The Nursing Minimum Data Set (NMDS) and Its Relationship with the Nursing Management Minimum Data Set (NMMDS): significance, development, and future of nursing profession

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Introduction

Without description and capturing of what nurses do and studying ways to make nursing more cost effective and efficient is not possible (McManus & Peason, 1993). With the decreased hospital stays, it is essential to that nursing care should be as effective and as efficient as possible. According to Clark and Lang (1992), it is becoming important for professional nurses all over the world to make visible what nurses contribute to the health of clients.

The identification of a standardized data set make it possible to compare the elements of nursing practice across settings and patient populations. The Nursing Minimum Data Set (NMDS) is the first work within nursing to identify nursing care elements to be collected in a standardized dataset. The NMDS facilitates collection of minimum, core, and essential data of national nursing care that describe nursing practice. With the implementation of NMDS in nursing information system (NIS), data are easily accessible and retrieval for quality evaluation and the use of NMDS enhances quality across settings and institutions because computer technology enables rapid collection of information from large data sets at low cost.

In nursing there is pressing needs to identify its core, essential data, and then to systematically collect that data in an easily retrievable and comparable format that can be incorporated into national databases(Huber et al., 1992). The Joint Commission on the Accreditation of Healthcare and Organizations (JCAHO), the Agency for Health Care Policy and Research, the Library of Medicine, and many other professional groups are pushing for the development of computerized information systems in nursing and standardized nursing data are required for nurses' use for the computer based patient record. Yet much of data are neither standardized across data set nor most nursing data elements are included in national level of databases. Certainly much

data collected and needed for nursing are not included in any databases. Therefore, many questions of interest to nursing cannot be answered and the evaluation of the effectiveness of nursing care and health care organizations cannot be addressed systemically.

For this purpose this article describes the NMDS including, database development, purpose and scope of the data sets, standardized classification systems for nursing, and limitation of existing NMDS. This article also highlights the international perspectives of the NMDS by comparing the datasets of three countries. Finally, this article describes the Nursing Management Minimum Data Set (NMMDS), and its relationship with the NMDS.

Background

1. Development of the Nursing Minimum Data Set

Under the auspices of the National Committee on Vital and Health Statistics (NCVHS), three patient-focused health data sets were developed for medical effectiveness research; 1) the Uniform Hospital Discharge Data Set; 2) the Long-Term Health Care Minimum Data Set, and 3) the Uniform Ambulatory Medical Care Minimum Data Set (NCVHS, 1980a, 1980b, 1981). None of these data sets contain nursing elements (Ryan & Delaney, 1995). Health care information which does not include nursing data cannot be comprehensive, and outcomes and quality of patient care cannot be evaluated correctly (Blewitt, & Jones, 1996; Brooten & Naylor, 1995; Johnson & Maas, 1997). Therefore, a minimum data set for nursing is needed.

The Nursing Minimum Data Set (NMDS) was developed in response to the absence of nursing data in national health care data bases. The

concept of the Minimum Data Set was formulated initially in 1969 in an effort to develop national health data standards and guidelines (Murnaghan & White, 1971). The basic nursing data set was conceptualized through small group work at the Nursing Information Systems Conference at the University of Illinois College of Nursing in 1977 (Newcomb, 1981). In 1985, an invitational conference was conducted at the University of Wisconsin-Milwaukee School of Nursing to establish the elements of a Nursing Minimum Data Set(MNDS) for inclusion in clinical records(Werley, Ryan, Zorn, & Devine, 1994). Werley and Lang(1988) proposed the NMDS to include an essential nursing data set to describe unique aspects of nursing practice and to demonstrate the effectiveness of nursing.

The NMDS was built on the concept of the Uniform Minimum Health Data Sets(UMHDS) (Werley, Ryan, & Zorn, 1995). The concept of the UMHDS was developed in 1969 from efforts to identify national health standards and guidelines (Murnaghan, 1973, 1976; Murnaghan & White, 1971). The UMHDS has been defined by the United States Health Information Policy Council(HIPC)(1983) as a minimum set of information with uniform definitions and categories, concerning a specific aspect or dimension of the health care system which meets the essential needs of multiple data users(p. 3).

In 1990, the ANA Steering Committee on Data Bases to Support Clinical Nursing Practice accepted the NMDS as a framework to guide their work(McCormick et al., 1994). In addition in 1991, the American Nurses Association (ANA) recognized the NMDS as the minimum data elements to be included in any nursing data set or clinical record(ANA, 1991). Therefore, it was intended to be used in any setting where nursing care was provided and not designed to meet the entire data needs of

the nursing community.

The purposes of the NMDS are to: 1) establish comparability of nursing data across settings, time, and populations; 2) describe the care provided by nurses in a variety of settings; 3) demonstrate or project trends of nursing care and nursing resource allocation according to patients' or clients' health problems and nursing diagnoses; 4) stimulate nursing research through linking data to the other health related data in nursing and other health care information systems; and 5) provide nursing data to facilitate and influence clinical, administrative, and health policy decision-making (Werley & Lang, 1988).

The NMDS has been used to describe care in hospitals, nursing centers, and home health care agencies and to establish comparability of nursing data across health care settings, patient populations, geographical areas and time. By doing this, nursing research would be more stimulated and could influence nursing related health policy decision making effectively (Ryan & Delaney, 1995).

2. Elements of the NMDS

The NMDS in the US includes sixteen elements categorized into three broad categories: 1) nursing care elements; 2) patient or client demographics; and 3) service elements. The second and third categories of elements are already included in the Uniform Minimum Health Data Set (UMHDS) which has been collected on Medicare patients since 1975 in large databases. Only six items are not included within the data sets. Two items of the six are a unique health record number for the client and a unique number for the principal registered nurse provider(Werley, Devine, Zorn, Ryan, and Westra, 1991). The other four items are nursing diagnosis, nursing intervention, nursing outcome, and nursing intensity (Coenen

& Schoneman, 1995).

<Table 1> depicts the elements of the NMDS in the US. The elements of NMDS must be included as an inherent part of all nursing information systems, and the elements must be accurately and consistently documented, linked, and stored(Werley, Ryan, & Zorn, 1995).

<Table 1> Elements of the NMDS

Nursing care Elements
1. Nursing Diagnoses
2. Nursing Intervention
3. Nursing Outcome
4. Intensity of Nursing care
Patient or Client Demographic Elements
5. Personal Identification*
6. Date of Birth*
7. Sex*
8. Race and Ethnicity*
9. Residence*
Service Elements
10. Unique Facility or Service Agency Number*
11. Unique Health Record Number of Patient or Client
12. Unique Number of Principal Registered Nurse Provider
13. Episode Admission or Encounter Date*
14. Discharge or Termination Date*
15. Disposition of Patient or Client*
16. Expected Payer for Most of This Bill*

* Elements comparable to those in the Uniform Hospital Discharge Data Set (UHDDS)

3. Standardized Classification systems for the NMDS

The NMDS is the first attempt to quantify essential nursing data which is used on a regular basis by the majority of nurses across settings(McCloskey, 1994). Thus, central to the development of the NMDS is the development of standard uniform definitions and terminology for the data elements included. A common language system to describe the elements of the NMDS should be used to achieve a widespread description of nursing practice.

To collect the elements of the NMDS, it is essential to have standardized languages or classification systems. Many classification schemes have been developed in several decades to describe health-related practice. The first taxonomy in nursing was the North American Nursing Diagnosis Association(NANDA) listing of nursing diagnosis. Recently, a variety of classifications systems have been developed to describe nursing practice more broadly. These classification systems in nursing include the following: Nursing Interventions Classification (NIC), Nursing Outcome Classification(NOC), Omaha system, Verran's Taxonomy of Ambulatory Care, Saba's Classification System for Home Health Care, Grobe's Nursing Intervention Lexicon Taxonomy, and Arnold's Toxonomy of Transitional Follow-up Care. These classifications and taxonomies vary significantly in term of the developmental stage, and applicability, however, and there is no one single, universally agreed-upon data set to date(Boweles & Nayor, 1996; Henry, Holzemer, Campbel, 1994; Henry, & Mead, 1997;McCloskey & Bulechek, 1996). However, only NANDA, NIC, and NOC are comprehensive classifications across specialty and practice settings.

The American Nurses Association Steering Committee on Databases To Support Clinical Nursing Practice has recognized seven classification systems that are usable in nursing practice. Another approach the nursing profession is moving toward is the development of a unified nursing language system(UNLS), which is being developed by the National Library of Medicine(McCormick et al., 1994). This approach would establish comparability among multiple classification systems. As another example, Moorhead and Delaney(1997) and Coenen, Ryan, and Stutton(1997) are using mapping process which links non-standardized intervention and nursing order into NIC.

The use and success of the NMDS is dependent on continued efforts to standardize and refine data elements of NMDS. <Table 2> describes the data elements of NMDS which were recognized by ANA. However, as you can see <Table 2>, there is no classification systems developed which can complete nursing care elements of the NMDS yet.

1) Nursing diagnoses

In 1973, the First National Conference for the Classification of Nursing Diagnoses was held to develop a standardized language which describes the problems nurses treat (Gebbie & Lavin, 1975). The North American Nursing Diagnosis Association (NANDA) was organized during the fifth national conference (Kim, McFarland, & McLane, 1984). The definition of a nursing diagnosis is "a clinical judgment about individual, family, or community responses to actual or potential health problems or life processes" (NANDA, 1997, p. 8).

The diagnosis serves as a framework for the care plan. Nursing diagnoses provide the basis

<Table 2> Elements of the NMDS and classification systems for nursing practice

Classification systems	Diagnosis	Intervention	Outcome	Intensity
NANDA	x			
Nursing Interventions Classification (NIC)		x		
Nursing Outcomes Classification (NOC)			x	
Omaha System	x	x		x
Georgetown Home Health Classification	x	x	x	
International classification of Nursing Practice	x	x	x	
Patient Care Data Set	x	x		
AORN Perioperative Data Set	x	x	x	

for selection of nursing interventions to achieve outcomes for which the nurse is accountable (Popkess-Vawter, 1991). The list of nursing diagnoses cannot be completed. A process for the maintenance of the NANDA taxonomy is evolving. Currently NANDA contains 149 approved diagnoses classified into nine domains. The more recent diagnoses have become more rigorous, but a gap exists between the older and the newer diagnoses.

NANDA alone does not complete the full scope of nursing practice and should be linked to nursing interventions and nursing outcomes. Other classifications for nursing diagnoses are the Omaha system and Saba's classification system developed for the needs of community and home health care settings(Martin & Scheet, 1992; Saba, 1992).

2) Nursing Interventions

After making a diagnosis, the nurse plans care or interventions with the patient to achieve expected outcomes. Interventions performed by nurses to solve problems of patients have not been standardized or well defined until recently(Robbins, 1997). Several preliminary intervention classification schema exist but these are incomplete and not validated. Only the Nursing Interventions Classification(NIC) is comprehensive, empiri-callybased, developed by a large research team, and validated by clinical experts.

NIC contains a standardized list of 486 interventions performed by nurses. Each intervention has a label name, a definition, a set of activities that a nurse does to carry out the intervention, and a short list of background readings. Each label has been coded for computerization. Research methods to develop and validate the interventions included content analysis, expert survey, and focus group review. Principles of label, definition, and activity construction were established for consistency across the classification. An ongoing review process is used to continually update and expand the classification(McCloskey & Bulechek, 2000)

The placement of the interventions in a 3level taxonomic structure facilitates selection of an intervention. The taxonomy was developed inductively by the team members using the methods of similarity analysis and hierarchical cluster analysis. The most abstract level is the domains. Each of the domains includes classes (groups) of related interventions which represent the second level of abstraction of the NIC taxonomy structure. Each domain and class has a definition that helps to place and locate specific interventions to its associated domain and class. The third, the most concrete level of the NIC taxonomy, consists of the interventions that nurses can choose to use with particular patients (Iowa Intervention Project, 1995).

3) Nursing Outcomes

Although nursing has shown an interest in the study of outcomes since the work of Nightingale, outcomes have been studied less frequently than problems and interventions (Henry et al., 1994). Part of the reason is the absence of valid and reliable data on outcomes of nursing care(Ozbolt, 1992). No research has offered strong evidence that the client outcomes are nursing sensitive(Rinke, 1988). As nursing becomes a full participant in outcomes research, it is essential that patient outcomes influenced by nursing be identified and measured (Jennings, 1991; Marek, 1989). Therefore, the development and implementation of a standardized classification that names and defines client outcomes influenced by nursing interventions is necessary(Lang & Marek, 1990; Lange & Jacox, 1993).

The Nursing Outcomes Classification(NOC) was developed by a research team at The

University of Iowa College of Nursing to provide standard patient outcomes for use in all clinical settings in which nursing care occurs(Johnson & Maas, 2000). The NOC provides a standard vocabulary and measures for patient outcomes that are influenced by nursing interventions. The NOC was developed using an inductive approach. Outcome labels and indicators were extracted from nursing texts, care plans, critical paths, actual measurement tools, and computerized nursing databases to represent different populations in every setting.

The current published classification contains 260 outcomes, each with a definition, indicators to assist in evaluating patient outcome status, and a measurement scale to rate the outcome status. Each NOC outcome is stated as a variable concept representing a patient or family caregiver state, behavior, or perception. Sixteen 5-point, Likert scales are used to evaluate outcome status of patients or caregivers with 1 being the least desirable status and 5 being most desirable status. The use of standardized nursing-sensitive outcomes will make the effects of nursing care more visible and increase nursing accountability (Johnson & Maas, 2000).

Although a standardized outcome measure has been developed for home care(Saba, 1992) and one other classification developed for a hospital setting(Ozbolt, et al., 1994), NOC is the most comprehensive nursing outcomes classification can be used in all clinical settings.

4) Intensity of Nursing Care

The fourth nursing care elements of the NMDS, intensity, is not well developed (Delaney & Moorhead, 1995). Thus, nursing needs information about nursing intensity to fill out all the nursing care elements of NMDS. The definition and measurement of intensity, however, are troublesome. Concepts of intensity, patient classification, patient acuity, staff ratios, nursing resources, and skill mix are intermixed in practice, rendering them unclear(Delaney & Moorhead, 1995). According to Werley, et al.(1992) intensity of nursing care is determined by 1) hours of nursing care administered to the patients, and 2) ratio of various types of nursing personnel involved in the patient's care(p. 23). The hours of nursing care refer to the total time expended in consumption of nursing resources for an individual patient during the episode.

Hours of care have been measured using patient classification systems(PCSs) which were developed to address the measurement of nursing resource consumption in hospital settings. In general these systems quantify nursing care requirements for the purpose of projecting staff allocation.

Prescott and Phillips(1988) reviewed 19 PCSs that measure care at the ordinal level. The results showed that there was considerable variability in time estimates for care when patients were categorized into five acuity levels. This variability caused by the algorithm used to estimate hours of care. For the majority of systems, the algorithm for estimating hours of care is based on data obtained from time and motion studies, in which time requirements were directly assessed from observation or indirectly determined from nurses' report of time spent.

Most of patient classification systems were designed prior to the implementation of prospective payment system and the need to identify nursing care costs was not as urgent. Also most systems were designed as administrative tools to predict or monitor unit workload. Often times, PCSs have not included patient teaching and psychosocial interventions such as support/counseling, and they have not directly measured complexity of the nursing care requirement of patients(Prescott, 1991).

Further, today's PSCs must be able to address the needs of individuals and groups of patients over time(Prescott, 1991).

4. International Perspectives of the NMDS

The effort to develop international as well as national standards and guidelines would be enhanced by a minimum data set which has been shown to meet the needs of multiple users (Health Information Policy Council). Work on NMDS must be continued with an international perspective. There are number of countries that are currently undertaking developments in the area of NMDS. All of these developments are at different stages and take different stances, and Belgium has accepted and the government is collecting information(Foster & Conrick, 1994). Since January 1, 1988, all Belgium general hospitals are required to collect data for an NMDS four times a year by law(the Minimale Verpleegkundige Gegevens /R sum Infirmier Minimum(MVG/RIM)(Goosen et al., 1998). However, the elements of NMDS are not consistent with that of the US.

Other countries are also developing NMDS. The countries developed some sorts of NMDS are Australia, Canada, German, France, England, and Netherlands. Also some of European countries, Belgium, Denmark, Finland, Greece, Iceland, Italy, Portugal, Switzerland, Great Britain, and Netherlands, are involved in TELENURSE project. TELENURSE project includes followings: 1) the development of nursing vocabulary and classifications; 2) an NMDS; 3) clinical systems to record nursing data; 4) information system to collect and aggregate nursing data; 5) systems to analyze

<Table 3> Comparison of the Nursing Minimum Data Set(NMDS)

	USA	Belgium	Australia	Canada	Europe
Name of data set	Nursing Minimum Data Set	Minimale Verpleegkundige Gegevens/ Resume Infirmier Minimum (MVG/RIM)	Community Nursing Minimum Data Set Australia (CNMDSA)	Health Information: Nursing Components (HI:NC)	TELENURSE & International Classification of Nursing Practice (ICNP)
Scope	National	National	National	National	Multinational
Setting	All settings	General hospitals	Community care	All settings	All settings
No. of elements	16	17	28	27(28 for newborns & infants)	16
Patient demographics	5 items	3 items	5 items	8 items	4 items
Medical care items	None	ICD code Complications	Medical diagnosis	Medical diagnosis Procedure Alive/dead code	None
Nursing care elements	Nursing diagnosis Nursing intervention Nursing outcome Intensity of care	Nursing interventions Activity of daily living (ADL)	Nursing diagnosis Goals of nursing care (7 types) Nursing interventions (8 types) Client dependency Discharge (4 items)	Client status Nursing intervention Client outcomes Nursing intensity	Nursing diagnosis/nursing phenomena Nursing intervention Nursing outcomes(future)

(this table was based on the article of Goossen et al. (1997))

<Table 4> Elements of the Nursing Minimum Data Sets

USA	Australia	Belgium
Nursing Care Elements:	1. Admission date	1. Hygiene
17. Nursing Diagnoses	2. Agency Identifier	2. Mobility
18. Nursing Intervention	3. Carer Availability	3. Elimination
19. Nursing Outcome	4. Client dependency	4. Feeding
20. Intensity of Nursing care	5. Date of Birth	5. Gavage Feeding
Patient or Client	6. Discharge Date	6. Care of Mouth, Nose, Eyes
Demographic Elements	7. Discharge Destination	7. Decubitus Prevention
21. Personal Identification	8. Ethnicity	8. Assisting in Getting Dressed
22. Date of Birth	9. Sex of Client	9. Attending to Tracheostomy
23. Sex	10. Location of Client	10. Tracheostomy with Ventilation
24. Race and Ethnicity	11. Medical Diagnosis	11. Interviewing patients
25. Residence	12. Nursing Intervention	12. Teaching Patient Occasionally
Service Elements	13. Nursing Diagnosis	13. Teaching Patient Fixed Program
26. Unique Facility or Service	14. Nursing Goal	14. Emotional Support
Agency Number	15. Resource Utilization	15. Supervision to Mentally Disturbed Patient
27. Unique Health Record Number of	16. Source of Referral	16. Reality Orientation Training
Patient or Client	17. Unique Client Identifier	17. Isolation
28. Unique Number of Principal	18. Other Support Service	18. Monitoring of Vital Signs
Registered Nurse Provider		19. Monitoring of Clinical Signs
29. Episode Admission or Encounter		20. Attending on Continuous Traction or Cast
Date		21. Drawing of Blood Specimen
30. Discharge or Termination Date		22. Medication IM/SC
31. Disposition of Patient or Client		23. Medication IV
32. Expected Payer for Most of This		24. IV Therapy
Bill		25. Surgical Wound Care
		26. Surface Traumatic Wound
		27. Traumatic Wound Care

data, produce information, and provide feedback for nursing decision making(Goosen et al., 1998).

<Table 3> and <Table 4> describe and compare the elements and contents of the three countries. As seen in the <Table 3> and <Table 4> the scope of the NMDS is a national level, except for the TELENURSE project. In some NMDS systems the elements are collected electronically, while others use paper-based systems, but the hospitals are required to send the collected data electronically. It is obvious that the five NMDSs have several elements in common, but there are differences as well. Compared with the US and Belgium system, the CNMDSA includes several additional elements including the date of referral and the date of first contact, and etc.

As stated earlier, a comparison is possible only when the definition and characteristics of every data elements are consistent and when data collection is based on unified terminology. However, some cases it might be inevitable because of the differences stemming from the different health care systems of countries. Thus, detailed description of data or adequate mapping technique of terminology are needed and fully discussed by nurses.

If the NMDS were implemented inter-nationally, the following benefits can be achieved: 1) access to comparable, minimum nursing care and resources data at international levels; 2) impetus to improved methods of costing nursing services; 3) improved data for quality enhancement; 4) impetus to development and refinement of nursing information systems; 5) comparative research on nursing care and referral for

further nursing services; and 6) contributions toward advancement of nursing as a research-based discipline(Werley, Ryan, & Zorn, 1995). The effort to develop international as well as national standards and guidelines would be enhanced by a minimum set of data which met the needs of multiple users(Werley, Lang, & Westlake, 1986). The use of a NMDS and standardized nursing language would remove one of the greatest barriers presently hindering nursing research on a national and inter-national basis(Foster & Conrick, 1994).

Additional information may need to be collected to meet the specific objectives of individual programs(Ryan & Delaney, 1995). The Nursing Management Minimum Data Set (NMMDS) is an example of adding elements to achieve additional purposes(Huber, Delaney, Crossley, Mehmert, & Ellerbe, 1992). To complement the NMDS, NMMDS will facilitate decision making and policy development in such areas as costs of nursing services, allocation of nursing personnel, and comparison of nursing care delivery methods, and will foster data collection, retrieval, analysis, and comparison of nursing management outcomes across settings, populations, time and geographic regions. However, elements of the NMDS should not be deleted, even if they are not immediately useful in certain settings.

5. The Nursing Management Minimum Data Set(NMMDS)

Current health care system emphasizes cost control and demands data and information about how effectively and economically nurses do for patients' health. However, no common data set exists to facilitate nursing management and administrative decision-making.

The NMMDS project was undertaken to address the gap between clinical information systems of individual data and nursing management /administrative /contextual data sets(Huber, Delaney, Crossley, Mehmert, & Ellerbe, 1992). Huber and Delaney(1998) developed the concept of the NMMDS to address the management of nursing care because neither the NMDS nor any other data set in nursing contains the elements for nursing management

The NMMDS is the critical core set of nursing management data and provides information needed by nurse managers to perform their job effectively, make timely decisions on complex issues in practice, and manage the large interdisciplinary teams(Huber & Delaney, 1998). For example, cost, occupancy, mode of care delivery, and type of nursing unit are specifically nursing admini-stration variables.

The NMMDS should draw from existing relational data bases, and add ONLY those new elements that add value to decision making for nursing management that are not included in these other related minimum data sets(Ryan, 1996). The NMMDS has built on the NMDS without altering the existing elements of the NMDS.

The NMMDS can be applied to nursing practice in four major ways. These applications include capturing consistent data for unit/ service level decision making, providing a system for internal organizational bench-marking, creating the opportunity for external organizational benchmarking, and establishing a method of continuum of care evaluation.

There are many needs for the development of the NMMDS. The Priority Expert Panel on Nursing Informatics of National Center for Nursing Research(NCNR, 1992) identified in Research Program Goal #2; the need to develop methods to build databases of clinical information and management information and analyze the relationships among the variables
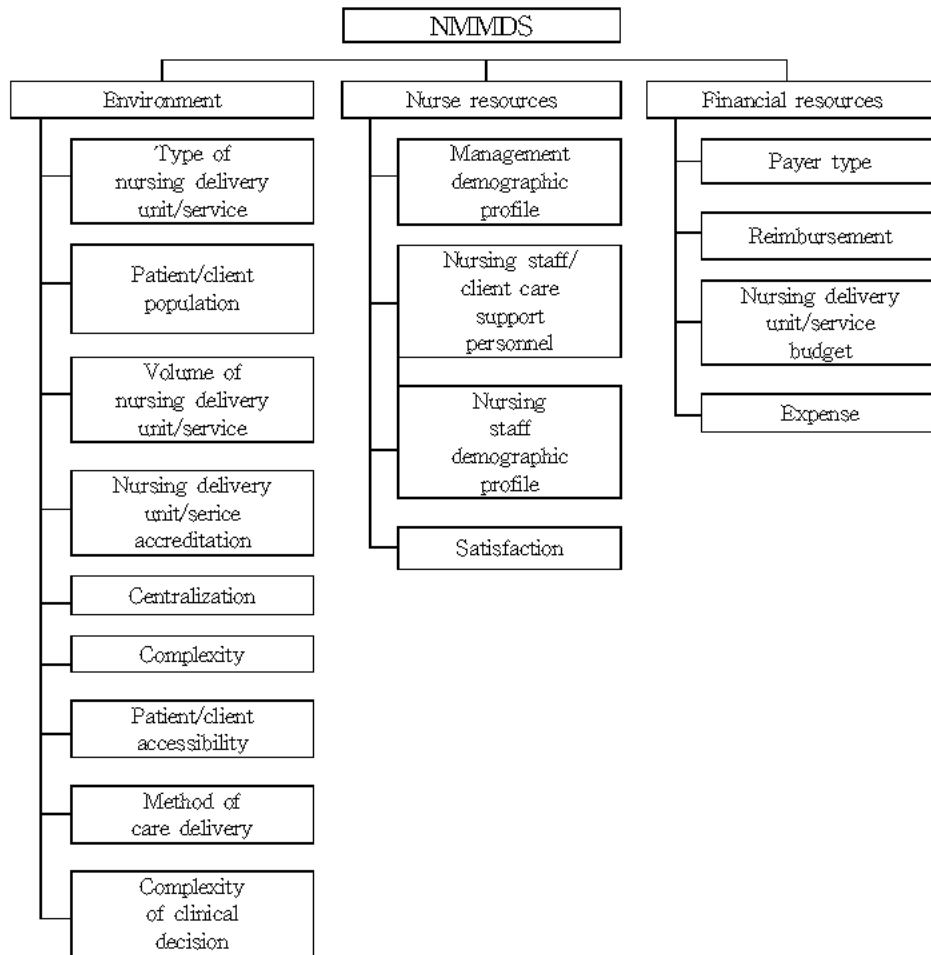
in databases. And the American Organization of Nurses Executives'(AONE) Board of Directors set the establishment of a uniform NMMDS as a top priority in their 1993 strategic activities. In 1996, the American Nurses Association's House of Delegates called a resolution for the NMMDS; A similar resolution was passed by Iowa Nurses Association annual convention in 1996(Huber & Delaney, 1998).

As a result, Huber and Delaney formed a research team to identify and develop the NMMDS(Huber, Delaney, Crossley, Mehment, & Ellerbe, 1992). After developing the elements of the NMMDS using Delphi method, they compared the validity and usefulness in acute care setting, non actuate care setting including long-term care, ambulatory care, occupational health, and home health/community health settings. 1n 1996, sponsored by the American Organizational of Nurse Executives(AONE), the invitational workshop was held to discuss measurement issues and define the elements of the NMMDS.

1) Elements of the NMMDS
The 17 elements of the NMMDS are divided

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                        NMMDS
    ┌─────────────────────┼─────────────────────┐
Environment          Nurse resources       Financial resources
  ├ Type of            ├ Management            ├ Payer type
  │ nursing delivery   │ demographic           │
  │ unit/service       │ profile               ├ Reimbursement
  │                    │                       │
  ├ Patient/client     ├ Nursing staff/        ├ Nursing delivery
  │ population         │ client care           │ unit/service
  │                    │ support               │ budget
  ├ Volume of          │ personnel             │
  │ nursing delivery   │                       └ Expense
  │ unit/service       ├ Nursing
  │                    │ staff
  ├ Nursing delivery   │ demographic
  │ unit/serice        │ profile
  │ accreditation      │
  │                    └ Satisfaction
  ├ Centralization
  │
  ├ Complexity
  │
  ├ Patient/client
  │ accessibility
  │
  ├ Method of
  │ care delivery
  │
  └ Complexity
    of clinical
    decision
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<Figure 1> Nurisng Management Minimum Data Set

into three main categories: the environment, nurse resources, and financial resources. Figure 1 describes the elements the NMMDS. The environmental domain contains 9 variables that are coordinated by the nurse manger at the unit or service level. Nurse resources domain includes 4 variables. These variables are description of the demographic profile of the management team. The last domain is the financial resource which includes four elements. The nurse manager can use the information gathered from these elements to enhance the human component in care delivery system. Also further aggregations of data are possible for analysis.

Discussion

Although, there are approximately 4.5 million nurses working in a variety of health care settings in the world(AJN newsline, 1994) and provide crucial care for the welfare of health care recipients, nursing is nearly invisible internationally because nursing data have not been documented and collected systemically. All around the world, nursing is faced with demands for information about health care and the development of information systems that can support nursing practice. Until recently, nurses were late in developing standardized nursing languages to describe what nurses do. Nurses have finally agreed upon that nurses need classifications of nursing diagnoses, interventions, outcomes to document what nurses do and study nursing care. With the advent of computerized health care information systems and the increased use of large data sets for the study of health care effectiveness, nursing's needs to develop data sets, which represent and prove their effectiveness and contribution to patient's health, are required more than ever.

Medicine has used standardized data sets to routinely collect large amount of patient data and has begun to explore the effectiveness of their medical intervention. In contrast, nursing's movement to develop data sets for studying nursing effectiveness has been limited.

NMDS is the first data set in nursing that includes the essential elements of nursing; nursing diagnosis, intervention, and outcome. Before implementing the NMDS, however, nurses should have standardized languages for the elements of the NMDS. The same nursing intervention may be described differently due to different usage of language in each country. This different usage of language can prevent knowledge development in nursing and nursing care effectiveness research. For the above reason, the request to develop an International Classification for Nursing Practice(ICNP) was proposed to the International Council of Nurses (ICN) at the meeting of the Council of National Representatives(CNR) in Seoul in 1989. The meeting expressed concern on the lack of ways to recognize nursing's distinctive contribution to health and health care and the inability to name the phenomena of nursing across countries(ICN, 1996).

McCloskey & Bulecheck(1996) and Clark (1997) state about an importance of standardized classification of nursing nomen-clatures internationally so that nurses in every country describe their care in the same way. As nurses become able to retrieve and analyze data from their clinical practice, nurses will gain the power to demonstrate both what and how nursing make a difference(Ozbolt & Graves, 1993). Nursing must have a statistics to demonstrate its impact on patient outcomes. To do so, nursing needs to use standardized languages in information systems to syste-mically analyze the nursing diagnoses, interventions performed for patients, and the resulting patient outcomes.

Choosing and documenting nursing diagnoses,

interventions and outcomes are clinical-decision making and the NMDS enables nurses to analyze their clinical decision-making process by continuously retrieving, processing, and analyzing data(Ryan, 1996; Ryan & Delaney, 1995). This will enrich the discipline of nursing as a research-based science. Likewise, the development of nursing as a research-based science will benefit the individual patient care, as well as the care generally provided by health care providers.

The Iowa interventions and outcomes research teams have developed the linkage lists of NANDA to NIC, NANDA to NOC, and NIC to NOC. These linkage lists 1) facilitate clinical decision making, 2) familiarize nurses with the NANDA, NIC, and NOC, 3) provide a direction for clinical information systems data base structure, and 4) facilitate field-testing and validation of the linkages. These linkage lists are comprehensive and include many possible interventions and outcomes(Iowa Interventions Project Team, 1998). These linkage lists also have several benefits including enhancing the effectiveness of nursing care by identifying what works in practice. The refinement and validation of these linkage lists should be followed and this process can be enhanced by using NMDS because NMDS is based on actual nursing practice(Johnson & Maas, 1997; McCloskey & Bulechek, 1996).

Using the NMDS, we can answer questions, such as: What are the common nursing diagnoses for patients with a specific clinical condition and do these diagnoses differ across geographical location? How do nursing interventions make a difference in a specific population's outcomes?(Ryan & Delaney, 1995) The NMDS provides a general view of the needs of patient populations as well as the needs of an individual patient(Delaney & Moorhead, 1995). Nurses can use this information to develop risk profiles, and then

identify patients who match the profile so that preventive action can be taken(Lange & Jacox, 1993). Identifying what interventions work for what conditions is related to knowing the cost of interventions. Successful implementation of the NMDS will provide a way to access nursing data across patient populations, settings and time, and this will ultimately contribute to enhancement of nursing position in the health care system.

Therefore, the introduction of a NMDS, NMMDS, and other standardized nursing data would break down one of the greatest barriers presently hindering nursing research on a national and international basis and advance the knowledge necessary for the cost-effective delivery of quality nursing care. Structuring and developing linkages between data sets are vital parts of a successful information system and computer based record. Linking clinical data set and management data set is necessary in order to more robustly capture data that can be used to analyze care and service outcomes. The use of logically linked data sets also decreases documentation work by reducing the needs for repetitive documentation of information used for multiple purposes in an organization. Unique patient numbers or other identifiers that will integrate the delivery of services across various settings could be used for this purpose.

It is necessary for the clinical nursing information system to allow for updating of the terminology and classification without compromising the data integrity of existing data in the system. Structuring of patient data and care information in clinical information system and the coordination of management/administrative/contextual data would allow quality improvement of care delivery. Through the linkages with other health care professional's databases, nursing could access and share data with various health care providers and researchers

while improving the availability and flexibility of the databases of nursing to other health providers.

Documentation systems vary across in Korea. While any documentation system must be individualized to meet the particular needs of each institution and site, it also includes common, core information with a standardized classification language. Computer systems must be designed to link the elements of the NMDS and elements of other data sets.

There are no systematic and organizational efforts to develop Korean NMDS yet. However the development of the future of Korean nursing largely depends on the ability to describe, collect, and analyze nursing data. Without it, the quality of nursing care cannot be effectively controlled and managed. The identification of essential data and minimum data sets represents an opportunity to enhance nursing by facilitating the development and the use of clinical databases. When standardized nursing language is used in nursing information systems, the effectiveness of nursing can be determined more effectively. The efforts to develop nursing practice and improve quality of nursing care should be continued. Now nursing in Korea has an answer for the future.

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- 국문초록 -

주요용어 : 데이터베이스, MNDS, NMMDS, 간호분
류체계

Nursing Minimum Data Set (NMDS)과 Nursing Management Minimum Data Set(NMMDS) 과의 관계

이 은 주*

현재의 보건의료체계에서는 모든 것이 급박하게 변화
하고 있으며 또 구체적인 자료를 요구한다. 컴퓨터의 보
급과 함께 이러한 변화에 능동적으로 대처하기 위해 간
호학에서도 표준화된 대규모 데이터베이스의 개발이 필
수적이다. Nursing Minimum Data Set (NMDS)은
간호학분야에서 개발된 최초의 표준화된 대규모 데이터
베이스로서, 간호가 일어나는 모든 상황에서 반드시 수
집되어야 할 핵심적인 간호요소를 포함하고 있다. 따라
서 본 논문에서는 NMDS 개발의 역사적인 배경, 목적,
요소, 그리고 간호계의 세계적인 동향과 관련하여

NMDS가 이루어야 할 방향, 그리고 NMDS를 완성하
기 위해 선행되어 할 문제로 표준화된 분류체계에 대해
논의하였다. 그리고 미국이외에도 몇몇나라에서 NNDS
나 혹은 유사한 데이터베이스가 개발 중이거나 이미 수
집되고 있는 나라들이 있으므로 이들에 대한 비교와 분
석도 제시하였다.

그리고 보다 최근에 개발된 데이터 베이스로 주로 행
정적인 목적을 위해 개발된   Nursing Management
Minimum Data Set (NMMDS)을 소개하였다. 즉
NMDS가 임상적인 자료의 수집에 초점을 맞춘 데 비
해, NMMD는 효과적인 간호관리에 필수적인 요소들을
포함시켰다. 그래서 간호행정가들이 의사결정에 필요한
재정적자원, 환경적자원, 간호자원에 대한 정보를 수집
할 수 있게 고안되었다. 이러한 데이터 베이스들은 관계
형 데이터베이스로 서로 연결되어야 하며, 다른 학문분
야와도 연계되어 활용되어져야 할 것이다. 만약 이러한
대규모 데이터베이스 들이 한국에서도 개발되고 사용되
어 진다면 환자간호에 더욱 비용 효과적인 관리가 가능
하게 될 것이다. 마지막으로 우리나라에서 NMDS나
NMMDS 같은 대규모데이터 베이스의 개발이 시급히
요청됨을 강조하였다.

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