeutic applications such as x-ray, iodine isotope, ultrasound, laser □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 3.9** □ I do not do this activity → **Please Skip to 3.9**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 3.9**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

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3. Therapeutic Measures, Procedures, or Techniques that Nurses Perform or Help Patients, their Families, and Medical Workers (other than nurses) perform (cont.)

Nursing Care Activity **(Start here)** (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
3.9 Applying surgical dressings □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity ➔**Please Skip to 3.10** □ I do not do this activity ➔**Please Skip to 3.10**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… ……………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity ➔ **Please Skip to 3.10**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
3.10 Performing/ helping in application of restraints, splints, casts, and traction for protection and support □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity ➔**Please Skip to 3.11** □ I do not do this activity ➔**Please Skip to 3.11**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… ……………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity ➔ **Please Skip to 3.11**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

3. Therapeutic Measures, Procedures, or Techniques that Nurses Perform or Help Patients, their Families, and Medical Workers (other than nurses) perform (cont.)

Nursing Care Activity **(Start here)** (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
3.11 Suturing minor lacerations □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 3.12** □ I do not do this activity →**Please Skip to 3.12**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 3.12**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
3.12 Delivering babies in normal case □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 4.1** □ I do not do this activity → **Please Skip to 4.1**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 4.1**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

4. Symptomatic Nursing Care Given to Patients with Following Symptoms

Nursing Care Activity (Start here) (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
4.1 Providing care to patients having marked disturbance of intake and output of gases demanding medical intervention or first aid □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity **→Please Skip to 4.2** □ I do not do this activity **→ Please Skip to 4.2**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity **→ Please Skip to 4.2**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
4.2 Providing care to patients having marked disturbance of nutrition, fluid and electrolyte balance –starvation, undernutrition, obesity, vomiting □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity **→Please Skip to 4.3** □ I do not do this activity **→ Please Skip to 4.3**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity **→ Please Skip to 4.3**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

4. Symptomatic Nursing Care Given to Patients with Following Symptoms (cont.)

Nursing Care Activity (Start here) (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
4.3 Providing care to patients having marked disturbance of elimination – constipation, diarrhea, retention or suppression of urine, incontinence of urine or feces □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →Please Skip to 4.4 □ I do not do this activity → Please Skip to 4.4	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… ………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 4.4**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
4.4 Providing care to patients having motor disturbances – hypoactivity, immobilization, and hyperactivity □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →Please Skip to 4.5 □ I do not do this activity → Please Skip to 4.5	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… ………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 4.5**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

4. Symptomatic Nursing Care Given to Patients with Following Symptoms (cont.)

Nursing Care Activity **(Start here)** (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
4.5 Providing care to patients having disturbances of consciousness and orientation □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4　☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 4.6** □ I do not do this activity → **Please Skip to 4.6**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 4.6**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
4.6 Providing care to patients having anxiety, depression, insomnia □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4　☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 4.7** □ I do not do this activity → **Please Skip to 4.7**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 4.7**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

4. Symptomatic Nursing Care Given to Patients with Following Symptoms (cont.)

Nursing Care Activity **(Start here)** (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
4.7 Providing care to patients having hyperthermia or hypothermia □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 4.8** □ I do not do this activity → **Please Skip to 4.8**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… ………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 4.8**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
4.8 Providing patients having local injury or wound with infection □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 4.9** □ I do not do this activity → **Please Skip to 4.9**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… ………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 4.9**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

4. Symptomatic Nursing Care Given to Patients with Following Symptoms (cont.)

Nursing Care Activity **(Start here)** (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
4.9 Providing care to patients having systemic infection-a communicable condition transmitted by various channels. □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 4.10** □ I do not do this activity →**Please Skip to 4.10**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… ………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 4.10**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
4.10 Providing care to patients having shock or collapse- with or without hemorrhage □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 4.11** □ I do not do this activity →**Please Skip to 4.11**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… ………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 4.11**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

4. Symptomatic Nursing Care Given to Patients with Following Symptoms (cont.)

Nursing Care Activity (Start here) (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
4.11 Providing care to patients having disorders of communications attributable to impairments of sight, hearing, and speech □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 4.12** □ I do not do this activity → **Please Skip to 4.12**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 4.12**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
4.12 Providing care to patients having the preoperative state and postoperative state □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity →**Please Skip to 4.13** □ I do not do this activity → **Please Skip to 4.13**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity → **Please Skip to 4.13**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

4. Symptomatic Nursing Care Given to Patients with Following Symptoms (cont.)

Nursing Care Activity (Start here) (Please check only one) ▼	Usually, when you are not sure or do not know how to do this nursing care, which of the following information sources do you NEED MOST? (Please check only one) ▼	Usually, which of the following printed/ electronic sources for information and knowledge do you USE MOST for your nursing care of this activity? (Please check only one) ▼	What best describes the reason you USE this source (in columns 3) THE MOST? (Please check only one) ▼
4.13 Providing care to patient having pain □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity **→Please Skip to 4.14** □ I do not do this activity **→ Please Skip to 4.14**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity **→ Please Skip to 4.14**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful
4.14 Providing care to dying patients and postpartum care □ I do this activity and need information for this activity. Please answer the questions in column 2, 3, and 4 ☞ □ I do this activity, but I do not need information for this activity **→Please Skip to Part II** □ I do not do this activity **→ Please Skip to Part II**	□ Nurse colleagues □ Doctors □ Patient and family □ Kardex/patient chart/record □ Printed/electronic information □ Other, specify…………… …………………………………	□ Printed standards/ protocols □ Printed textbooks □ Printed nursing journals □ Journal databases □ Internet/World Wide Web □ Hospital information system □ I do not use any of these printed/electronic information sources for this activity **→ Please Skip to Part II**	□ Available and easy to get □ Applicable and useful □ Easy to understand □ Reliable and truthful

You are half way ☺ ☺ ☺
You may take a short break and come back to complete Part II and III

PART II: Information Needs and Uses in General

1. Nurses need information to answer questions, solve problems, make decisions, and/or fulfill nurses' desire to have information for nursing care and practice. In your working day, how often do you need information for your nursing care and practice, patient education and/or for your practice at administration unit, education unit, or other units?

	Once or more a day	Once or more a week	Once or less a month	Do not need
	▼	▼	▼	▼	
Patients and family…..□	□	□	□	□
Nurse colleagues...□	□	□	□	□
Doctors………………………………………….□	□	□	□	□
Other colleagues…………………………………□	□	□	□	□
Printed text books...□	□	□	□	□
Printed nursing journals…………………………□	□	□	□	□
Journal databases………………………………..□	□	□	□	□
Internet search/ World Wide Web………………□	□	□	□	□
Electronic patient records (EPR)……………..... .□	□	□	□	□
Hospital Information System (excluding EPR).. .□	□	□	□	□
Drug/lab manual………………………………...□	□	□	□	□
Printed standards/ Protocols……………………□	□	□	□	□
Printed kardex/ patient chart/ patient record …..□	□	□	□	□

2. Nurses use their own experiences as well as others' experiences for their nursing care and practice. For your nursing care and practice, what source of experience is USED MOST?

□ My own experience

□ Experience of others, including colleagues and physicians

□ Both used about the same

3. Usually, when you are looking for information to answer questions, solve problems, make a decision, and/or enhance knowledge for your nursing care, which of the following printed/electronic information source would you USE the LEAST? (Please select only one)
□ Printed standards/protocols
□ Printed textbooks
□ Printed nursing journals
□ Journal databases
□ Internet/World Wide Web
□ Hospital information system (excluding EPR and written standards/protocols)
□ I do not use any of these information sources

4. According to your answer in 3, which of the following best describes the reason you would USE this source the LEAST? (Please select only one)
- □ Not available/ difficult to get
- □ Not applicable and useful
- □ Difficult to understand
- □ Not reliable and truthful
- □ Not necessary to use it

5. From a total of 100 %, please specify the percentage of your weekly need for information

_____ % For your personal and career
　　　　development such as for degree obtainment

_____ % For your patient care, including patient
　　　　education, and/or your practice job

_____ % Other, please specify……………………..

Total 100 %

6. Have you heard about the following research databases?

Thai research databases	□ Yes
	□ No
Cumulative Index to Nursing	□ Yes
and Allied Health Literature (CINAHL)	□ No
MEDLINE/Pubmed?	□ Yes
	□ No
The Cochrane Library	□ Yes
	□ No

7. Does your UNIT/WARD have a reference/book room or   book area?
- □ Yes→ **How often do you use it?**
  - □ Once or more a day (of your working day)
  - □ Once or more a week
  - □ Once or less a month
  - □ Never
- □ No→ **Do you want your unit/ward to have it?**
  - □ Yes
  - □ No

8. Does your HOSPITAL have a library or a book room?
- □ Yes
- □ No→ **Do you want your hospital to have it?**
  - □ Yes
  - □ No   ⎫ **SKIP to Question 10**

9a. If "Yes", how often do you use the library/book room at your hospital in the last year for your nursing care and practice (not for educational degree obtainment)?

☐ Once or more a day (of your working day)
☐ Once or more a week ⎤ **SKIP to Question 10**
☐ Once or less a month ⎦
☐ Not at all

9b. If you answered "Once or less a month" or "Not at all" to Question 9a, please put a "1" next to the most important reason you do NOT use more, a "2" next to the second most important reason and a "3" next to the third most important reason.

_____ There are few nursing printed information sources
_____ The books are out of date
_____ It is for doctors
_____ I have no time
_____ I have no need to use it
_____ I obtain information from other sources

10. Does your UNIT/WARD have a computer connected to the Internet?

☐ Yes
☐ No→ **Do you want your unit/ward to have it?**
  ☐ Yes
  ☐ No

11. Does your HOSPITAL have a computer connected to the Internet?

☐ Yes
☐ No→ **Do you want your hospital to have it?**
  ☐ Yes
  ☐ No

12. Does your HOME/DOMITORY have a computer connected to the Internet?

☐ Yes
☐ No→ **Do you want to have it?**
  ☐ Yes
  ☐ No

13. How often do you use the Internet/World Wide Web to search for information?

☐ Once or more a day
☐ Once or more a week
☐ Once or less a month
☐ Never →**SKIP to Question 15**

14a. Do you search for nursing and health-related information from the Internet/World Wide Web?

☐ Yes
☐ No → **SKIP to Question 15**

14b. When you search for nursing and health-related information, which search engine or website do you use THE MOST? (Please check only one)

☐ Google or other general search engines
☐ Pubmed, CINAHL
☐ Websites of nursing and health care organizations
☐ Others, please specify………………………...

14c. Usually, when you search for general and/or nursing and health related information from Internet/World Wide Web and databases, which search strategies do you use the MOST? (Please select only one)
- ☐ Basic search (typing the words/subjects)
- ☐ Selecting from prelisted subject domain/menu
- ☐ Boolean operators (AND, OR, NOT)
- ☐ Using subject heading such as medical subject heading (MeSH)
- ☐ Advance search features such as refine or limit search

15. If you do not search for information from the Internet/World Wide Web, what reason best describes why you do not search information from the Internet? (Please select only one) (Please SKIP this question if you search information from the Internet)
- ☐ I have no time
- ☐ Most websites are in English
- ☐ I do not know how to use the Internet
- ☐ The Internet connection speed is very slow
- ☐ I do not have it at home
- ☐ I do not have it at work
- ☐ I have no need to have the information from the Internet
- ☐ It is expensive to use the Internet service

16. Does your UNIT/WARD have a hospital information system including electronic patient record (HIS or EPR)?
- ☐ Yes
- ☐ No→ **Do you want your unit/ward to have it?**
    - ☐ Yes
    - ☐ No

17. Does your unit/ward or hospital have research databases such as CINAHL, MEDLINE, Thai health care databases?
- ☐ Yes
- ☐ No→ **Do you want your unit/ward or hospital to have it?**
    - ☐ Yes
    - ☐ No

18. How often do you use the databases such as CINAHL, Pubmed/MEDLINE?
- ☐ Once or more a day
- ☐ Once or more a week
- ☐ Once or less a month
- ☐ Never

19. How often do you use Thai health care databases?
- ☐ Once or more a day
- ☐ Once or more a week
- ☐ Once or less a month
- ☐ Never

20. How often did you use the library at the university or nursing college in the past year for your nursing care and practice (not for educational degree obtainment)?

    ☐ Once or more a day
    ☐ Once or more a week   **SKIP to Question 22**
    ☐ Once or less a month
    ☐ Not at all

21. If you answered "Once or less a month" or "Not at all", please put a "1" next to the most important reason you do not use the library more, a "2" by the second most important reason, and a "3" by the third most important reason?

_____ It is far from my work or far to commute

_____ There are few nursing printed information sources

_____ The books are out of date

_____ It is for students, instructors, and researchers

_____ I have no time

_____ It requires membership

_____ I have no need to use it

_____ I obtain information from other sources

22. Usually when you use a library, what is the search strategy you use THE MOST for searching information from the library? (Please select only one)
    ☐ Ask a librarian
    ☐ Go directly to the shelves of subject areas
    ☐ Use the card catalog
    ☐ Use the online library catalog
    ☐ Use journal databases
    ☐ Use the Internet/World Wide Web
    ☐ I do not use the library

23. How often do you read Thai professional nursing and health journals?
    ☐ Once or more a day
    ☐ Once or more a week
    ☐ Once or less a month
    ☐ Not at all

24. How often do you read professional nursing and health journals published in English?
    ☐ Once or more a day
    ☐ Once or more a week
    ☐ Once or less a month
    ☐ Not at all

25. Do you personally subscribe to a professional nursing or health journal (s)?
    ☐ Yes
    ☐ No

26. **When was the last time that you applied your retrieved printed/electronic information, which is not information from a research study, to solve your clinical problem and/or nursing care/work problem?**

  ☐ Today or last few days

  ☐ Last week

  ☐ Last month

  ☐ Last three months

  ☐ Last 6 months

  ☐ Last year

  ☐ Never did

27. **When was the last time that you sought for information from a research study and applied it into your practice/nursing care and/or work problem?**

  ☐ Today or last few days

  ☐ Last week

  ☐ Last month

  ☐ Last three months

  ☐ Last 6 months

  ☐ Last year

  ☐ Never did

28. **To what extent does your unit/ward/hospital use the following strategies to communicate or inform about the practice or work among its members (both administrative staff and nursing care/practice staff)?**

	Once or more a day ▼	Once or more a week ▼	Once or less a month ▼	Never ▼
Letter/ Leaflet….	☐	☐	☐	☐
Memo/Note….....	☐	☐	☐	☐
Email…………	☐	☐	☐	☐
One-to-one istruction	☐	☐	☐	☐
Meeting…………	☐	☐	☐	☐
Training class…	☐	☐	☐	☐

29. Do you have a cell phone?
- ☐ Yes
- ☐ No

30. Do you have an electronic mail address (Email address)?
- ☐ Yes
- ☐ No→ **Skip to Question 35**

31. How often did you use email in the past month?
- ☐ Once or more a day
- ☐ Once or more a week
- ☐ Once or less a month
- ☐ Not at all

32. How many times have you attended a conference in the past year?
- ☐ More than 5 times
- ☐ 3-5 times
- ☐ 1-2 times
- ☐ None

33. Please check the following continuing education or training you want to have THE MOST in order to improve your practice and nursing care based on information/research (Please select only one)
- ☐ Library skills
- ☐ Literature searching (Internet/database searches)
- ☐ Computer skills
- ☐ English skills
- ☐ Research knowledge and methods

34. What following supports do you want THE MOST from your hospital or related organizations such as the Ministry of Public Health to provide or support the nurses' needs and uses of information and research? (Please select only one)

- ☐ Providing a loan for buying a computer

- ☐ Having a high speed Internet connection and information system at hospital

- ☐ Having more information/databases available in Thai

- ☐   Having electronic health system that allows accessing to major hospitals and universities for information/research   database

- ☐ Providing more time to nurses for taking educational courses and training for information uses

- ☐   Other, specify…………………………………………….

35. To what extent do you agree or disagree with the following statements about information needs and uses for your nursing care/practice?
(SA = Strongly Agree; A = Agree; N = Neither Agree nor Disagree; D = Disagree
 SD = Strongly Disagree; NO = No Opinion)

	SA ▼	A ▼	N ▼	D ▼	SD ▼	NO ▼
35.1. Administrators at my hospital support the nurses' use of printed and/or electronic information……………………………………	□	□	□	□	□	□
35.2. Supervisors at my hospital support the nurses' use of printed and/or electronic information………………………………..	□	□	□	□	□	□
35.3. Doctors at my work place support the nurses' use of printed and/or electronic information……………………………………	□	□	□	□	□	□
35.4. My nursing colleagues support me in using printed and/or electronic information..…………………………………	□	□	□	□	□	□
35.5. I trust my own experience in making decision about my nursing care/practice more than other sources …………..	□	□	□	□	□	□
35.6. My own experience is more helpful in making decision about my nursing care/practice than other information sources……	□	□	□	□	□	□
35.7. My nursing colleagues believe that their own experience is more helpful in making decision about their nursing care/ practice than other information sources…………………….....	□	□	□	□	□	□
35.8. Information from my colleagues/patient/family and/or others is more helpful in making decision about my nursing care/ practice than from printed and/or electronic information…….	□	□	□	□	□	□
35.9. I trust information from my colleagues/patient/family and/or others in making a decision about my nursing care/practice more than from printed and/or electronic information……….	□	□	□	□	□	□
35.10. It is very important for nurses to practice with sound information such as research evidence………………………..	□	□	□	□	□	□
35.11. If nurses used evidence from research more in their practice it would make a positive difference to patient care and outcomes .……………………………………………….	□	□	□	□	□	□
55.12. Nursing research done in other countries cannot be applied to Thai nursing care/practice...	□	□	□	□	□	□
35.13. I do not use information/research published in English because of my limited English skills…………………………..	□	□	□	□	□`	□
35.14. My limited knowledge about electronic information search prevents me from using information/research from electronic information sources and Internet/World Wide Web…………..	□	□	□	□	□	□

35. To what extent do you agree or disagree with the following statements about information needs and uses for your nursing care/practice? (Cont.)
(SA = Strongly Agree; A = Agree; N = Neither Agree nor Disagree; D = Disagree
 SD =   Strongly Disagree; NO =   No Opinion)

	SA ▼	A ▼	N ▼	D ▼	SD ▼	NO ▼
35.15. My limited computer skills prevent me from using information /research from electronic information sources and Internet/ World Wide Web………………………………………………	☐	☐	☐	☐	☐	☐
35.16. I will read and use research more in my nursing care/ practice if it is easy to access and available………………..	☐	☐	☐	☐	☐	☐
35.17. My hospital provides enough computer and Internet access to nurses……………………………………………	☐	☐	☐	☐	☐	☐
35.18. My hospital provides enough printed/electronic and research information to nurses……………………………..	☐	☐	☐	☐	☐	☐
35.19. The best information for my nursing practice does not need to be research information……………………………	☐	☐	☐	☐	☐	☐
35.20. Seeking and reading information from nursing textbooks and professional nursing and health journals are a part of my role as a nurse…………………………………………....	☐	☐	☐	☐	☐	☐
35.21. Using research in nursing care/practice puts another burden on me…………………………………………....	☐	☐	☐	☐	☐	☐
35.22. I will seek and use printed information and research more if I have supports from my supervisors and colleagues…….	☐	☐	☐	☐	☐	☐

1. Gender: ☐ M ☐ F

2. Which year were you born? _____

EDUCATION

3. Which year did you complete your basic BSN?
  _____(YYYY)

4. Do you have a graduate degree?
  ☐ Yes
  ☐ No   SKIP to Question 7

5. What is your highest graduate degree?
  ☐ MSN, MN
  ☐ MS or MA, not in nursing
  ☐ PhD in nursing
  ☐ PhD, not in nursing

6. Which year did you complete this degree?
  _____(YYYY)

7. Do you have a formal training certification, which is a 3 month or longer training certification, after BSN?
  ☐ Yes
  ☐ No →SKIP to Question 9

8. What is your formal training certification?
  I have a training certification in_____

9. Do you currently teach nursing students and/or nursing staff?
  ☐ Yes
  ☐ No →SKIP to Question 11.

10. If Yes, where do you teach?
  ☐ Unit/ward for clinical practice as a preceptor/mentor
  ☐ Academic and/or other health care service institutions as a guest lecturer
  ☐ Both

11. Are you taking an educational course or working on your Master's degree or higher degree?
  ☐ Yes
  ☐ No

12. Have you ever completed a course in research in nursing?
  ☐ Yes
  ☐ No
13. Have you ever been trained in information searching/database searching?
  ☐ Yes
  ☐ No

14. How do you rate your English skills?

Poor = **You cannot read English textbooks to understand, write a paper, listen to understand, or speak with foreigners.**
Fair = **It is difficult and you feel uncomfortable to use English skill.**
Good = **It is not difficult for you to use English language. However, you still feel uncomfortable in using that skill.**
Very Good = **It is not difficult for you to use English language. You feel comfortable in using that skill.**

	Poor ▼	Fair ▼	Good ▼	Very Good ▼
Reading skill............................	☐	☐	☐	☐
Writing skill…… ..……………	☐	☐	☐	☐
Listening skill…………………..	☐	☐	☐	☐
Speaking skill…... ……………	☐	☐	☐	☐

15. How do you rate your computer and information skills? (Please use the similar criteria you rated your English skills)

	Poor ▼	Fair ▼	Good ▼	Very Good ▼
Word Processing….......................	☐	☐	☐	☐
Spread Sheet…….……………....	☐	☐	☐	☐
Database such as Access……….	☐	☐	☐	☐
Computer Assisted Instruction…	☐	☐	☐	☐
Hospital Information Systems….	☐	☐	☐	☐
Presentation Graphics………. …	☐	☐	☐	☐
Electronic Mail…..…………….	☐	☐	☐	☐
Internet search…….....................	☐	☐	☐	☐

PROFESSIONAL EXPERIENCE

16. In which year did you begin to work as a nurse?
_____ (YYYY)

17. Which term is best describes you?
☐ RN
☐ RN as a certified advanced nurse practitioner
☐ RN as a nurse specialist in_____

18. Which practice role is best described your job?
☐ Practice/Nursing Care
☐ Education
☐ Administration
☐ Other (Specify……………………………)

19. At the department/unit where you work, what is your position?
☐ Head/subhead nurse
☐ Staff nurse
☐ Other (Specify_____)

20. How many hours per week do you work in this position?
_____ hours per week

21. What shift do you normally work more in this position?
☐ Morning shift
☐ Afternoon shift
☐ Night shift
☐ I work each shift equally

22. Do you provide direct patient care?
☐ Yes
☐ No → **If No**, please describe your job.........................

23. Which type of hospital do you work as a government servant or government employee?
☐ University-affiliated hospital
☐ Regional hospital
☐ General hospital/provincial hospital
☐ Community hospital (District hospital)

24. Which department/unit/ward do you primarily work at this hospital?
(Please select only one)
☐ Emergency Department
☐ Outpatient Department
☐ Inpatient Department (Please specify ward/unit ………………………….)
☐ No separated unit/ward at my hospital
☐ Other (please specify……………………)

25. How many professional, technical, practical nurses and other personnel does your unit have?

_____ Professional nurses (BSN or RN), including Head Nurse

_____ Technical nurses (TN or two year associated degree nurses)

_____ Practical nurses (PN or one year associated degree nurses)

_____Others, specify…………………………………….

26. How many patients does your unit/ward normally have?

_____ Patients Total

27. In addition to your full-time job at your government hospital, do you have a part-time job?

☐ Yes

☐ No

28. How many hours per week do you work for your part-time job?

_____ hours per week

Thank you very much for taking the time to complete this questionnaire. Your assistance in providing this information is very much appreciated. If there is anything else you would like to tell us about this survey, or about the information sources you need from your hospital and/or from the Ministry of Public Health, please do so in the space provided below.

Please put this completed questionnaire in the enclosed envelope, seal it, and give it to the investigator (Wiriya Phokhwang) or the nurse coordinator, who collects the questionnaires at your hospital. If you are working at a university hospital, regional, or a provincial hospital, you may also put it in a box for returning the completed questionnaires provided at nursing department of your hospital.

Any question, comment, and/or concern about this study, please contact Ms. Wiriya Phokhwang, the principal investigator, at 086-949-8950 or Dr. Edward Halloran, the chair of research committee, in USA at 01-919-960-2707. You may write us as well at the address in Thailand (Wiriya Phokhwang   Boromarajonani College of Nursing, Surat-Thani Muang, Surat-Thani 84000) or the address in the USA (Wiriya Phokhwang School of Nursing Carrington Hall, CB #7460 Chapel Hill, NC 27599-7460 USA), or at wiriya@email.unc.edu.

Any question, comment, and/or concern about your rights as a participant in this study, please write to IRB Medical School Building 52 Mason Farm Road CB # 7097 Chapel Hill NC 27599-7097 USA or call at 01-919-966-3113. You can also contact the ethics committee for research in human subjects of your hospitals (for university-affiliated hospitals) or of the Ministry of Public Health at 02-02-590-6171-2 (for the hospitals under the Ministry of Public Health)

APPENDIX B
IRB Approval

THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

OFFICE OF HUMAN RESEARCH ETHICS
Medical School Building 52
Mason Farm Road
CB #7097

TO: Wiriya Phokhwang
School of Nursing - OASS
CB:7460

FROM: Public Health-Nursing IRB

Ruth Humphrey
Authorized signature on behalf of IRB

APPROVAL DATE: 4/03/2007

EXPIRATION DATE OF APPROVAL: 4/01/2008

RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Submission Type: Initial
Expedited Category: 7.Surveys/interviews/focus groups
Study #: 07-0008

Study Title: Information Needs and Uses of Nurses in Thailand: A National Sample Survey

This submission has been approved by the above IRB for the period indicated. It has been determined that the risk involved in this research is no more than minimal.

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

When applicable, enclosed are stamped copies of approved consent documents and other recruitment materials. You must copy the stamped consent forms for use with subjects unless you have approval to do otherwise.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented (use the modification form at ohre.unc.edu/forms). Should any adverse event or unanticipated problem involving risks to subjects or others occur it must be reported immediately to the IRB using the adverse event form at the same web site.

Study Description:
Purpose: To explore: 1) What specific information Thai nurses need and use for their clinical practice in general and for their specific nursing care activities (as described in Principles and Practice of Nursing, 6th edition [Henderson & Nite, 1997]. 2) What factors influence the information needs and uses of Thai nurses for their clinical practice in general and for their specific nursing care activities. Participants: Baccalaureate degree Thai nurses working at university-affiliated hospitals under the Ministry of Education and at regional, provincial, and community hospitals under the Ministry of Public Health nationwide. Procedures: This descriptive survey will employ stratified random sampling with proportional to size to select nurse subjects and employ a researcher-developed questionnaire to collect data.

Details:

This research meets criteria for a waiver of written (signed) consent according to 45 CFR 46.117(c)(2).

Call the IRB at 966-3113 if you have any questions. You can now access IRB status information at https://my.research.unc.edu/.

This study was reviewed in accordance with federal regulations governing human subjects research, including those found at 45 CFR 46 (Common Rule), 45 CFR 164 (HIPAA), and 21 CFR 50 & 56 (FDA), where applicable.

The University of North Carolina at Chapel Hill holds a Federal Wide Assurance approved by the Office for Human Research Protections, Department of Health and Human Services (FWA # 4801).

CC:
Edward Halloran, School Of Nursing, CB:7460 5012 Carrington Hall, Faculty Advisor
Veena Jirapaet, , , Co-Investigator

APPENDIX C

Cover Letter and Information Fact Sheet (Informed Consent Form)

Carrington Hall, CB #7460
Chapel Hill, NC 27599-7460
USA

Dear Colleague,

I am writing to ask for your help in a survey study on information needs and uses among Thai nurses. This research study has two major purposes: 1) to discover what information Thai nurses need and what information sources Thai nurses use in their nursing care and practice and 2) to describe what factors influence the information needs and uses of Thai nurses.

You are selected because you are a professional nurse working at a community, general/regional, or university hospital in Thailand. Your participation in this research study is completing the questionnaire that is asking what information you need and use for your specific nursing care (PART I) and what information you need and use in your nursing care and practice in general (PART II). In this questionnaire, you will also be asked to provide your personal information and work experience (PART III).

Results from this research study will be used to help Thai nursing achieve a better quality of nursing care. Understanding what information Thai nurses need, what information sources they use, and what factors influence their information needs and uses in both specific nursing care activities and nursing care and practice in general is an important prerequisite for authority persons to develop and provide education, training, and information resources for Thai nurses that shall ultimately help to improve their information uses for patient care and for personal development.

Your response is entirely voluntary. By returning your completed questionnaire, you consent to be a participant in this research study. All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have any questions or comments about this research study, we would be happy to talk with you. You can call Ms. Wiriya Phokhwang, the principal investigator, at 086-949-8950, or Dr. Edward Halloran, the chair of the research committee, in USA at 01-919-966-7207. You may also write us at the address in Thailand (Wiriya Phokhwang Boromarajonani College of Nursing, Surat-Thani Muang, Surat-Thani 84000 or wiriya@email.unc.edu) or at the address in USA on the letterhead.

If you have any question about your rights as a participant in this research study, please write to the Institutional Review Board, Medical School Building 52 Mason Farm Road CB # 7097 Chapel Hill, NC 27599-7097 USA or call at 01-919-966-3113. You may also contact the Ethics Committee for research in human subjects in Thailand. If you are working at a regional, provincial, or community hospital, you can contact the Ethics Committee for research in human subjects at the Ministry of Public Health at 02-590-6171. If you are working at a university-affiliated hospital, you may contact the Ethics Committee for research in human subjects at your hospital.

We have enclosed 50 Thai baths as a way of saying thanks for your help. You may keep this money even if you choose not to complete and return the questionnaire. Thank you very much for helping with this important research study.

Sincerely yours,

Ms. Wiriya Phokhwang (Principal Investigator)
PhD Candidate   University of North Carolina Chapel Hill

Information Needs and Uses of Thai Nurses: A National Sample Survey
Frequently Asked Questions

How was I selected to be in the sample?
We used a scientific sampling to select hospitals and nurses across the nation. You were selected to provide what information Thai nurses need and use because you are working at one of the selected hospitals. You are one among 971 nurses, who were selected to answer this questionnaire.

What are possible benefits and risks or discomforts from being in this research study?
This research study may not directly benefit you. However, it will benefit nursing society, as the information we receive from all nurses participating in this study will be communicated and distributed to the profession through publication in the literature and presentation at professional meetings. The information will also be directly disseminated to professional and related health care organizations such as the Ministry of Public Health and your hospitals. You may experience having physical or emotional discomfort such as tiredness and fatigue from answering the questionnaire. If you have any problem about answering the questionnaire, you can write or call the principal investigator at the address and phone number on the front page of this letter anytime.

Who sees my answers?
As regulated by the Institutional Review Board, the University of North Carolina, Chapel Hill, North Carolina, USA, only the principal investigator and her research committee will see your actual questionnaire form. In addition, there is no identified information question that asks you to give your name, address, or phone number on the questionnaire. Your answers remain confidential. Your actual questionnaire form will be kept and locked in a file cabinet at the principal investigator's office at Boromarajonani Nursing College, Surat-Thani, Maung, Surat-Thani for five years. After that, it will be disposed by using a paper shredding machine.

How much time does the questionnaire take?
Based on preliminary tests and questionnaire adjustment after the tests, we estimate that it will take approximately 30-45 minutes for completion. Since not everyone will complete every question of the questionnaire, actual times vary. If you have comments on the time required for this survey, please send them to Wiriya Phokhwang, Boromarajonani Nursing College, Surat-Thani, Maung, Surat-Thani 84000 or email your comments at wiriya@email.unc.edu.

What happens if I do not answer?
This is a voluntary survey. Whether you answer the questionnaire or not will have no effect on your job status. You are allowed to not answer any question for any reason. However, your answer can represent about 56,323 Thai nurses, working at university-affiliated, regional, provincial, and community hospitals.

Why is this survey important? Can I see a report from the survey?
On the front page of this letter we listed some of the many purposes of this survey. We are conducting this survey in order to obtain the results that can inform authorities in nursing education, practice, administration, and policy making for their decisions about possible future provisions of resources for the improvement of information needs and uses of nurses for the quality of patient care, practice, and outcomes and also for the personal development of the nurses. This is why we need the information and survey input from nurses like you. If you would like a copy of the study reports or publications based on this survey to learn more about its results and uses, please check the box "□ Yes, I would like to have a copy of one of study reports or publications" on the enclosed postcard. Then, you can mail it to the address on the card or give it to the investigator or the nurse, who collects the questionnaires at your hospital. To protect your identity, please do not put this postcard in the questionnaire envelope.

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APPENDIX D

Postcard: Request for One of Study Reports or Publications

UNC

Information Needs and Uses of Nurses: A National Sample Survey

☐ Yes, I would like to have a copy of one of study reports or publications
Please send it to me at: (Your name and address)

_____

_____

_____

Or email it to me at: (Your email address) _____

Note: Please return this postcard to the investigator or the nurse coordinator, who is collecting the questionnaires at your hospital, or put it in a box provided at the nursing department of your hospital. You can send this postcard to the address on the front as well. You may also email your request for study reports or publications at katewiriya@yahoo.com.
TO PROTECT YOUR CONFIDENTIALITY, PLEASE DO NOT PUT THIS POSTCARD IN YOUR COMPLETED QUESTIONNAIRE ENVELOPE

Thank you very much for your help with this important study.
We really appreciate it.

Wiriya Phokhwang (Principal Investigator)
PhD Candidate
University of North Carolina Chapel Hill, North Carolina, USA.

(Back of return card)

To

Wiriya Phokhwang
Boromarajonani College of Nursing, Surat-Thani
Maung, Surat-Thani
84000

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APR 0 3 2007

(Front of return card)

Information Needs and Uses of Nurses: A National Sample Survey

UNC

Carrington Hall, CB #7460
Chapel Hill, NC 27599-7460
USA

Date

Dear the Hospital Director
CC: the Head Nurse
Attachments: 1) An approval letter to conduct this research study issued by the research ethics committee for research study in human beings, the Ministry of Public Health (OR by the ethics committees of university-affiliated hospitals for the university-affiliated hospitals)
2) A letter soliciting the cooperation and permission to collect data in nurses issued by the Director of Praboromarajchanok Institute for Health Workforce Development (PBRI or PIHWD), Ministry of Public Health.
3) A questionnaire package

My name is Wiriya Phokhwang, a nursing instructor from Boromarajonani Nursing College, Surat-Thani, the Ministry of Public Health and a PhD candidate from the University of North Carolina at Chapel Hill, USA. I am conducting a research study, *Information Needs and Uses of Thai Nurses: A National Sample Survey*. This research study has two major purposes: 1) to discover what information Thai nurses need and what information sources Thai nurses use in their nursing care and practice and 2) to describe what factors influence the information needs and uses of Thai nurses.

This research study has been approved by the research ethics committee for study in human subjects of the Ministry of Public Health and by your hospital (for university affiliated hospitals).

Your hospital is one among 92 hospitals that were randomly selected to have nurses voluntarily participating in my research study. I would like to ask for your cooperation and permission for my data collection. My data collection involves distributing and collecting the copies of questionnaire to and from nurses by mail or by hand at your hospital. Each nurse subject will receive a questionnaire package, as attached.

I will contact the head nurse for my data collection in more details later.

Best regards,
Wiriya Phokhwang
PhD Candidate
University of North Carolina at Chapel Hill, USA

APPROVED - IRB, UNC-CH

APR 0 3 2007

Contact Address:
Boromarajonani College of Nursing, Surat-Thani
Muang, Surat-Thani, 84000
Email: wiriya@email.unc.edu
Tel. 086-949-8950

Letter Informing the Head Nurses or Nurse Coordinators about the Questionnaire Distribution and Collection

Praboromarajchanok Institute
Office of the Permanent Secretary
Ministry of Public Health
Tivanont Rd. Nonthaburi 11000

Date
Dear the Hospital Director,
Cc: Head nurse

I am writing to ask for your cooperation in a very important research study, *Information Needs and Uses of Thai Nurses: A National Sample Survey*, conducted by Ms. Wiriya Phokhwang, a nursing instructor from Boromarajonani College of Nursing, Surat-Thani and a PhD candidate from School of Nursing, University of North Carolina, Chapel Hill, USA. The results of this study can be used to inform authoritative persons such as those at your hospital and at the Ministry of Public Health to improve and possibly provide information and resources to nurses for their nursing care and practice as well as for their personal development.

Your hospital is one among 92 hospitals that have been randomly selected to voluntarily participate in this research study. I would like to ask for your cooperation and your permission to Ms. Phokhwang for her data collection. Ms. Phokhwang's data collection involves distributing and collecting the questionnaires to and from a sample of nurses at your hospital by either mail or by hand. Your cooperation and permission are voluntary. There will be no effect on your job status or any other consequences for you or your institution should you choose to decline permission to Ms. Phokhwang in her data collection.

Ms. Phokhwang will contact the head nurse at your hospital for her data collection about 1 week later.

Thank you very much for your cooperation in this important research study.

Best Wishes,
Papassorn Jiamboonsri, MD.
Director of Praboromarajchanok Institute

APPROVED - IRB, UNC-CH
APR 0 3 2007

APPENDIX G

A Draft Letter Soliciting Nurses' Cooperation Issued by the Director of Praboromarajchanok Institute for Health Workforce Development (PBRI or PIHWD), Ministry of Public Health

Praboromarajchanok Institute
Office of the Permanent Secretary
Ministry of Public Health
Tivanont Rd. Nonthaburi 11000

Date

Dear Colleague,

I am writing to ask for your cooperation in a very important research study, *Information Needs and Uses of Thai Nurses: A National Sample Survey*, conducted by Ms. Wiriya Phokhwang, a nursing instructor from Boromarajonani College of Nursing, Surat-Thani and a PhD candidate from School of Nursing, University of North Carolina, Chapel Hill, USA. I would like to ask you to help in completing the questionnaire and returning it to the principal investigator (Ms. Wiriya Phokhwang) or a nurse coordinator at your hospital. Your questionnaire completion is entirely voluntary. This questionnaire completion is for research purposes. Whether you complete the questionnaire or not will have no effect on your job status. Your director or supervisor will not be made aware of who does or does not complete the questionnaire. Except for the investigator and her research committee, no one will see your actual answers to the questionnaire. The results of this study will be important to inform authoritative persons such as those at your hospital and at the Ministry of Public Health to improve and possibly provide the information and resources to nurses for their nursing care and practice as well as for their personal development.

In order for the authorities from your hospital, the Ministry of Public Health, as well as nurse educators to facilitate and provide the best suite of information nurses need and use in the future, we need the information, knowledge, and feedback from nurses like yourself. By completing and returning this questionnaire, you greatly help Thai nursing for the possible improvement of quality of patient care and personal nurses' development. You also help relevant health care organizations such as your hospitals, the Ministry of Public Health, and nursing education institutions in possibly serving your information needs and uses accordingly. You are a voice among 971 nurses representative of about 56,000 Thai baccalaureate degree nurses working at public hospitals to tell us and authoritative persons at these relevant organizations about what information you need and use.

Thank you very much for your help in this important research study.

Best Wishes,

Papassorn Jiamboonsri, MD.

Director of Praboromarajchanok Institute

APPENDIX H

Telephone Contact Scripts to Head Nurses and Nurse Coordinators

1st Contact

Purpose: to inform about the study and ask for permission

Hello

I am Wiriya Phokhwang, a nursing instructor from Boromarajonani Nursing College, Surat-Thani and a PhD student from University of North Carolina at Chapel Hill, USA. I am conducting a research study, *Information Needs and Uses of Thai Nurses: A National Sample Survey*. The purposes of this research study include 1) to discover what information Thai nurses need and what information sources Thai nurses use in their nursing care and practice and 2) to describe what factors influence the information needs and uses of Thai nurses.

I am calling you today because your hospital was randomly selected by statistical methods to have a number of nurses (which is about....) working at your hospital to voluntarily participate in my research study.

I hope you already received the document package including the letter from the director of Praboromarajchanok Institute soliciting the hospital's cooperation and informing about this data collection.

In collecting data, I will hand the questionnaire to nurses in your hospital OR I will mail the questionnaire (for community hospitals) to the nursing department and ask yourself or a nurse coordinator to distribute and collect the questionnaire to and from any nurse, who wants to voluntarily participate in this research study. Your participation is voluntary. You may say "yes" or "no" to allow me collecting data with nurses in your hospital. There is no penalty from any organization and no effect on your job status or anything on you or on your hospital.

Would you mind to allowing me to distribute questionnaires to nurses in your hospital OR to mail the questionnaires to you (for the community hospitals) and ask for your help distributing the questionnaire to nurses?

Would you mind to tell me when it is a good date and time for you to let me distribute the questionnaires in your hospitals (for university-affiliated, regional, and provincial hospitals) ?

(For community hospitals) In this questionnaire distribution and collection, you will distribute the questionnaires and collect them to and from nurses and mail them to me. I will provide a prepaid envelope for returning the complete questionnaires for you.

(For regional, provincial, and university-affiliated hospitals) When I am there, I would like to ask for your help leading me to patient wards or units and if you don't mind please introduce me to the head nurse at those units. In this data collection, some nurses may be able to complete the questionnaires and return their completed questionnaires to me; some may not. If you mind to help in collecting the completed questionnaires from nurses, who cannot return it to me. In addition, I would like to put a box to collect the questionnaires at the nursing department and would like to ask for your help collecting them and mailing to me. I will provide a prepaid envelope for you.

One important thing for this data collection is that the IRB regulation by UNC requires you to sign and give or send to me an Oath of Confidentiality stating that you will keep the completed questionnaire confidential and you will not open the completed questionnaires. You also will not coerce or give any special treatments or punish any nurse, who participates or who does not participate in this study.

APPENDIX I

Personal Contacts When Distributing and Collecting the Copies of Questionnaire by Hand at University-Affiliated, and Regional Hospitals and Oath of Confidentiality

Hello (Head Nurse)

My name is Wiriya Phokhwang, the principal investigator in a research study, *Information Needs and Uses of Thai Nurses: A National Sample Survey*. As you know from the letter I sent to the hospital director and the phone contact I made before, I am here today to distribute the copies of the questionnaire to nurses in your hospital. Would you mind to lead me and introduce me to unit-head nurses and nurses at wards/units where I can hand the questionnaire packages to those nurses? Thank you very much.

Hello (Unit-head Nurses and Nurses)

My name is Wiriya Phokhwang, the principal investigator in a research study, *Information Needs and Uses of Thai Nurses: A National Sample Survey*. This research study has two major purposes: 1) to discover what information Thai nurses need and what information sources Thai nurses use in their nursing care and practice and 2) to describe what factors influence the information needs and uses of Thai nurses.

I am here today to distribute copies of the questionnaire to nurses. This questionnaire will ask about nurses' information needs and uses for their nursing care and practice. It is entirely voluntary for you to participate in this research study. There is no effect on your job status for participating or not in this research study. Your participation consists of completing this copy of the questionnaire and returning it in a sealed envelope to me the next day, when I come to collect the questionnaire packages from nurses. You can also give it to the nurse coordinator or head nurse, who collects the questionnaire, or put it in a box provided at the nursing department. More information about the confidentiality and your rights as a participant is attached in this questionnaire package.

Thank you very much for your help. I do appreciate it.

Oath of Confidentiality

Oath of Confidentiality

I, ...(head nurse or coordinator's name)......, am taking an oath that I will keep all the completed questionnaires confidential. I will not open any completed questionnaire. I know that this questionnaire completion is for research purposes. I will not coerce, punish, or give special treatments to any nurses, who complete or do not complete the questionnaire. I know that it is the nurses' right to participate or not participate in this study. I am not going use my authority to convince or force any nurse to participate or respond in any way to the questionnaire in this study.

....
(signature)
....
(Name)
....
(Date)

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Questionnaire No.

APPROVED - IRB, UNC-CH

APR 0 3 2007

UNC
SCHOOL OF NURSING

Information Needs and Uses of Thai Nurses: A National Sample Survey

Your response is confidential. We will use it to produce statistical summaries from which no one may identify any particular person. Your response is entirely voluntary, and failure to provide some or all of the requested information will not in any way adversely affect you.

Conducted by:

Wiriya Phokhwang
PhD Candidate

The University of North Carolina at Chapel Hill North Carolina, USA

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