THE USE OF THE INTERNATIONAL CLASSIFICATION OF NURSING PRACTICE
FOR CAPTURING COMMUNITY-BASED NURSING PRACTICE

BY

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A Thesis
Submitted to the Faculty of Graduate Studies
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Abstract

Improvements to the use of information in community health practice will not

occur without the development of standardized methods of collecting and classifying

practice. Nursing and community health practice have been noticeably absent or limited

in most of the large-scale studies examining existing classification systems. This study

examined the ability of one classification system for nursing practice, the International

Classification of Nursing Practice, to capture documented community health practice.

This retrospective descriptive study examined public health and community health

nursing documentation randomly drawn from 81 charts in a community health care

setting. Documented practice was reduced into minimum concepts and subsequently

matched to terms in the ICNP. Of the 566 concepts identified in the text, 68.9% (390)

matched with terms in the ICNP as exact or conceptual matches. The remaining 31.1%

(176) concepts did not match with terms in the ICNP. This 68.9% level of match is

consistent with tests of other commonly used classification systems and indicates that the

ICNP has potential for classifying community-based nursing practice however, the

unmatched 31.1% suggests the need for further development and testing and reflects

difficulties in classifying community level and group interventions. Nursing

phenomenon/diagnosis were stated in only 16 of the 81 charts reviewed and over half of

the data transcribed was not included in the study suggesting the need for further

emphasis on nursing documentation at the practice level.

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Chapter 1: Introduction

Introduction

If we cannot name it, we cannot control it, finance it, teach it, research it or put in

into public policy (Clark & Lang, 1992, p. 109).

Background and Significance of the Problem

Health care system reform is an ongoing priority of both Federal and Provincial

governments within Canada. Throughout the health reform process, there has been an

increasing recognition that the effective use of information technologies has many

clinical and financial benefits (CANARIE Inc., 1996; Hannah & Edwards, 1998). One

necessary aspect of information technology is the development of standardized core data

sets to serve clinical and administrative purposes. Data collected through electronic

medical records and other administrative databases can provide a basis for evaluation of

practice and resource usage to support evidence-based clinical and policy decision

making (CANARIE Inc., 1996). For example, researchers at the Centre for Health Policy

and Evaluation in Manitoba have used physician billing records, medical records and

census data to examine various aspects of the health care system (Cohen & MacWilliam,

1994; Decoster, Peterson, & Kasian, 1996). "The effective management of the health

care system, including basic planning, management, control and evaluation functions,

can be accomplished only with the support of comprehensive, co-ordinated and

comparable information systems" (Alvarez, 1993, p. 18).

As these large data sets are developed, selection of data elements appropriate for

inclusion will have a critical impact on the potential for these data bases to

contribute to the development of health policy. These data items must include

the elements of health care delivery that can best describe patients' needs for care

and predict the use and allocation of scarce resources (Coenen, Marek, &

Lundeen, 1996, p. 441).

Traditionally, nurses have not emphasized verbalizing, recording and identifying

the complexity of the nursing role and, as a result, the nursing role, particularly the less

quantitative caring aspects, has not been understood well by those outside of the nursing

profession (Duffield & Lumby, 1994; Murphy, 1997). Clark and Lang state, "Nursing is

invisible in healthcare systems and its value and importance go unrecognized and

unrewarded" (1992, p. 109). The evaluation of nursing effectiveness begins with the

development of reliable and measurable indicators of nursing practice (Barriball &

Mackenzie, 1992, 1993). The absence of nursing data from the major computerized

information systems currently in use is directly attributable to the inability of nursing to

expedite the adoption of uniform data elements (Delaney & Moorhead, 1995). The

nursing profession has responded to the increased emphasis on classifying and measuring

the effectiveness of practice within the health care system with the development of

several nursing classification systems, but has not yet adopted one primary classification

system for use in all nursing settings (Iowa Intervention Project, 1997).

The concept of a Nursing Minimum Data Set (NMDS) to identify the minimum

data required to capture nursing practice originated in the United States (Werley, Devine,

Zorn, Ryan, & Westra, 1991). Canadian efforts in this area began in the early 1990's

with the NMDS Conference held in Alberta in October of 1992 (Canadian Nurses

Association, 1992). Since this time, the term NMDS has been replaced with Health

Information: Nursing Components (HI:NC) in Canada to better reflect the broad

interdisciplinary context in which nurses practice (Anderson et al., 1994). Stemming

from this initial work, several classification systems have been proposed to capture

nursing practice in a variety of settings. These include: the Omaha Classification

System; The North American Nursing Diagnosis Association's Nursing Diagnosis

Taxonomy; Nursing Interventions Classification; Nursing Outcomes Classification; and

the Home Health Care Classification.

The development of nursing information systems has progressed significantly

however, national and international consensus has not been achieved regarding which

classification system(s) should be used. The International Council of Nurses (ICN)

initiated a long-term project to develop an International Classification of Nursing

Practice (ICNP) to combine and integrate nursing diagnoses, interventions, and outcomes

for use in all nursing practice settings (Lang & Murphy, 1995). Terms in the ICNP have

been linked to terms in the other existing nursing classification systems and the ICNP

was designed to be compatible with other large scale classification systems currently

used in health care such as the International Classification of Diseases (Lang & Murphy,

1995; Mortensen, 1996). Due to these existing links, this system has the potential to

classify a wide variety of nursing practice. Throughout the development of the ICNP,

healthcare and informatics workers have been encouraged to provide suggestions and

feedback to support the development of a clinically relevant classification system (Clark,

1996). Research based clinical trials of this classification system have not yet been

published, however, feedback has resulted in a developmental Beta version of this system

which is now available on the Internet (Telenurse, 1998). The final Beta version is

expected to be released in mid 1999.

In general, systems to capture institutional, hospital based patient encounters are

more advanced than those capturing community based care (Coenen et al., 1996). Due to

the diverse potential settings, practice goals, and client groupings (such as families or

communities), capturing community health nursing is more difficult (Hettinger &

Brazile, 1992). The ability of most of the established classification systems to track

nursing practice in areas such as community health and health promotion, has not been

established. The National Health Information Council (1990) has identified, as one of

their strategic directions, the need to develop better information for and about

community services, particularly those involved with health protection, promotion and

health service provision.

The use of standardized classification systems does not negate the need for

qualitative data for the evaluation and support of community nursing practice however,

quantitative data has been identified as "information necessary for the growth and

survival of nursing centres" (Frenn, Lundeen, Martin, Riesch, & Wilson, 1996, p. 57).

The NMDS and informatics in general may contribute to improvements in many aspects

of community based care delivery through supporting research and quality improvement

endeavours which will improve clinical, administrative and policy based decision making

(Coenen & Schoneman, 1995; Giovannetti & O'Brien-Pallas, 1998; Henry, 1995). Frenn

et al. (1996) identify the need for a consistent standardized nomenclature across

community nursing centres to allow for comparison between centres.

Purpose

The purpose of this study is to describe the extent to which community-based nursing practice as documented within text based nursing notes may be represented within the ICNP. Specifically, this study will address two questions, 1) What nursing phenomenon and interventions are documented by community health nurses and public health nurses in a community health site? 2) To what extent do documented nursing phenomenon and interventions correspond to classification terms in the ICNP? The study will also reveal the documented nursing phenomena and interventions which cannot be classified within the ICNP.

Chapter 2: Critical Review of Relevant Literature

Introduction

The importance of developing and using a standardized language to classify, or

name, the elements of nursing practice is being recognized internationally (Henry, 1995;

Mortensen, 1996). In the United States, the Nursing Minimum Data Set (NMDS) was

developed out of a recognition that nurses, unlike physicians, hospitals, and other health

related groups, did not have a standardized method for the collection of essential data for

use by clinicians, researchers, administrators and policy makers. As a substantial amount

of direct care is provided by nurses and most patients are admitted to institutions due to a

need for nursing care, an absence of nursing specific data represents a significant gap in

each episode of patient care (Werley et al., 1991). Having a standardized system for

classifying and recording nursing information will contribute to improvements in many

aspects of care delivery including research and quality improvement endeavours which

will support clinical, administrative and policy based decision making (Coenen &

Schoneman, 1995; Giovanetti & O'Brien-Pallas, 1998; Henry, 1995).

Classifying Health Information

Nurses in most settings already provide information about aspects of their

practice for various administrative, fiscal or epidemiological purposes, such as: census

counts; staffing costs/mix; or number and type of clients seen. While the pure sciences

have long worked toward the formal classification of all aspects of natural life such as

plants, less formal classifications permeate most aspects of nurses' working and daily

lives: cutlery is organized by function, clothes are organized by type in drawers, supply

rooms are organized to store similar items such as types of intravenous fluids together; calls for emergency service are classified based on urgency; and numerous aspects of nursing practice already depend on classification such as the staging of pressure ulcers (Bailey, 1994). Classification systems provide understandable and consistent methods for organizing or prioritizing information. Imagine an emergency response system where the urgency of calls is determined by the whim of the each individual ambulance or a supply room where items are thrown in at random. An emergency response system would be equally ineffective if calls were only classified based on the order they were received, regardless of the level of urgency, emphasizing the need for classification systems which respond to and reflect the realities of practice in order to develop efficient and effective processes.

<u>Uniform Classification Requirements</u>

Classification systems have been developed to meet a wide variety of specific purposes and for use in a variety of different practice settings however, non-uniform systems make comparisons between settings difficult and often impossible. Using a consistent classification system simplifies the process of moving between settings or comparing information between settings. Consistent and comparable classification systems can be used: as a descriptive tool; to reduce complexity; to easily identify similarities and differences across different settings or cases; to provide an exhaustive listing of dimensions or possibilities; to allow for quick comparisons within certain classification types; for information inventory and management purposes; to study relationships; and, to provide some uniform criteria for measurement and versatility

(Bailey, 1994). It is important to note that, the use of consistent classification systems

does not mean all practitioners must practice in the same way, only that the words used

to describe and abstract that practice have the same meaning and context across settings.

Computerized Classification Systems

Ideally, classification schemes used for computer-based patient records must have

the following characteristics: completeness (ability to capture all clinical settings); clarity

(one code for each term without duplication with terms that are clearly defined and

unambiguous); administrative mapping (ability to link to other existing administrative

and epidemiological reporting systems, such as the ICD codes), atomic and

compositional character (events broken into basic component pieces to allow for

flexibility i.e. one representation for back, then combined with pain to define back pain

rather than a discrete term); synonyms (ability to support alternate terminology);

attributes (ability to modify meanings of core terms); uncertainty (must include a

graduated record of certainty for findings and assessments); hierarchies and inheritance

(a logical linking of general and specific terms); context-free identifiers (codes, for

computerization, without clinical meaning to avoid confusion); unique identifiers (no

reassignment of codes); definitions (concise explanation of terms); language

independence (codes/scheme should not be language dependent); and syntax and

grammar (a set of rules to define the construction of codes) (Campbell et al., 1997).

The National Health Information Council identified four key goals for health

information in Canada for 1990: "1) detection, measurement and monitoring of risk

factors and health status determinants; 2) indicators of the health status of populations; 3)

health care management information systems to measure efficiency and productivity; 4)

information systems to assess quality and evaluate effectiveness of interventions or

strategies" (1990, p. i). The attainment of each of these goals requires some level of

standardized data collection.

These goals are echoed, but refocused, in a newer document developed jointly by

the Canadian Institute for Health Information (CIHI), Health Canada, and Statistics

Canada "Health Information Roadmap: Responding to Needs" (CIHI, 1999). Health

information systems in Canada should allow us to answer two key questions: "how

healthy is the health care system", which includes the effectiveness, efficiency and

responsiveness of the system; and, "how healthy are Canadians", or is the health status of

Canadians improving (CIHI, 1999). Health information in Canada is currently limited in

its ability to answer these questions for several reasons: data are fragmented into silos

despite increased integration within the health care system; data are incomplete,

particularly in the areas of preventive services and home care; data cannot be shared

easily between settings, providers and provinces; data, particularly on the determinants of

health other than medical care, are not being analyzed fully; and, the results of research

about how to improve health are not accessible to Canadians (CIHI, 1999).

Numerous computerized classification systems already exist to capture

institutional and out-patient health care. The International Classification of Disease

(ICD0 is a primarily disease-based, internationally used classification system for

indexing medical records which includes diseases, external causes of injury and other

factors which affect health status (McCloskey & Bulechek, 1996). The Uniform Hospital

Discharge Set is a collection of patient information collected at discharge which is

derived primarily from hospital billing systems. The Hospital Medical Records Institute

is a Canadian repository for information abstracted from patient records at the time of

discharge from hospital. It includes patient demographic information; dates of

discharge/admission; disposition status (where they went when discharged); diagnoses

and procedures (using the medically based ICD); information about case mix group;

clinical categories or resource intensity ratings; information about physician providers

and their specialties; and some other optional data (Hannah, Ball, & Edwards, 1994;

Podolak, 1993). While this is one of the few national databases in Canada, it contains no

specific nursing data (Hannah, 1993). Few of the major health information databases,

the majority of which focus on medical diagnosis, include any nursing data and those that

do, include limited nursing information (Hannah, Ball, & Edwards, 1994). Currently, the

nursing information systems that are used vary between nursing specialties and between

practice settings.

These limitations make it next to impossible to easily use health information to

meet the objectives of the National Health Information Council (1990) and CIHI (1999)

previously stated. In order to provide information that is useful beyond each individual

practice setting, provincial, national and international consistency is necessary. The

Canadian Institute for Health Information (1999) has identified the following criteria for

a future Canadian Health Information System: secure and respects Canadians' privacy;

consistent across settings; relevant, including the continuum of care and outcomes of

care; integrable, reflecting client movement throughout the system from hospitals to

long-term care to community; flexible enough to reflect health care across the country

including the ability to add optional data in some areas; and user-friendly and accessible

for the public, health care providers, managers and analysts.

Health Information: Nursing Components

While methods for the systematic reporting and classification of nursing practice

began with Florence Nightingale (1859/1946) who asserted the need for nurses to use

their powers of memory and non-subjective observation to track the condition of those in

their care, the NMDS was one of the first nursing efforts to prepare for computerized

classification systems and develop a minimum framework for all nursing data. The

NMDS has been described as "a minimum set of items of information, with uniform

definitions and categories concerning the specific dimension of professional nursing that

meets the information needs of multiple data users in the health care system" (Werley et

al., 1991, p. 422). The NMDS is comprised of 16 key elements which are divided into

three general groups: nursing care; client demographics; and service elements (Werley et

al., 1991). Nursing care elements include the nursing process, nursing diagnosis, nursing

intervention, nursing outcome, and, nursing intensity (hours of care and staff mix).

Client demographics include: a personal identifier; birth date; sex; ethnicity; and

residence. Service elements include: a facility identifier; a patient identifier; a care

provider identifier; the date of care or admission; the date of discharge or termination;

the disposition of the client (status at discharge); and, the expected payer.

In Canada, the need for a uniform language to describe nursing practice was

formally recognized in the early 1990's with the Canadian Nurses Association (CNA)

resolving to work toward the development of a Nursing Minimum Data Set (NMDS) (CNA, 1992). Work in Canada has progressed significantly since that time and Health Information: Nursing Components (HI:NC) has been identified as the recognized name in Canada for the NMDS as it better represents nursing data (and nursing practice) as a key piece of larger health data systems (Anderson et al., 1994). The term HI:NC is defined by the CNA as, "the group of data that represent registered nurses' contribution to a larger system of client-centred health information" (CNA, 1996). Information captured by HI:NC is intended to: 1) provide data which describe nursing care in the various settings in which nurses practice; 2) allow for nursing data to be compared between different settings and geographic locations, 3) be used to identify trends in nursing which may impact on resource use; and, 4) contribute nursing information to provincial and national databases being used for outcomes research and to assist with the development of health care policy (Anderson et al., 1994).

The NMDS and HI:NC are broad conceptualizations of the types of nursing information needed and are not classification systems. They do not provide direction as to what individual data should be collected or the taxonomy (language) that should be used to capture nursing practice (Anderson et al., 1994). Minimum data sets have been described as interchangeable parts, a way of standardizing a number of items so that they may be used in more than one way (Nelson, 1997). The use of the NMDS and HI:NC will support nursing practice through improved documentation, and support for evidence-based practice; nursing administration though facilitating the development of nursing information systems, identifying and justifying new nursing roles, and defending

resource allocation; nursing research through the provision of a new data source which allows comparisons across multiple sites and practice settings; nursing education through enhanced identification of education needs; and, health policy through the inclusion of nursing data in the description and analysis of health care delivery (Anderson & Hannah, 1993).

Existing Nursing Classification Systems

Several classification systems have been developed to meet the need for a standardized method of collecting nursing information. Some focus on specific aspects of nursing practice such as nursing diagnosis (Blegen & Tripp-Reimer, 1997; Warren & Hoskins, 1995), nursing interventions (McCloskey & Bulechek, 1996), or nursing outcomes (Johnson & Maas, 1995). Some have been developed which focus on community health such as the Home Health Care Classification (Saba, 1995, 1997) and the Omaha Classification System (Martin & Scheet, 1992, 1995). The International Classification of Nursing Practice (Mortensen, 1996) is intended for use in all practice settings and currently includes nursing diagnosis and interventions with terms for nursing outcomes under development.

Despite the current move toward community-based care delivery, information systems for community health practice, particularly that of nurses, has generally been far behind those for institutionally based care (Coenen et al., 1996). Most discussion surrounding data systems in Canada has focussed on tracking hospital or medically based interventions which may not provide an effective format for tracking the diverse nature of community-based practice (Alvarez, 1993; Hannah, 1993). The systems which have

been developed for community health nursing were developed in the United States and

tend to reflect a home care, illness-based approach to community practice (see Appendix

A).

NANDA's Nursing Diagnosis Taxonomy. One of the first major movements

towards a standardized classification for nursing practice came from the recognition in

the early 1970's that it was not possible to contribute nursing specific data to

computerized patient databases due to a lack of a standardized nomenclature for nursing

practice (Warren & Hoskins, 1995). National conferences and invitational meetings to

develop a classification for nursing diagnoses eventually let to the formation of the North

American Nursing Diagnosis Association (NANDA) (Warren & Hoskins, 1995).

Currently, NANDA's Nursing Diagnosis Taxonomy includes 137 approved diagnoses

organized into nine patterns (Blegen & Tripp-Reimer, 1997; Warren & Hoskins, 1995).

New diagnosis terms are still being proposed and go through a standardized review

process developed by NANDA. As this taxonomy includes only nursing diagnoses, it

does not reflect the full spectrum of nursing care previously identified for the NMDS

(nursing process, nursing diagnosis, nursing intervention, nursing outcome and nursing

intensity). The NANDA Nursing Diagnosis Taxonomy has recently been linked to

nursing interventions in the Nursing Intervention Classification (McCloskey & Bulechek,

1996). NANDA recently made an unsuccessful attempt to have this taxonomy accepted

for inclusion in the International Classification of Disease (ICD-10) (Hogston, 1997).

The refusal to include NANDA in the ICD-10 echoed the concerns of nurses in the

European nursing community who feel the system is not internationally useful as it

evolved from North American nursing practice and does not fit the terminology used in all cultures (Hogston, 1997; King, Chard, & Elliot, 1997).

Home Health Care Classification. The Home Health Care Classification (HHCC) was designed in the United States specifically for home health and ambulatory care settings (Saba, 1997). Initially it was developed as a method of assessing and classifying patients to determine resource usage and was intended to be used as a point-of-care data entry system, replacing traditional paper charting (Saba, 1995). The HHCC system is based on a six step nursing process: assessment; diagnosis; outcome identification; planning; implementation; and evaluation. Assessment components were adapted from Gordon's Eleven Functional Health Patterns and include 20 components arranged into four major headings: health behaviours components; psychologic components; functional components; and physiologic components. It includes 160 nursing interventions (60 major categories and 100 subcategories). Outcomes are measured as discharge status using the following alternatives: improved, stabilized or deteriorated (Saba, 1995).

Omaha Classification System. The Omaha Classification System was developed inductively from home care client records using a community health framework (Martin & Scheet, 1992). Nursing practice is classified using a Problem Classification Scheme (with 44 client problems or nursing diagnoses), an Intervention Scheme, with four categories: health teaching, guidance, and counselling; treatments and procedures; case management; and surveillance), and unlike many of the other classification systems, a Problem Rating Scale for Outcomes (Martin & Scheet, 1995). Client status is scored on the Problem Rating Scale for each of three domains: knowledge, behaviour, and status (a

rating of symptoms). Upon admission to their case load, nurses identify a baseline for each client using the Problem Rating Scale which is then updated on a formative, ongoing basis and on a summative, discharge basis (Martin & Scheet, 1992). The system has been tested and validated for use numerous settings (Martin & Scheet, 1992, 1995). This system is used in many community health settings in the United States but is designed for an illness based home care type of community health practice which does not reflect the broader public health nursing practice found in Canada.

Nursing Interventions Classification. The Nursing Interventions Classification (NIC) was developed to classify nursing interventions and the second edition of this classification contains 433 defined interventions and related activities (Blegen & Tripp-Reimer, 1997; Bulechek, McCloskey & Donahue, 1995; Daly, Button, Prophet, Clarke, & Androwich, 1997; McCloskey & Bulechek, 1996). Each intervention is named using clinical language, has a unique definition and includes a list of activities that would constitute this intervention. Examples of interventions include: embolus precautions; bleeding reduction; bathing; and anxiety reduction (McCloskey & Bulechek, 1996). Interventions include both nurse and physician-initiated treatments and the NIC has been tested in the clinical setting (Daly et al., 1997). The second edition of the NIC has been expanded to include suggested links to NANDA diagnoses (McCloskey & Bulechek, 1996).

Nursing Outcomes Classification. The Nursing Outcomes Classification (NOC) began in 1991 with the formation of a research team at the University of Iowa (Johnson & Maas, 1995). The system is still in the early stages of development and is not yet in a

standardized taxonomy ready for computerized coding (Johnson & Maas, 1997). The

system has been developed to be complementary to the NANDA and NIC systems, with

the majority of outcomes representing the resolution of a specific nursing diagnosis. The

NOC currently contains 190 defined outcomes for individual patients or families with 16

measurement scales used to measure the outcomes. Examples of the range of outcome

measurements include:

- "extremely compromised" to "not compromised" to rate nutritional status or

cognitive ability;

- "dependent, does not participate" to "completely independent" to rate self-care:

activities of daily living or transfer performance;

- "not adequate" to "totally adequate" to rate breastfeeding maintenance or

nutritional status: nutrient intake.

Systematized Nomenclature of Human and Veterinary Medicine. The

Systematized Nomenclature of Human and Veterinary Medicine (SNOMED) III is not a

nursing specific database however, some nursing terms are included. The primary focus

of the system is on illness and disease processes. The system includes 11 separate

modules including: topography of human and veterinary anatomy; morphology of terms

to describe changes in disease and abnormal development; function terms to describe

physiology and pathophysiology; living organisms of significance in human and animal

disease; chemicals, drugs and biological products (including pharmaceutical

manufacturers); occupations; social context terms to describe conditions and

relationships of importance to medicine; diseases/diagnoses; procedures and general

linkages between the modules (College of American Pathologists, 1998). This system is being used in various settings, including some managed care settings and is intended to capture all types of practice in a health care setting (College of American Pathologists, 1998).

International Classification for Nursing Practice. As work to develop nursing classification systems progressed, it became apparent that consensus was particularly difficult to achieve and that many of the systems being developed overlapped each other or did not provide comparable information, making it impossible to describe nursing care across practice settings, client populations, and geographic areas (Clark & Lang, 1992). The International Council of Nurses (ICN) began to work toward an international classification system for nursing practice which resulted in the development of the International Classification for Nursing Practice (ICNP) (da Cruz et al.,1994). This is one of the few nursing classification systems which is linked to other non-nursing classification systems such as the International Classification for Disease, is intended for multiple settings, and which includes more than one aspect of nursing practice (it currently includes nursing phenomena and nursing interventions/actions and will soon include nursing outcomes) (Clark & Lang, 1997; ICN, 1998). It also is seen as more acceptable for use in diverse cultural settings allowing for international use, but this has yet to be tested in any meaningful way (Hogston, 1997).

The following criteria have been identified for the ICNP:

(1) broad enough to serve the multiple purposes required by different countries;

(2) simple enough to be seen by the ordinary practitioner of nursing as a

meaningful description of practice and a useful means of structuring practice; (3)

consistent with a clearly defined conceptual framework but not dependent upon a

particular theoretical framework or model of nursing; (4) based on a central core

to which additions can be made through a continuing process of development and

refinement; (5) sensitive to cultural variability; (6) reflective of the common

value system of nursing across the world as expressed in the ICN Code for

Nurses; and (7) usable in a complementary or integrated way with the family of

classifications developed within World Health Organization, the core of which is

the International Classification of Diseases (ICD). (Clark & Lang, 1992, p. 111).

The initial step in the development of the ICNP was the collection of terms from

multiple sources including publications, conference proceedings, and surveys of national

nurses' associations (Coenen & Wake, 1996; "ICNP in Europe," 1996; "Introducing

ICN's," 1996). The terms were arranged into diagnoses/problems, interventions and

outcomes. Initial lists of these terms, published in 1993, were given to classification

experts, primary care nurses from two continents, and nurses at the 1993 ICN

Quadrennial Congress (Coenen & Wake, 1996; Lang & Murphy, 1995). A database was

then developed to track all of the terms including source and definition and the database

was expanded to include terms from eleven existing classification sources (Coenen &

Wake, 1996). Problems were identified in the classification of primary care and

community health as many terms (i.e. teenage pregnancy or malnutrition) could be

identified as individual, family or community problems and also fall into several

categories such as physical, health behaviours or social issues (Coenen & Wake, 1996).

The Beta version of the ICNP is currently under development and selectively

available for searching on the internet, however, no complete Beta versions are currently

available (ICN, 1998; Telenurse, 1998). Changes in the ICNP Beta Version include

changing the name of nursing interventions to nursing actions to reflect a wider variety of

activities and a change to a multi-axial approach (ICN, 1998). The multi-axial approach

allows terms at the top of the hierarchy to be combined with terms from other levels or

other axes to increases flexibility for users of the system.

The ICNP is organized by "rules of classification" which is a hierarchical

structure (ICN, 1996). For example, decreased lactation is not a discrete term but a

continuation of a progression of terms leading from the broadest concept to that specific

term (Mortensen, 1996). This progression is illustrated in Table 1.

Table 1

ICNP Hierarchy Leading to the Term for Decreased Lactation

Numbered Code	ICNP Term
1.	Factors influencing health status
1.1	Nursing Phenomena
1.1.1	Nursing Phenomena pertaining to the Human Being
1.1.1.1.	Nursing Phenomena pertaining to functions
1.1.1.1.1.	Physiological functions
1.1.1.1.1.7	Breast Feeding
1.1.1.1.1.7.1	Lactation
1.1.1.1.1.7.1.2.	Decreased Lactation

Urinary incontinence follows a similar hierarchical structure as a nursing phenomena

pertaining to physical function branching off into elimination toward the end of the

hierarchy (see Table 2):

Table 2

ICNP Hierarchy Leading to the Term Urinary Incontinence

Numbered Code	ICNP Term
1.	Factors influencing health status
1.1	Nursing Phenomena
1.1.1	Nursing Phenomena pertaining to the Human Being
1.1.1.1.	Nursing Phenomena pertaining to functions
1.1.1.1.1.	Physiological functions
1.1.1.1.1.8	Elimination
1.1.1.1.1.8.2	Urinary elimination
1.1.1.1.1.8.2.1.	Urinary incontinence

This increasing specificity gives additional flexibility to users of the system and facilitates computerized information data entry and retrieval. It also bridges language differences as the terms are hierarchically and logically connected and have numeric equivalents rather than discrete terms. The hierarchy has been changed somewhat in the Beta Version however, the underlying concept is still the same (ICN, 1998). Terms within the ICNP also are cross mapped to existing classification systems (Mortensen, 1996).

Relevant Research

While each of these classification systems has been developed using input from expert clinicians, administrators and researchers, limited research has been done to examine the ability of these systems to capture nursing practice. The ability of a universal classification system to accurately track nursing practice, particularly in community settings, has not been clearly established yet.

There are few large scale published studies which include nursing classification

systems and those that do, tend to compare nursing systems with other general

classification systems for capturing a particular client type (Campbell et al., 1997; Chute,

Cohn, Campbell, Oliver, & Campbell, 1996; Henry, Holzemer, Randell, Hsieh, & Miller,

1997; Henry, Holzemer, Reilly & Campbell, 1994). Few studies examined the ability of

nursing classification systems to capture nursing practice (Blewitt & Jones, 1996; Bowles

& Naylor, 1996; Humphreys, Hole, McCray, & Fitzmaurice, 1996). Research studies do

exist which focus on community health resource utilization (Coenen, Marek, & Lundeen,

1996; Cox, Wood, Montgomery, & Smith, 1990) however, no studies were found which

looked at the ability of classification systems to capture Canadian community health

practice (see Appendix B).

Comparisons Between Classification Systems

As classification systems for health care have been developed, the majority of

critical literature has focussed on comparisons of various systems for specific uses.

Campbell et al. (1997) used a comparative descriptive methodology to compare

three controlled clinical terminology sources for use within a computer-based patient

record: READ codes version 3.1; SNOMED International; and Unified Medical

Language System (UMLS) version 1.6. The systems were compared on the variables of

completeness, taxonomy, administrative mapping, term definitions and clarity. Data

were abstracted from textual and flowchart based clinical records at four medical centres,

resulting in a total of 1,929 source records (after editing of source material). Records

were coded by one of the investigators and checked by the developer of the coding

scheme. A panel of clinicians then scored the match between the source concept and

identified code for acceptability using a Likert scale. Computerized browsing tools for

each term were used to abstract data and identify codes. While the browsing tools

facilitated data abstraction, the researchers encountered cumbersome software

difficulties with the browsers and missed terms due to cultural differences in phrasing or

spelling. Ultimately, none of the systems were completely able to capture the patient

record with each showing strengths in different aspects of the identified areas. Overall,

SNOMED was found to be the most complete.

This differs from the findings of Lange (1996) when she compared SNOMED III

and UMLS for their ability to represent everyday nursing language. Everyday language is

believed to be important as systems with the ability to capture everyday language will be

better accepted by clinical users (Lange, 1996). Neither of the classification systems are

exclusively nursing databases, SNOMED III is described above and UMLS is a project of

the National Library of Medicine in the United States and has incorporated NANDA,

OCS, HHCC and NIC. Lange (1996) used the shift notes of 14 nurses, created by the

nurses during and immediately after the shift change report as her data source. Terms

were manually extracted and phrases transcribed verbatim into a spread sheet program.

Terms were reduced as far as possible without losing the clinical meaning, and synonyms

were grouped together. The search for matches within the two taxonomies began with

the exact term or abbreviation used by the nurses, if no match was found, this was then

expanded to a non-abbreviated term, and if a match was still not found, this was

expanded to search for synonyms. Matches were scored as: 1) exact concept match; 2)

one-to-many match (when more than one term in the databases was required to make a

complete match); 3) main concept match; 4) partial match of the main concept; and 5) unmatched. The first three of these categories were considered to be a good match. More exact matches were found in UMLS (56.4%) than SNOMED (49.1%) and fewer unmatched terms were found in UMLS (19.1%). When good matches were compared, UMLS matched 70% of the sample while SNOMED matched 60%. Unmatched terms included modifiers, time descriptors, acronyms and abbreviations and Latin terms. The UMLS also has been found to support laboratory terminology matching terms used for laboratory tests and procedures exactly 30% of the time and 72% of the time overall (Cimino, 1992).

Chute, Chon, Campbell, and Oliver (1996) studied whether existing clinical coding systems can cover the content of most patient conditions and events in both inpatient and outpatient settings. They reviewed seven coding systems: ICD-9-CM; ICD-10; Current Procedural Terminology (CPT); SNOMED III; Read V2; UMLS 1.3; and NANDA. In this comparative descriptive study, data were taken from clinical records including history and physical, nursing notes, consult notes, outpatient/inpatient progress notes, discharge summaries, radiology reports and operative reports. Data were randomly selected from four settings and transformed into machine readable text resulting in 14,247 words. Words were grouped into concepts which were grouped into diagnoses, modifiers, findings, treatments, procedures, and other. Concepts were coded into the systems by two reviewers with different primary reviewers for each coding system. Concepts were coded as no match, fair match, or complete match. This graded coding was used to avoid missing terms which were similar conceptually but phrased

differently than those in the classification system. Consensus was used for any

discrepancies. SNOMED consistently scored the highest on all of the categories with an

overall score of 1.74 out of 2, followed by UMLS 1.3 with a score of 1.11. NANDA did

poorly compared to all other coding systems scoring only .02 overall, however, it did

slightly better than CPT in the diagnosis category, neither of which are surprising results

as NANDA represents nursing diagnoses only, not the entire nursing process. Overall, all

systems missed a large amount of clinical data. Analyses did not include any breakdown

by provider type. Nursing notes provided only 94 clinical concepts which is considerably

fewer than the concepts drawn from other sources ranging from history and physical

dictations (341 concepts), consulting notes (161 concepts), progress notes (251 concepts)

and inpatient progress reports (148 concepts). Other sources such as discharge

summaries, outpatient progress notes, radiology reports and operative reports identified

an additional 2,066 concepts. This strengthens the argument for separate testing of

classification systems using nursing-specific data to determine which aspects of nursing

care are and are not included in these systems. In an earlier study by Chute, Atkin and

Ihrke (1992), SNOMED-II also outperformed ICD-9-CM and the UMLS (Experimental

version 8) although in this earlier study all three classification systems, all of which have

since been upgraded, were found to be unsatisfactory as adequate matches were found

only 60% of the time or less.

Henry et al. (1997) compared the ability to categorize nursing activity terms into

NIC and CPT codes. This retrospective descriptive study used a sample of 201 patients.

"Nursing activity terms" (n=21,366) were collected from patient interviews, nurse

interviews, intershift reports and patient records and categorized using NIC and CPT

codes. Activity terms were categorized by two raters using a set of decision rules. The

NIC was found to be superior for categorizing nursing activities emphasizing the

importance of developing discipline-specific classifications. The NIC was able to classify

all the terms identified versus 60% which were classifiable by CPT codes which

represents a statistically significant difference between the two systems (p<.0001).

In an earlier study, Henry et al. (1994) examined frequencies of the types of terms

(NANDA diagnosis, medical diagnosis, sign/symptom, patient goal, or other) used by

nurses to describe patient problems and the feasibility of using SNOMED III to represent

these terms. Nursing terms were gathered from four data sources: nurse interview,

intershift report, nursing care plans, progress reports. This study utilized a prospective

research design with manual matching of terms to SNOMED III vocabulary. Terms used

to describe patients (n=201) hospitalized for pneumocystis carinii pneumonia resulted in

total of 4,262 problems. Sign/symptom terms were most frequently used verbally. North

American Nursing Diagnosis Association (NANDA) terms were used to describe 15% of

problems in the interview, 13% in the intershift report, and 35% in the nursing care plan.

Medical diagnoses were used infrequently in written data. The most frequently occurring

problems were identified by 25 terms (representing 969 patient problems). NANDA

terms alone described 30% of the patient problems which was increased to 69% with the

inclusion of SNOMED III terms. Many of the terms that couldn't be classified were not

written in a manner that was consistent with NANDA or SNOMED III nomenclature but

were essentially conceptual matches such as "need for teaching" which would match the

term knowledge deficit. Other terms which could not be classified were exact measures such as temperature and oxygen saturation. While the study demonstrated that SNOMED III, with the inclusion of NANDA diagnoses, had the ability to capture more nursing practice than NANDA diagnoses alone, 31% of nursing terms were not captured within this system which is still a large portion of documented practice.

Internationally, large-scale testing of multidisciplinary vocabularies has begun. One example of this is the NLM/AHCPR large-scale vocabulary test of the UMLS Knowledge Sources which includes 30 vocabularies, four of which were nursing focussed: NANDA; HHCC; NIC; and the OCS (Humphreys et al., 1996; Humphreys, McCray & Cheh, 1997). The UMLS metathesaurus was available for search on the Internet to 63 participants to determine the extent of coverage. The 63 participants searched a total of 41,127 terms, 80% of which related to patients' conditions (Humphreys et al., 1997). Of all the terms, 58% had an exact match within the UMLS, 41% had related concepts and only 1% were not found. Of the vocabularies included in the UMLS metathesaurus, only SNOMED International and Read Codes individually had more than 60% of the terms. Only 8% (3,239) of the terms related to public health practice and the percentage of exact meanings was lowest for this group (50%). The low level of public health representation was attributed to the need for a high-speed internet connection for participation in the study which is not available in the work settings of many public health professionals. Specific information about nursing data is not discussed but is listed in chart form, 6,745 nursing terms were submitted with an exact match percentage of 63%, and only 3% of the terms had no related concept found

(Humphreys et al., 1997).

Nursing-Specific Classification Systems

Blewitt and Jones (1996) studied the effectiveness of NIC interventions and associated NANDA diagnoses in predicting outcomes for patients undergoing parathyroidectomy. This was the only study found which indicated a conceptual framework, the Iowa Model an administrative model which combines systems and outcomes knowledge. The study design was exploratory descriptive and took place as part of a larger pre-existing study. Data were collected on 20 patients and analyzed using an excel spreadsheet program. The authors identified NANDA diagnoses, NIC interventions and outcomes identified most frequently through nurse and patient questionnaires. Nurses were given 16 NANDA diagnoses and asked to rate them on a Likert scale indicating most relevant to least relevant for this patient population. These were compared with those documented most frequently. When the authors compared the nursing diagnoses identified by nurses in the interview with those documented in patient record, they discovered that the priority diagnosis (risk for altered respiratory function) identified by the nurses in the questionnaires was not documented in any of the patient charts. Other priority diagnoses also were not charted regularly. The inconsistent use and documentation of the critical data elements made it impossible to establish a link between nursing activities and patient outcomes for patients recovering from parathyroidectomy (Blewitt & Jones, 1996). Patient demographics were not collected and data were collected from the chart using a chart abstraction form. Face and content validity were established using clinical and academic experts. The researchers did not

convert interventions documented in patient charts to the NIC set as no expert nurses were available to validate this conversion. This study draws attention to the large amount of nursing practice and knowledge that is not captured in the patient document.

Bowles and Naylor (1996) examined the OCS, the NIC, and the HHCC to determine: whether these classification systems were able to meet their original purpose; whether the language and system facilitate computerization; the extent of reliability and validity testing of the systems; and the extent to which the systems link with the Nursing Minimum Data Set. The study provides informative comparisons about the development processes for each system however, as each was developed for a different purpose, direct comparisons between them were limited.

Nurses in Spain sought to determine the applicability of NANDA diagnosis categories for practice in a neonatal unit (González Carrión, Sánchez Garcia, de Dios Luna de Castillo, Ruiz, & Ruiz, 1997). Using a nominal group technique, nurses identified the main problems seen by nurses in this setting. These were then categorized using NANDA diagnostic labels resulting in 36 NANDA diagnostic categories. The NANDA diagnoses were validated by determining concordance between two nurses who independently observed forty newly admitted newborns and identified which of the diagnostic labels would apply. Five categories were validated with excellent or good concordance (a Kappa coefficient of > 0.70) and two with average concordance (a Kappa coefficient of <0.70 and >0.40). The remaining 29, a large proportion of the identified diagnoses, could not be statistically tested due to a low frequency of occurrence. Despite the low number of validated terms, the authors supported the use of NANDA diagnoses

in this setting.

NANDA has also been examined in an Australian setting (King et al., 1997).

Using an audit of 198 nursing care plans revealed a total of 398 nursing diagnoses only

47.5% of which were identified as NANDA diagnoses. The authors felt that cultural

differences accounted for many of the terms chosen to identify diagnoses that were not

NANDA diagnoses. This supports the need to use systems which are not limited by

culturally biased language.

Community Health Classification Systems

The majority of studies focussing on community health practice have originated

in the United States with a focus on the ability of classification systems to predict

resource usage. In a small survey of provincial health departments, community health

centres, public health and home care settings in Canada, the CIHI Partnership Working

Group 2 (1999) found that 86% of respondents (n=28) were using a classification system

of some sort in their information systems with the majority using DSM-IV, ICD-9, and

ICD-9 Clinical Modification. The majority of those planning to implement systems

within the next 18 months indicated they would be using ICD-10 or the Canadian

Classification of Health Interventions, designed to accompany the ICD-10. Respondents

also indicated a need for community-health based classification systems and for CIHI to

broaden their mandate to include community health. It is notable that none of the main

classification systems identified are specific to community health and none include

nursing specific terms.

Coenen et al. (1996), examined the ability of nursing diagnoses within the OCS to

predict primary health care services in a community nurse centre. The sample included all clients receiving care at the centre over a 14 month time frame (n=331). The study involved secondary data analysis of data already collected in the computerized data system at the clinic using the OCS. Hierarchical regression analysis was conducted to examine predictors of utilization. Nursing diagnoses were found to be a significantly better predictor of centre utilization than client demographics.

Cox, Wood, Montgomery, and Smith (1990) explored the usefulness of using patient record data classified by ICD-9 and Diagnosis-Related Groups (DRG) to predict resource use in a home health care setting. This retrospective longitudinal descriptive study utilized record audits and included a sample of 50 patients (a total of 93 admissions and readmissions to a home health care organization). It was found that patient record data was not as sensitive as professional nursing judgement (prognosis) in predicting resource usage. Qualitative data such as capacity for self-care and nurse determined prognosis were the most sensitive in predicting patient outcomes.

Summary

Due to the changing nature of knowledge in this area, it is difficult to draw any clear conclusions from these studies as many are comparing different versions of the same classification systems. Nursing and community health specific information are absent or limited in most of the large-scale studies reviewed (Campbell et al., 1997; Chute et al., 1992; Chute et al., 1996; Humphreys et al., 1997). Studies which do focus on nursing practice have generally found that nursing-specific systems do a better job of classifying nursing practice (Henry et al., 1997). As would be expected, nursing

classification systems which focus on one specific aspect of the nursing process miss a large portion of data generated in practice, supporting the need to create and test systems which include all aspects of the nursing process (Henry et al., 1994). Therefore, it seems appropriate to focus on classification systems, such as the ICNP, which include more than one aspect of the nursing process and which are intended for more than one practice setting when pursuing future studies. No studies were found which test the ICNP in practice although, correspondence with the developers has revealed that studies are currently underway. The W.K. Kellog Foundation have provided funding to nurses in Latin America and South Africa to pilot the ICNP in community-based/primary care settings, however, results have not been published (ICN, 1998). Studies in Spain and Australia, have shown that tests of standardized nomenclatures must occur in diverse cultures and settings in order to ensure universal applicability, if this is indeed possible, supporting the need for international classification systems such as the ICNP (González Carrión et al., 1997; King et al., 1997). No studies were found which looked specifically at the classification of Canadian community health practice, or practice in Canadian settings in general, supporting the need for research to focus in this area.

Chapter 3: Frame of Reference

Introduction

This purpose of this study was to determine the extent to which documented nursing practice could be represented by terms in the ICNP. The framework used for the development of the ICNP, which places the ICNP in the broader context of health information systems, was used to guide data collection and analysis. While documented nursing practice has been shown to represent only a limited portion of the actions and knowledge actually used by practising nurses, it does provide an excellent starting point for the evaluation of classification systems which ultimately might serve as a framework for computer-based documentation of nursing practice.

Conceptual Framework

This study was guided by the model presented by the ICN to depict the development of the nursing components of health information systems (ICN, 1996, p.14). The model, presented by ICN in a visual form, has been converted and revised to meet the objectives of this study. The model presents a set of discrete steps beginning with nursing practice and following the completion of all the steps to the development of health information systems, and then returns again to nursing practice. This emphasizes that the basis for all nursing data is nursing practice and that the ultimate purpose of nursing information systems is to improve practice (see Figure 1).
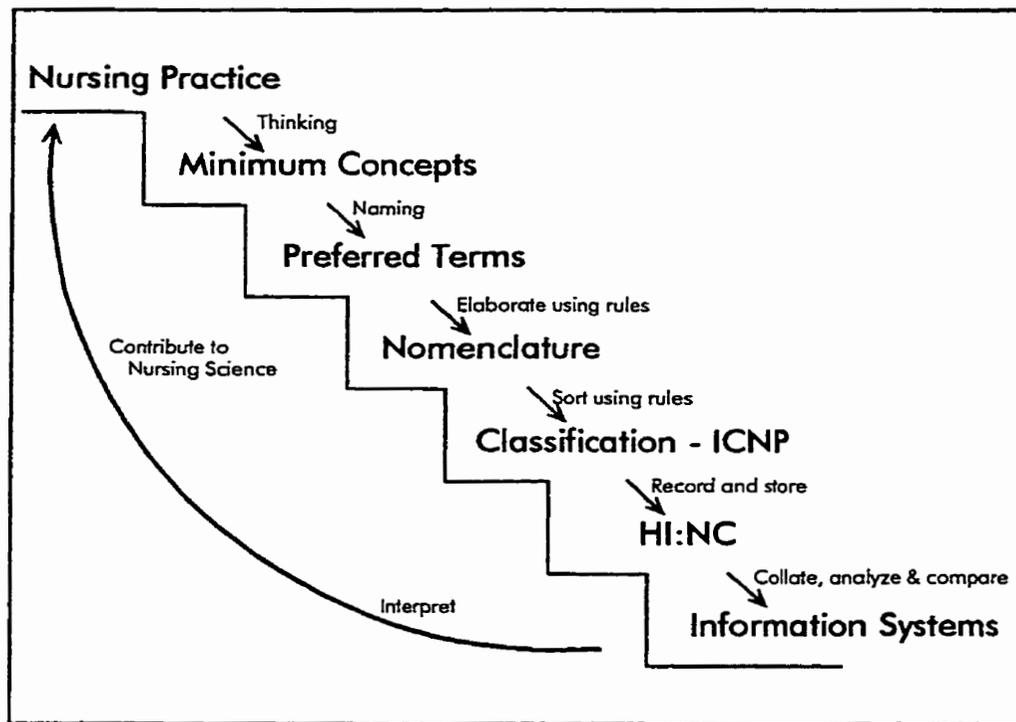
Figure 1. Conceptual model

The first five steps are integral to the initial development of nursing classification

systems and were used for developing the ICNP. Data collection and analysis for this

study followed the same process. *Nursing practice* data, recorded verbatim from client

charts, are abstracted into *minimum concepts*, or practice elements. Minimum concepts,

are the smallest amount of text which represents a particular aspect of nursing practice, a

single sentence may be broken down into any number of minimum elements to reveal the

essential nursing diagnoses and interventions described. These minimum concepts are

then named using standardized, or *preferred terms*. *Preferred terms* are a recognized

way of identifying, or naming an aspect of practice, such as teaching or assessing, and

most preferred terms are already commonly used by nurses to describe their practice.

These *preferred terms* are defined using pre-established rules to ensure that all users

understand what is meant when a particular word is used. This then becomes a

nomenclature. A *nomenclature* is a set system of names for each of the preferred terms

(Hensyl, 1990). This is a way of ensuring that everyone uses the same words when

describing similar things. Information in the nomenclature is sorted using rules which

becomes a *classification system,* in this case, the ICNP. Classification is defined as "a

systematic arrangement into classes or groups" (Hensyl, 1990, p. 313). This organizes

classification systems by arranging the words into similar groupings. *Classification*

systems provide a mechanism for recording and storing information to provide *Health*

Information: Nursing Components (or the Nursing Minimum Data Set).

Health Information: Nursing Components are the group of data that represent the

minimum set of items of information with uniform definitions and categories that

represent registered nurses' contribution to a larger system of client-centred health

information (CNA, n.p.; Werley et al., 1991; Werley, Ryan & Zorn, 1995). Information

within the HI:NC is collated, analyzed and compared within larger *Information Systems*

which include all health information from numerous sources. Ultimately, these data are

interpreted through research or evaluation and becomes the basis of nursing science

which, in turn, guides nursing practice. In this study, nursing practice data and the

ensuing steps were used to evaluate the ICNP rather than to develop it.

<u>Objectives, Questions and Hypotheses</u>

<u>Research Objective</u>

To describe the extent to which community-based nursing practice at a

community health site, as documented within text based nursing notes, may be

represented within the ICNP.

<u>Research Questions</u>

1.   What nursing phenomena and interventions are documented by community health

nurses and public health nurses in a community health setting?

2.   To what extent do documented nursing phenomena and interventions correspond

to classification terms (either as exact or conceptual matches) in the ICNP?

<div align="center"><u>Major Variables</u></div>

The source of data for this study were documented nursing practice episodes at a

community health site in Winnipeg, Manitoba. Each nursing practice episode included

all documented information, from the most recent date of contact, related to any client

encounter. Client encounters included individuals, families, groups, and communities.

The documented information could involve any number of client or nurse identified

problems/diagnoses and/or interventions, the nurse-client contact could take place in any

setting (i.e. at the clinic or at a client's home), and involve any type of contact such as in-

person or by phone. Any follow-up calls or contacts with, or on behalf of, the client

documented on the same date, were included. This methodology provided a cross-

section of care for a particular client, and allowed for the collection of a wide variety of

practice data.

The practice elements examined included the nursing phenomena and nursing

interventions resulting from any documented nursing activity with, or on behalf of, a

client. Nursing phenomena, are defined as health conditions or practices on the part of

the client or within the client's environment of concern to nursing (Mortensen, 1996).

These include anything which pertains to: physiological or psychological functions of the client (i.e. respiration, pain); actions or reasons for actions by the client (i.e. personality, self care); and aspects of the client's human or natural environment (i.e. family relationship, community, housing). Nursing phenomena relate very closely to a more common term, nursing diagnoses, and are defined as, "the description or label given by nurses to the phenomena which are the focus of nursing interventions" (ICN, 1996, p. 14).

Nursing interventions are defined as, "the actions taken in response to the phenomena nurses diagnose. The term nursing intervention encompasses the full range of nursing activity -- cognitive, affective and psycho-motor -- including health promotion, prevention of illness, restoration of health, and alleviation of suffering" (ICN, 1996, p.14). In addition to the actual action, nursing interventions in the ICNP can be further classified by descriptors such as time/place, anatomical sites, means, type of approach, type of object used, and type of action (Mortensen, 1996). As the ICNP did not include nursing outcomes at the time of the study, documented outcomes were not included as part of the study.

<div align="center">Attribute Variables</div>

A limited number of demographic variables were collected to provide a brief description of the types of clients and practice situations captured in the documented sample. Clients were designated as individuals, groups, families, or communities and information was recorded about location of contact, reason for contact (presenting request or problem), type of nurse (community or public health nurse) and date of

contact. For individual clients, additional information about age and gender also was collected. Most of this information was drawn from the contact form used at the community health site to capture demographic information at first contact or drawn from the documented practice episode.

Assumptions

A fundamental assumption of this study was that text-based nursing notes would provide an adequate representation of nursing practice in this community health setting. It has been shown that documented practice does not capture the full spectrum of nursing practice (Blewitt & Jones, 1996). Documentation is, out of necessity, a reductionistic process (Murphy, 1997) however, as this is the mechanism that nurses use to communicate with each other and other professionals, and the only permanent record of care provided, it provided a starting point for evaluating the ICNP. At the moment, neither nursing notes nor the ICNP can, or possibly should, claim to capture all aspects of nursing practice.

Chapter IV: Methods and Procedures

Introduction

This retrospective descriptive study was developed to determine the extent to which the ICNP captured documented nursing practice at a community health site. The data were abstracted from client charts randomly drawn from the chart filing system at the chosen community health site and included individual, group, family and community clients and included contacts with clients at the centre and in the community. Text-based documented practice was reduced to minimum concepts, or text excerpts, which were then linked or matched to terms in the ICNP using a modified qualitative methodology for the initial data analysis. Once the minimum concepts were linked to ICNP terms, they were ranked based on how well the ICNP matched the actual words used in the text excerpts to determine the extent to which practice was captured and how closely the ICNP matched the terms currently used.

Research Design

This study used a retrospective descriptive design. Using a qualitative framework, nursing practice documented in nursing notes was coded into the ICNP through a process of breaking down each aspect of the practice into a minimum concept, matching this concept with preferred terms using the defined nomenclature of the ICNP, and coding this concept using the preferred terms of the ICNP. As the minimum concepts were coded, each was ranked on a four point scale by the researcher as: 1. an exact match; 2. a conceptual match; 3. no match, but relates to a term on the hierarchy; and 4. no match.

Data Set

Client charts were systematically drawn from the existing files at a Community

Health Site in a mid-western urban setting. Within each chart, all documentation (i.e.

flow-sheet information and narrative notes) relating to the most recent nursing contact

with that client was included in the sample. A nurse was considered to be any Registered

Nurse working out of the community health site. This site maintains a wide variety of

file types accumulated over the three years since it began operations and samples were

taken from files relating to individuals/families, community agencies (i.e. schools), and

groups/classes to provide a diverse range of nursing situations.

Individual and family client charts were drawn from the alphabetical files at the

community health site. Client files were stored alphabetically in three sections under

each letter of the alphabet: 1) charts of clients seen at the centre; 2) public health nurse

referral files; and, 3) single sheet contact forms for clients who have contacted the site

but are not regular clients. The fifth file from each of these three sections was drawn

from each letter of the alphabet. In any section where there were fewer than five files,

the first was used. If a file was drawn that did not contain any documented nursing

contacts, it was returned and the next file was taken and so on until an appropriate

nursing file was found. A total of 75 files were taken from this section.

Additional files were organized under the following headings: agencies; schools;

and groups/classes. These files contained group and community level activities. Two

files were drawn from each of these categories, the first and the fifth, for a total of 6. In

total, 81 client records were utilized. It was expected that each chart should produce at least 10 minimum concepts, for a sample of at least 810 concepts for matching. While fewer concepts were actually found (n=566), the sample provided a meaningful, yet manageable data set. Of the previous studies reviewed, a wide number of concepts or terms were used ranging from 398 in a study of nursing diagnoses (King et al., 1997) to 41,127 terms in the largest study (Humphreys et al., 1996). Lange (1996) identified 627 terms in a similar study to this one which examined the presence of everyday nursing language in the SNOMED classification system.

Access

Permission to access client charts was received from the community health site which owns the charts and is the trustee of the health information of clients seen by community health nurses at the site and from the regional health authority which directly employs the public health nurses working out of the site. Client charts were randomly selected by support staff at the site using the inclusion criteria outlined above. Nurses and staff at the community health site were informed of the study through an information sheet which was distributed to staff prior to the study commencement and through two meetings attended by the researcher to present the study and answer questions (see Appendix C). Staff were assured that any information obtained about their clients would be maintained in a confidential manner and that the documentation of individual staff members would be not be identified in the study. Ethical approval, discussed further on in this chapter, was obtained from the Ethical Review Committee of the Faculty of Nursing.

Setting

The setting for the study was a community health site in Winnipeg, Manitoba. Exact numbers of clients seen at this site were not available to the researcher but approximately 965 clients and 251 groups were seen by staff at the centre in the first quarter of 1998. As the centre had been in operation for approximately three years at the time of the study, the number of client charts available was adequate to meet the needs of the study. The services and programs offered at the community health site used for the study are based on a primary care framework and are expected to provide, "1) Nurse-managed care; 2) On-going community involvement in the identification of needs, and the planning and evaluation of programs/services to meet those needs; and 3) Access to a full continuum of services, including health promotion, prevention of illness and assessment/recommendations for the treatment of illness" (CNRC Evaluation Team, 1997, p. 2). Public health nursing, which also operates out of this site is defined as, "an art and a science that synthesizes knowledge from the public health sciences and professional nursing theories. Its goal is to promote and preserve the health of populations and is directed to communities, groups, families and individuals across their life span, in a continuous rather than episodic process" (Canadian Public Health Association, 1990, p.19).

This site has already established an information system which provides primarily administrative data to assist with evaluation and to facilitate accountability. Initially the site had used an existing system, the Manitoba Health Public Health Statistics Reporting System which includes both individual and community data but has since developed a

new system for data collection (Community Nurse Resource Centre Evaluation Team,

1997; Manitoba Health, 1996). This study was not intended to duplicate these efforts or

validate the information system already in place as the ICNP is broader in its focus.

Findings from the study may assist with further identification of practice areas in this

setting which can be tracked in a computer based system.

Measurement Methods

Two data templates were used to record each nurse-client contact. These

templates were developed for this study as no examples of data collection tools for a

study of this nature were available in the literature. Client demographics were pre-

formatted for direct entry on a statistical spreadsheet, SPSS Version 7.5 (see Appendix D

for the variables included). The nursing text was transcribed verbatim using

WordPerfect 8.0 and was formatted for direct entry into Ethnograph Version 5.0, a

qualitative data management program.

Each data set was assigned an identification number by the researcher in the order

charts were reviewed. Demographic data included the nurse type which was recorded as

public health nurse or community health nurse, using a listing of staff provided by the

community health site. Individual nurses were not identified. The type of nurse was

collected to determine the extent to which both types of practice were represented in the

sample. Client demographics, recorded directly into SPSS, were collected in order to

describe the sample used for the study. Demographic data included type of client

(individual, family, group, community); individual clients' age and sex if known; reason

for contact (if known); and location of contact (clinic, home, telephone, or other).

While only nursing phenomena and related nursing interventions for that nursing episode were reduced into minimum codes for inclusion in the study, all nursing practice related to the most recent client contact, including assessments, diagnoses, interventions and outcomes, was transcribed verbatim into WordPerfect 8.0 to minimize any loss of data due to selective transcription, and to minimize the time required for on-site transcription. Additional relevant notes were included within the text when necessary to assist with prompting the researcher as to the meaning or context of the notes however, these notes were not coded as part of the sample. An example of this would be documentation that relates to ongoing contact for a previously documented issue which fails to restate the existing nursing diagnosis or client problem. Information recorded on flowsheets or standardized assessment forms also was converted into text and transcribed.

Data analysis began with identifying all the nursing interventions and phenomena in the data set. Each of these were then broken down into minimum concepts which were coded using terms in the Alpha Version of the ICNP (Mortensen, 1996). These codes were then ranked as: 1. an exact match; 2. a conceptual match; 3. no match, but relates to a term on the hierarchy; and 4. no match. For example, a score of "1. an exact match" would occur if the term "stress incontinence" was documented as a nursing phenomenon which corresponds exactly to the ICNP term and definition for "1.1.1.1.1.8.2.1.1. Stress Incontinence". A score of "2. a conceptual match" would occur if the nurse documented, "Pt. reports leakage of urine during exertion" which corresponds to the definition of 1.1.1.1.1.8.2.1.1. Stress Incontinence: "Involuntary loss

of small amounts of urine occurring with increased abdominal pressure and dribbling of

urine", indicating that while the words chosen to identify the nursing phenomenon differ,

the intent is similar. A score of "3. no match, but relates to a term on the hierarchy"

would occur if the documented term was diuresis which does not have an exact or

conceptual match but does relate on the hierarchy to 1.1.1.1.1.8.2. Urinary Elimination.

This provides a sense of how far out of the classification system the concept lies as the

closest term which relates to the concept was specified for each. Terms which were

scored "4. no match" had no corresponding terms in the classification and no similar

branch identified on the hierarchy. A score of 1 or 2 were considered a match, and 3 or 4

were considered no match.

<center>Procedure</center>

As client charts could not be removed from the site, every documented nursing

episode was transcribed by the researcher directly from client charts on site into Corel

WordPerfect 8.0 and SPSS 7.5 using a lap top computer over a period of two days. As

outlined in the methods section above, text based practice data was then entered into The

Ethnograph Version 5.0 and all terms and phrases describing nursing phenomenon and

nursing interventions were reduced to minimum concepts and coded using the existing

ICNP classification. Other text excerpts, which were coded as assessment data or as

outcomes, neither of which are captured in the ICNP, were removed from the data set. In

keeping with the guidelines for utilizing definitions in the ICNP, concepts were matched

to the most specific term within the genus (Mortensen, 1996). Terms were only coded in

the context in which they were used. For example, if breastfeeding was identified by the

nurse as a diagnosis or client problem or in some way as a nursing phenomenon, it was

coded as breastfeeding which is a nursing phenomenon in the ICNP. If the nursing

interventions related to breastfeeding (i.e taught football hold or explained feeding habits

of infants), these were not coded as teaching breastfeeding (the nursing phenomenon) as

they were the objects of nursing interventions and were coded as "teaching" "positioning

technique" or "breast feeding habits", "infant". Each of the coded text excerpts were

then grouped by code and re-analyzed for consistency of data within each code.

Numerous text excerpts were re-coded at this time. This process was repeated twice to

ensure consistency in coding and to identify text excerpts missed in the coding process.

Using The Ethnograph Version 5.0, each of the text excerpts were then grouped by code

and each text excerpt was scored to represent the level of match (see Appendix E for a

sample of text reduced to minimum concepts and corresponding ICNP classification and

scoring). Once all the text-based data had been coded, the total number of text excerpts

at each level of match were manually tabulated for each code. The code name, the total

number identified, and the number identified at each level of match were entered into

Microsoft Excel97 which was used to generate the descriptive statistics as this step was

beyond the capacity of The Ethnograph Version 5.0.

Henry and Mead (1997) have identified the need to examine the extent of data

loss when coding nursing practice into a classification system as none have been

produced with formal encoding rules to ensure that multiple coders would generate the

same data set. This was an issue in this study as the researcher required several passes

through the data to feel confident that most of the text had been captured and the

majority of the codes were consistently used. Most existing studies of this nature have involved a team of researchers and a panel of experts to enhance the validity and reliability of the coding. As this was not feasible for the size and scope of this study, other measures were used to enhance reliability of the coding process. Modifying the method outlined by Burnard (1991), two colleagues were recruited to independently verify segments of the minimized data and coding using the ICNP (see Appendix F). The segments were chosen to reflect three of the most frequently found codes. Two of these codes were also chosen as they included a word which had resulted in some ambiguity during the coding. The term "discussing" is included in the ICNP, however, most of the times the word "discussed" was used in the text excerpts, it was coded as "informing" or "educating" depending on the context. The issues around this term are discussed in detail in the findings section. In keeping with the guidelines for retaining qualitative validity outlined by Imle and Atwood (1988), one of the panel members was a clinical expert with knowledge of the practice at the health site. The other was a substantive expert familiar with classification systems.

As the raw coding was a very time consuming task and required extensive familiarity with the ICNP, each of the two panel members were provided with ICNP codes (with definitions), the corresponding excerpts of text and the score given to that code. This text was stripped of all demographic identifiers but some context was provided. The panel members were asked to agree or disagree with the coding and indicate their comments with any disagreements (see Appendix G). Any discrepancies between the coding of the researcher and the independent coders would have been

discussed and the coding adjusted using consensus to determine the most appropriate

term to enhance the trustworthiness of the coding process however, the percentage of

initial agreement between each of the external raters and the researcher was 100%. Imle

and Atwood (1988) identify a range of criteria for percentage agreement in rating items

for the development of a measurement tool but generally 70% is the minimum necessary;

and a range from 80% to 90% is adequate to good depending on the maturity of the scale

and the intended use. The minimum acceptable percentage of agreement between the

raters identified for this study was 70% as a measure of the ease of coding into the

classification. A lower level of agreement would suggest that terms would not be used

consistently in actual practice.

Ethical Considerations

Approval for this study was received from the Faculty of Nursing Ethical Review

Committee. The researcher was not in a position of power with any of the subjects or

within the setting. While limited demographic data was collected, it was presented and

analysed in aggregate form and subjects are not identifiable in the text excerpts

abstracted from their files. All of the text excerpts were separated from any nurse

identifiers to ensure that the practice or documentation style of any particular nurse was

not identified. Data were transcribed without patient identifiers and nurse identifiers to

further ensure anonymity.

As the study was retrospective in nature and demographic information was

immediately separated from the nursing notes, consent from the individuals whose charts

were accessed was not required. This was in keeping with the guidelines outlined in Bill

51: The Personal Health Information Act which came into effect in Manitoba on December 11, 1998 shortly before this study began. As there was a potential for nursing staff to view the study as a way to compare practice between providers, staff were assured that no notations would be made about individual providers. A description of the study was provided to staff members in written form and staff were encouraged to contact the researcher to address any concerns they may have (see Appendix C). Consent from individual providers is not usually required in the case of retrospective chart reviews as the charts and documentation are considered to be the property of the institution or employer from whom access is requested, rather than from individual staff members.

In all chart reviews, there is a limited possibility that the review may reveal an incident of inappropriate nursing practice. This was unlikely in this review as only a single nurse-client contact was used from each chart which would not reveal the extent of any previous contact, undocumented actions on the part of the nurse or actions documented elsewhere. Initial planning for this study included the provision that should any concerns arise, the chart in question would be brought to the attention of the Executive Director of the community health site or the Public Health Supervisor as appropriate, to determine the need for additional follow-up with a nurse or client. Staff were made aware of this in their introduction to the study and fortunately, this issue did not arise during data collection.

While the focus of the study was the ICNP, the study also revealed information about documented nursing practice in this setting. In this time of health care reform,

most institutions view themselves as somewhat vulnerable. The researcher remained

sensitive to these potential concerns throughout the process of analysing and presenting

the data, as a review of documented care was not expected to reflect the entire practice of

this community health setting.

<div align="center">Data Analysis</div>

This study used a triangulated approach to data analysis blending both qualitative

and quantitative methodologies. This was primarily a qualitative study as the raw data is

open-ended and coded to reflect salient themes. Unlike pure qualitative research, the

codes were predefined and the ultimate analysis resulted in descriptive statistics as well

as some general descriptions of the types of practice captured and not captured in the

ICNP. This is not unusual in classification work which ultimately seeks to quantify a

qualitative entity.

> Although it is common in social science for a researcher to adopt either a
>
> qualitative or quantitative perspective and virtually exclude the alternative
>
> approach...when it comes to classificatory techniques, the qualitative and
>
> quantitative approaches are not contradictory by any means, but rather are
>
> complementary and symbiotic (Bailey, 1994, p. 77).

As was previously discussed, source data from each episode of care previously typed into

WordPerfect 9.0 was transferred into Ethnograph Version 5.0 to complete the initial step

of identifying the minimum concepts and matching them with the defined nomenclature

of the ICNP. The codes were grouped and re-analyzed twice to ensure consistent themes

and data types within each code. The codes were then manually tabulated to determine

the number of occurrences and each text excerpt within each code was scored for the

level of match with the chosen code. The total number of occurrences for each code and

the number of occurrences of each match type were then entered into Microsoft Excel97

to generate descriptive statistics outlining the percentage of the nursing data captured and

not captured using the ICNP. Demographic data already entered into SPSS for Windows

Version 7.5 also were analysed to provide descriptive statistics about the sample used.

Methodological Limitations

This study attempted to explore the ability of the ICNP to capture community

health nursing practice, however the use of only one practice site potentially limited the

types of practice that were captured. This limitation was mediated somewhat as nursing

practice at this site included both public health nurses who often work in community

settings, and community health nurses whose work includes primary health care provided

at the clinic setting however, these findings are not necessarily transferrable to other

settings. A further limitation should be noted also. Staff at the community health site

indicated that their documentation is guided somewhat by the information system already

in place in the setting. Thus, some of their practice may not be emphasized in the

narrative notes, and not represented in this study, if it is also not reflected in the statistics

the nurses submit.

The use of documented practice does not begin to capture the diversity of nursing

practice. Health care records are not designed as research documents and data are often

missing or selectively entered (vonKoss Krowchuk et al., 1995). This was reflected in a

study by Blewitt and Jones (1996) where the nurses' identified priority diagnosis (risk for

altered respiratory function) for patients undergoing parathyroidectomy was not found in

a review of these same nurses' charting. Information taken from retrospective chart

reviews in this study was viewed as potentially incomplete and not representative of the

full spectre of nursing practice. It does, however, provide an excellent starting point for

examining and possibly classifying the diverse range of practice found in community

health nursing.

Chapter 5: Results

Introduction

This chapter provides a summary of the demographic characteristics of the

clients' whose charts comprised the data set and the nature of their contact with the

community health site. Analysis of the text excerpts is divided into several sections. As

the ultimate source of data was the client charts, descriptive statistics are provided to

identify which concepts were identified most often in the sample text regardless of how

well these examples match with existing ICNP codes. The analysis then examines those

concepts which were most commonly matched with ICNP codes both as general matches

and as exact matches. Concepts which were unmatched in the ICNP are described. The

level of congruence with the external reviewers is also explored.

Data Set

A total of 81 charts were selected for inclusion in the study. Of these, 80.2%

(n=65) related to interactions with individuals, 12.3% (n=10) were family charts, 4.9%

(n=4) were interactions with community groups, and 2.5% (n=2) related to groups or

classes run out of the centre. Of the individual clients, the average age was 32.7 years

with ages ranging from 1 month to 66 years. Interactions with new mothers were often in

individual files, rather than family files, and while the documentation related primarily to

the infant in some cases, the mothers' age was recorded as client age unless this was

unavailable. The majority of clients, 71.6% were female. The dates of contact for the

interactions covered a period of two and one half years ranging from May 1996 to

January 1999. The majority of the contacts 53.1% (n=43) occurred over the telephone,

39.5% (n=32) of the contacts took place at the clinic site with only 3.7% of contacts

occurring in client homes and 2.5% occurring in other locations. More than two thirds of

the episodes were documented by Community Health Nurses (70.4%) with the remainder

documented by Public Health Nurses (29.6%).

Clients received services for a wide variety of reasons. Using the presenting issue

identified by the nurse, these were grouped into major categories. The most common

reason for the contact was post partum follow-up with 32.1% (n=26) clients receiving

care for this reason. This category includes parent initiated questions about normal

infant development and habits, family adjustment, requests for weight and length

measurements, and standard public health postpartum follow-up. Clients specifically

seeking breastfeeding advice or visiting breastfeeding clinics were not included in this

group as there were sufficient numbers to group these clients separately.

Clients seeking counselling, which includes documentation relating to a

counselling session with a community health nurse and those seeking information about

counselling resources, was the second most common reason for contact with 12 clients

(14.8%) falling into this category. Primary care services were the third most common

reason for contact with 11 clients in this category (13.6%). Primary care services

included questions about a wide variety of illnesses and conditions, for example, lice and

meningitis. Clients presenting with medical concerns such as abdominal pains,

requesting blood pressure checks, assessment of small cuts, or removal of stitches were

included in this group also.

The remaining contacts each constituted less than 8 clients and were grouped into

the following categories: prenatal or family planning inquiries (8.6%), breastfeeding support (7.4%), asthma teaching (4.9%), support group activities/development (4.9%), other (4.9%), inquiries from other health/social services professionals (3.7%), diabetes teaching (2.5%) and general information (2.5%).

Results

The 81 documented nursing episodes transcribed for the study produced over 9,700 words for analysis. Over half of these, approximately 5,400 words, were excluded from the analysis as they related to documentation of initial assessment data which did not fit into the categories of nursing phenomena or nursing interventions. Over 700 words used to document outcomes were also excluded and, approximately 90 words were removed as their meaning was unclear. The remaining words, approximately 3,500 were coded into 566 basic concepts which were then matched to 147 different ICNP terms.

Aspects of Nursing Process Identified

While the nursing phenomena could be assumed from the nursing assessment data and the interventions chosen, an actual statement or statements indicating the nursing diagnosis or nursing phenomenon were documented in only 16 of the 81 (19.8%) nursing episodes included in the study. These were coded using 16 different nursing phenomenon codes in the ICNP which occurred a total of 24 times or in 4.24% of all the concepts identified (see Figure 2). Each of the nursing phenomena identified were scored as an exact or conceptual match.
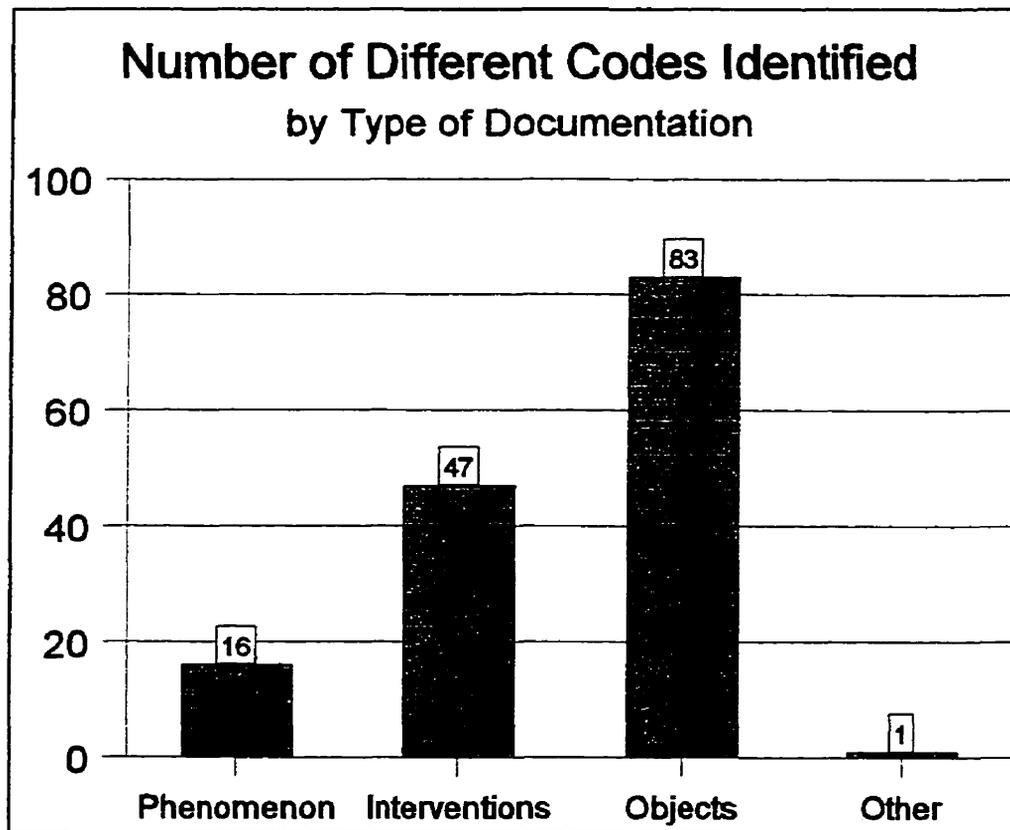
Figure 2. Number of different concepts identified by type of ICNP term

The most frequently occurring type of concepts found in the data were those

which indicated the objects of nursing practice. Objects of nursing practice can be

described as the tools used to perform nursing interventions or terms to further clarify the

focus of nursing interventions. These can include items used to carry out interventions

(i.e. suturing material), referral options (i.e. emergency services), or terms to define the

focus of the intervention (i.e. positioning technique). Objects also include anatomical

identifiers such as "back" or "leg" to explain what part of the body was the focus of the

intervention. Eighty-three different nursing objects were identified a total of 290 times
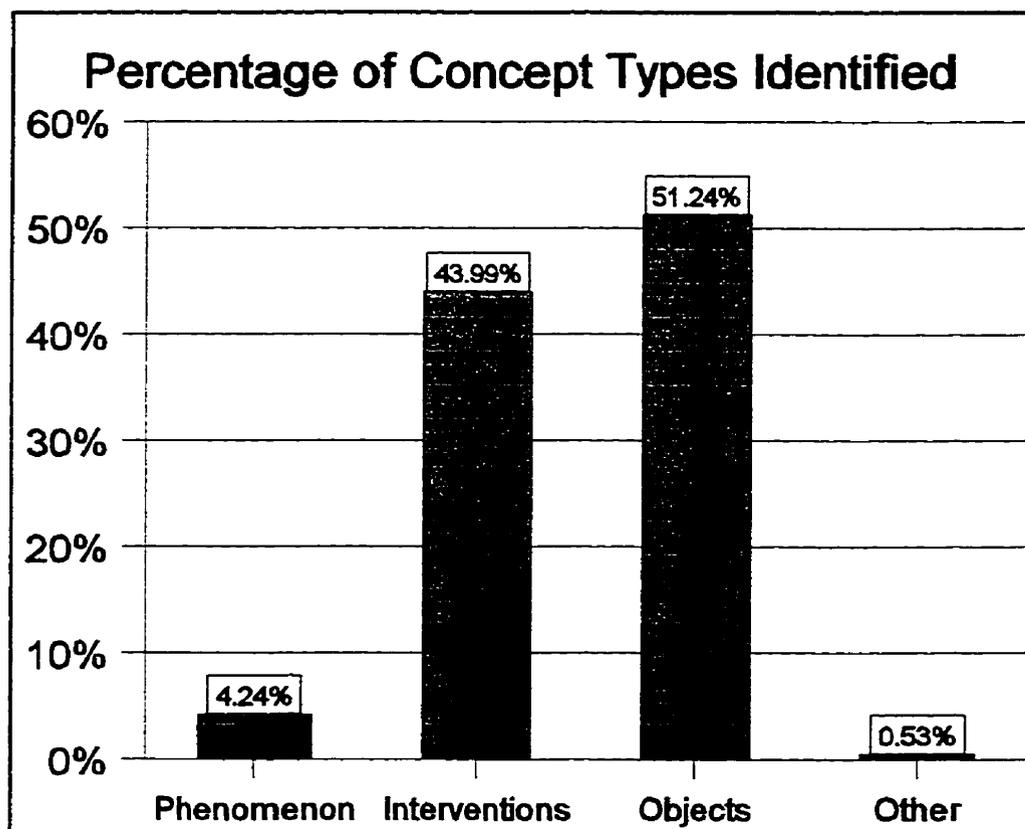
Figure 3. Percentage of concept types identified by type of ICNP term

making up 51.24% of the concepts identified. A total of 47 different nursing

interventions or actions (i.e. informing, educating, discussing, empowering) were

identified in the nursing text a total of 249 times making up 43.99% of the concepts

identified (see Figure 3).

Concepts Identified in the Nursing Text Excerpts

The most frequently occurring concepts which were identified from 16 to 37

times each in the nursing text were matched to the following ICNP terms (see Figure 4):

- educating (n=37, 6.54%),

- empowering (n=29, 5.12%),

- advising (n=24, 4.24%)

- informing (n=22, 3.89%)

- services other than medicine and nursing (n=21, 3.71%)

- providing (n=19, 3.36%), and

- referring (n=16, 2.83%).
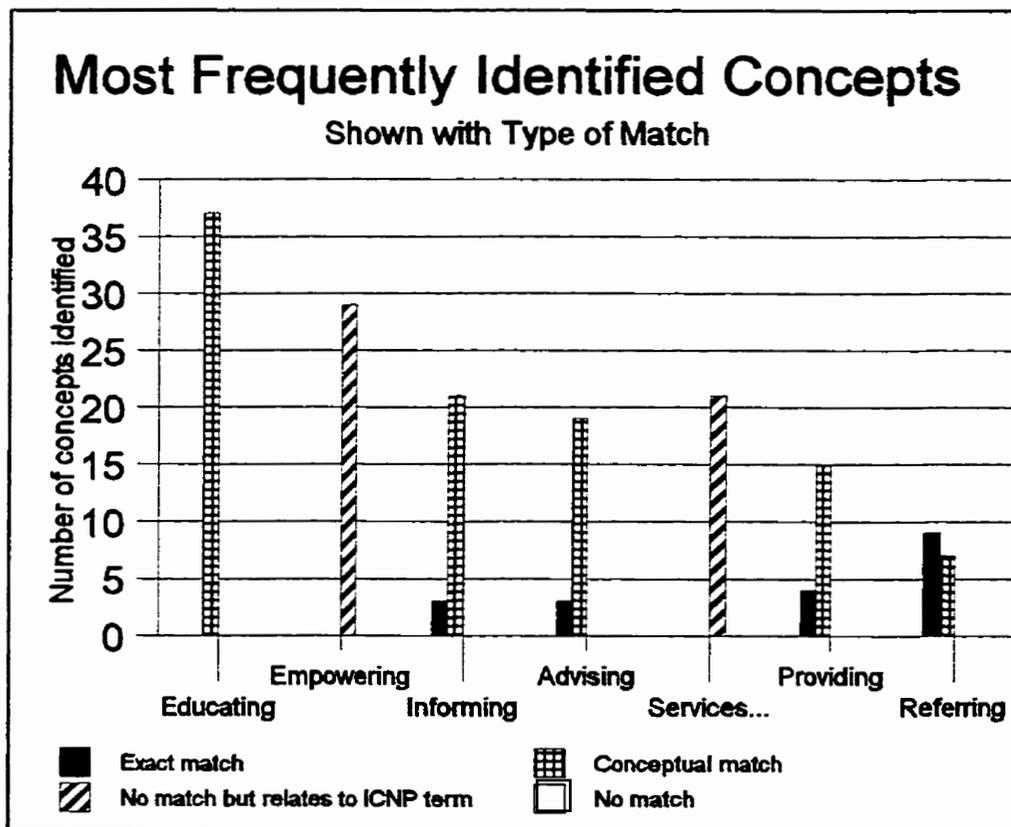
Figure 4. Most frequently identified concepts in the nursing text identified with level of match

Educating. The most frequently identified concept occurred 37 times (6.54%) and

is captured by the ICNP term "educating". Educating is defined in the ICNP as "a type

of Teaching with the following specific characteristics: Giving knowledge of something

to somebody" (Mortensen, 1996, p.242). Each of these 37 matches were coded as

conceptual matches as the words discussed (n=25), reviewed (n=11), and explained

(n=1) were used in the nursing text to express the concept (see Appendix H).

The word "discussed" was used to describe educational interventions 25 times, for example "discussed recovery from yeast and nipple trauma" however, "discussing" is identified as a separate term in the ICNP. These excerpts were not coded as "discussing" as the definition of educating presented a more accurate reflection of the context in which the term was used. Discussing is defined in the ICNP as "a type of Examining with the following specific characteristics: Examining something by argument" (Mortensen, 1996, p.228) which seems to suggest more debate than would usually occur when information is being shared between nurse and client.

Empowering. "Empowering" was identified as a concept 29 times or in 5.12% of the sample. Empowering is defined in the ICNP as "a type of Promoting with the following specific characteristics: Enabling persons to make choices so that they can realize their potential to influence their health" (Mortensen, 1996, p.240). Each of these 29 excerpts reflect closure statements commonly found at the end of a documentation episode indicating that the client has been invited to call as the need arises or that the client will call with any future questions and essentially indicating that no further contact is needed unless the client initiates it. The actual word empowering was never explicitly stated or even conceptually implied and therefore these text excerpts were marked as unmatched with empowering identified as a possible header for this group of concepts. Essentially, this concept was interpreted as empowering the client to seek further health care services and influence their own health, however, a term which conveyed closure or something more specific to ensuring ongoing availability may have been more

appropriate and was not found in the ICNP.

Advising. "Advising" was identified as a concept 24 times or within 4.24% of all the text excerpts. It was identified as an exact match 3 times, when the word advised was used, and as a conceptual match 21 times. Advising is defined as "a type of Guiding with the following specific characteristics: Suggesting that a course of action being promoted should be followed" (Mortensen, 1996, p.243). Statements coded as conceptual matches used the words "suggested", "recommended" or "encouraged" and usually related to a particular action on the part of the client. For example, "advised to discontinue pablum". In a similar conflict to that described for "discussing", "encouraging" is a term defined in the ICNP as "a type of Supporting with the following specific characteristics: Giving confidence or hope to somebody" (Mortensen, 1996, p. 239) however, this did not capture the statement, "encouraged father to contact the day care office" therefore, this excerpt was coded as advising .

Informing. Informing was identified as a concept 22 times or within 3.89% of all concepts identified. It was identified as an exact match 3 times, as the word informed was used, and as a conceptual match 19 times. Informing is defined as "a type of Nursing Intervention with the following specific characteristics: Telling somebody about something" (Mortensen, 1996, p.242). Concepts identified as informing were differentiated from those identified as educating as they were less interactive and generally referred to telling clients how to access a particular service or describing the clinic or other services of the clinic. For example, "informed client of 6-week wait for counsellor".

Services other than medicine and nursing. "Services other than medicine and

nursing" is a broad term in the ICNP and 21 text excerpts were coded using this term.

Text excerpts referred to natural family planning classes (which may or may not be

taught by nurses or health professionals), prenatal classes, financial counselling, general

statements about local resources, non-professionally run support groups, and social

services. These text excerpts were considered to be a non-match but related to the term

"services other than medicine and nursing" as they were not included among the specific

terms that are listed under this heading. "Services other than medicine and nursing" is a

term listed as an object of nursing interventions in the ICNP and, as with most of the

objects of nursing practice identified in the ICNP, this term does not have a stated

definition, leading to a great deal of ambiguity in the coding of these elements. Some of

the services specified under "services other than medicine and nursing" include:

physiotherapist services, social worker services, home services, psychotherapy services,

legal services, and religious services.

Providing. Providing, defined as, "a type of Managing with the following specific

characteristics: Giving or supplying (what is needed)" (Mortensen, 1996, p.232), was

identified as a concept 19 times in the text. It was matched exactly 4 times and matched

conceptually 15 times. Nursing interventions coded using this term related to providing

learning materials, phone numbers for community resources, and intake forms for

counselling services. In addition to the term provided, a wide range of words were used

to describe this intervention such as "info sent out", "printed info given", "offered

written materials" etc. There was one variation from this as a nurse stated "provided

opportunity for [client] to vent" which was included as it did not conflict with the stated

definition of providing although the context was markedly different from the other text

excerpts.

Referring. "Referring" was identified as a concept 16 times or in 2.83% of all the

concepts identified in the nursing text. Referring is defined as "a type of Coordinating"

with the following specific characteristics: Sending on or direct a person to something"

(Mortensen, 1996, p. 230). This term was the most frequent exact match with nine of the

occurrences using the term referred, the remaining seven were scored as conceptual

matches with terms such as "recommended [client] meet with [CHN]" and "left a

message with city health nurse...as resource for client".

Other major concepts. Numerous other individual concepts were identified and

have been listed in Appendix H. One additional concept warrants further discussion. In

addition to educating and informing, teaching was a nursing intervention which falls

within the same hierarchy on the ICNP and was identified nine times making nursing

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2.A.-5. Informing: a type of Nursing Intervention with the following specific
characteristics: Telling somebody about something.

    2.A.-5.1. Teaching: a type of Informing with the following specific
characteristics: Giving systematic information to somebody about
health related subjects.

        2.A.-5.1.1. Instructing: a type of Teaching with the following
specific characteristics: Giving systematic information to
somebody about how to do something

        2.A.-5.1.2. Educating: a type of Teaching with the following
specific characteristics: Giving knowledge of something to
somebody.

Figure 5. ICNP terms related to informing

interventions related to informing/educating/teaching the most frequently documented activity in the sample. Within the ICNP, informing is the top of the hierarchy as the broadest concept with teaching as a subcategory directly under it. Instructing and educating are both subcategories of teaching. The definitions for each of these terms are provided in Figure 5. Text excerpts which suggested the exchange of fact-based or simple information such as details about how to access a service were coded as "informing". Text excerpts which identified the sharing of health information in response to a client need were coded as "educating". Excerpts coded as "teaching" reflect the "systematic information" definition of teaching, and included teaching that utilized a standardized teaching sheet or checklist, or when the word teaching was used by the nurse and it was unclear from the text whether the teaching session was structured or unstructured.

Congruence Between Documented Practice and Terms in the ICNP

Of the 566 concepts identified in the text, 390 or 68.9% were matched with terms in the ICNP. A total of 123 (21.7%) concepts were coded as exact matches and 267 (47.2%) were coded as conceptual matches. The remaining 31.1% or 176 concepts were considered to be unmatched within the ICNP with 154 (27.2%) concepts relating to some term on the ICNP hierarchy and 22 (3.9%) not relating to ICNP terms at all (see Figure 6).
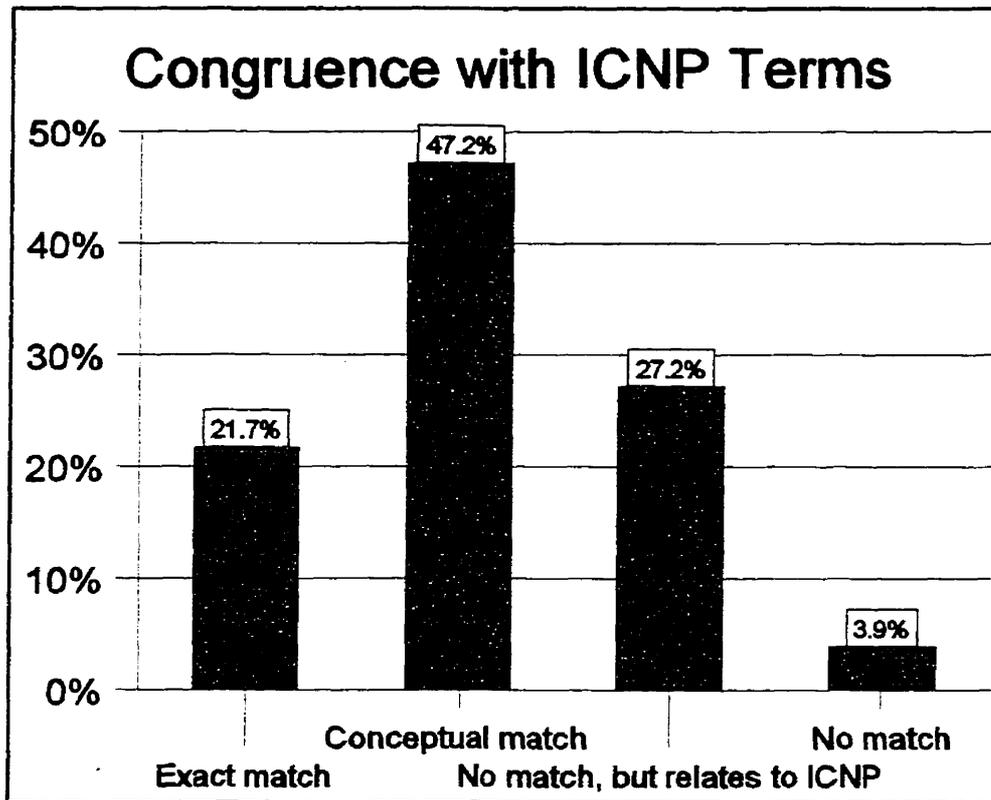
Figure 6. Percentage of concepts identified which match to ICNP terms

General match with ICNP terms. When only concepts which were linked to a

ICNP codes as a general match (i.e. exact or conceptual match) are used to organize the

data, the concepts seen most frequently are very similar to those seen when the concepts

are organized in order of frequency regardless of match to ICNP. A different structure

emerges however, when only concepts scored as exact matches with ICNP codes are used

to organize the data (see Table 3).

Table 3

Concepts Most Frequently Identified Overall, by General Match, and by Exact Match

Most frequently identified concepts		Most frequently identified concepts by general match (exact and conceptual)		Most frequently identified concepts by exact match	
Concept Name	%	Concept Name	%	Concept Name	%
educating	6.54	educating	6.54	referring	2.83
empowering	5.12	advising	4.24	clinic	1.06
advising	4.24	informing	3.89	teaching	1.59
informing	3.89	providing	3.36	medication regime	1.41
services other than medicine and nursing	3.71	referring	2.83	body weight	1.24
providing	3.36	medical services	2.30	blood pressure	0.88
referring	2.83	nursing services	2.30	providing	3.36

This table reveals that the exact matches generally reflect more concrete items than those identified as a general match. Terms such as "clinic" to identify a physical space, "medication regime" when discussing medications and "body weight" or weight to identify a particular concept are generally less ambiguous. "Referring" and "teaching", while more conceptual, are terms commonly used in practice.

Concepts scored as unmatched in the ICNP. Thirty one percent of the concepts identified, a total of 176, were scored as unmatched which includes both those scored as unmatched but links to a term in the ICNP and those with no match in the ICNP. The majority of these unmatched concepts, 27.2% were linked to terms in the ICNP. This

was done through a process of seeking ICNP terms which closely approximated the

concept but were not concrete enough to be considered a match. For example financial

counselling services were scored as unmatched under the term "services other than

medicine and nursing" as the ICNP term did not specify this concept. The ICNP terms

scored most commonly as unmatched include:

- empowering (n=29),

- services other than medicine and nursing (n=21),

- strategies of prevention (n=11),

- disease conditions (n=11), and

- psychotherapy services (n=8).

The text excerpts used for "empowering" and "services other than medicine and

nursing" are discussed in detail in previous sections of this paper. "Strategies of

prevention" which is an undefined object of nursing practice in the ICNP was identified a

total of 13 times. In two of these excerpts, the word prevention is used but these were

coded as conceptual matches as the lack of a definition in the ICNP made it difficult to

determine an exact match. The remaining 11 text excerpts were coded as not matched

but relating to the term "strategies of prevention". The content of these text excerpts

included identifying early warning signs for asthma attacks, prevention of head lice and

thrush, using guidelines to determine a baby's readiness for a bigger car seat, ways to

avoid side effects of medications, and environmental changes to avoid allergens. One

other text excerpt, "suggested giving her son and self a break from weaning process and

try again next week", was coded as "advising" and "strategies of prevention" as, in

context, it was viewed as a way of preventing failure and frustration on the part of a

client having difficulty weaning. It is likely that had the term been defined, some of

these may have been coded as matches or may not have been linked to this term at all,

but without the definition it was difficult to say clearly that the concepts in the text and

the ICNP term were congruous.

"Disease conditions" is another undefined object within the ICNP. Specific

conditions which are listed in the ICNP under this heading are "infection",

"inflammation", "mentally disturbed", "delirium", "cataract", "diabetes", and

"sickness/illness". As specific terms do exist for some disease conditions, disease

conditions captured in the text excerpts that aren't represented in the ICNP were coded

as unmatched. This concept was identified as unmatched 11 times and included asthma

(n=3), jaundice (n=2), thrush (n=2), head lice (n=1), plantar warts (n=1), viral and

bacterial meningitis (n=1), and chicken pox (n=1).

"Psychotherapy services" is another undefined object within the ICNP which is

listed under "services other than medicine and nursing". This concept occurred 8 times

and was coded as unmatched but related to the ICNP term "psychotherapy services" as

all the text excerpts related to counselling services, which may or may not be provided by

nurses and which may or may not involve psychotherapy.

Unmatched with no related ICNP terms. Of the 31.1% of concepts scored as

unmatched in the ICNP, only 3.88% were coded as unmatched and unrelated to any

terms within the ICNP. These were grouped into concepts by the researcher and given an

identifier which reflected the basic meaning of the term. The most commonly identified

concept occurred 3 times and was given the identifier "healing process". This concept

reflected explanations given to clients about what to expect during the healing process

such as "reviewed signs/symptoms of healing" and "discussed recovery from yeast and

nipple trauma".

The following concepts were each identified twice: "health care system access",

"birth control methods", "self care skills", "antibacterials/antibiotics", "treatment goals

and objectives", "program planning", "hydration". The remaining unmatched concepts

were each identified once: "allowing to vent", "social supports", "pregnancy testing",

"communication skills", and "funding sources". "Self care" and "social support" are

both listed as nursing phenomena in the ICNP. In the text excerpts, these were used as

objects of a nursing intervention (i.e. developing self care skills was the objective of

education) and couldn't be coded accurately using the ICNP terms. Similarly,

"communicating" is included in the ICNP as a nursing intervention which was not an

accurate reflection of the text coded as "communication skills" which referred to

communicating as a client skill that can be taught or developed rather than an action on

the part of the nurse.

Community Level Interventions

Six of the 81 nursing episodes reviewed (7.4%) involved classes/groups or

community-level interventions. These nursing episodes included:

- plans to organize community focus groups and seek funding in partnership with a

    community group;

- collaborative planning with a community group to provide parenting classes;

- a call from a local school for help identifying resources for a family;

- response and planning related to an invitation to participate in a school volunteer placement program;

- minutes from meetings of two support groups; and,

- an inquiry from a community member about a support group.

It was more difficult to extract salient concepts from these six episodes than from the individual and family charts. The coding for these episodes generally resulted in summarizing extensive text excerpts into one or two codes rather than the shorter excerpts coded in the other nursing text examples. In some ways, the extensive blocks of text are similar to the assessment text removed from the rest of the data set as it described background or preliminary data collection related to the issue at hand. For example, the excerpt that captures the planning for some parenting classes includes details such as, "advertising to indicate sponsored by [the community health site]. Instruction provided by [community group]...require no fees from parents...can offer a 5 wk series preferably on [Mon] evenings." This entire except was coded as "planning" to reflect the basic nature of the details included in the documentation.

One of the group charts contained the minutes of a support group meeting and detailed the number present, the names of guest speakers who attended, planning for the next meeting and general statements such as, "a brief question and answer period followed, as well as a socializing time". While it may have been possible to abstract from these excerpts the benefits to group members such as developing social networks and the education provided to the group, these were not explicitly stated in the text and

the ICNP did not provide any codes to capture broadly focussed interventions such as group education by non-nurses. Throughout the rest of the coding, concepts which were not explicitly stated in the text were not assumed and it was not appropriate for the researcher to assume the nursing phenomena and interventions taking place. Stating these as nursing interventions would also overlook the collaborative and client driven nature of these nursing episodes.

Several of the concepts scored as unmatched, with no corresponding term in the ICNP, came from these group/class and community level interactions. These concepts were given the identifiers: "funding sources", "programming", and "health care system access". These findings suggest that it is difficult and possibly inappropriate to document these types of nursing activities as nurse focussed or even nurse directed as many were collaborative or facilitated rather than driven by the nursing presence. The ICNP did include several concepts which captured nursing role very well. Some of the terms that were matched in the ICNP from these text excerpts included: "collaborating"; "implementing", "communicating", "planning", "arranging", "coordinating" and "providing".

Congruence with External Reviewers

As previously discussed, the reliability of the coding process was validated using a modification of the method identified by Burnard (1991). Two expert reviewers received identical text excerpts with the corresponding ICNP terms defined and the level of match assigned by the researcher indicated (see Appendixes F and G). The text excerpts were chosen to reflect three of the most frequently identified codes. In keeping

with the guidelines for retaining qualitative validity outlined by Imle and Atwood (1988) one of the panel members was a clinical expert with knowledge of the practice at the health site. The other was a substantive expert familiar with classification systems.

The panel members were asked to agree or disagree with the coding and indicate their comments with any disagreements (See Appendix G). There was 100% agreement between each of the external raters and the researcher. In keeping with the criteria identified by Imle and Atwood (1988), the minimum acceptable percentage of agreement identified for this study was 70% which was exceeded.

The 100% rate of agreement may suggest the coding would be used consistently in actual practice however, the limited number of codes given to the external reviewers makes drawing any conclusions difficult. Both coders commented on the difficulty of distinguishing between similar concepts such as "informing" and "teaching". Having multiple coders work from the same raw data set to identify codes would provide a better measure of reliability and potential clinical consistency however, this would have required extensive time and commitment on the part of the external reviewers which was not feasible for this study.

Chapter 6: Discussion

Interpretation of Major Findings

Overall, the ICNP captured the documented nursing practice with 68.9% of the concepts identified matching with ICNP terms either exactly or conceptually. This suggests that the ICNP has the potential to classify community health nursing practice in this setting however, the 31.1% of the concepts that were not matched within the ICNP suggest the need to further expand the capacity of the ICNP to capture community health nursing practice particularly in the areas of community level interventions and community/program development.

All of the nursing phenomena/diagnoses identified in the data set were considered to be either an exact or conceptual match with ICNP terms. Despite the consistency between stated phenomena/diagnoses and ICNP terms, nursing phenomena/diagnoses were explicitly stated in only 16 of the 81 (19.8%) nursing episodes included in the study, limiting the ability to draw any conclusions about the ability of the ICNP to capture nursing phenomena/diagnoses in this practice setting. In most of the practice episodes included in the study, it could be assumed from the documented assessments and interventions, the nurse had identified phenomena or diagnoses related to the assessment data and used this to guide the interventions chosen however, without an actual statement indicating the diagnosis or phenomenon, there was no way to include the diagnosis in the study. This finding is reflective of the experiences of Blewitt and Jones (1996) who could not link outcomes to nursing diagnoses as the priority nursing diagnoses stated by nurses in interviews were not actually written in these same nurses'

charts. Nursing documentation must clearly state those aspects of client care which are unique to nursing, such as nursing diagnoses, or risk losing this aspect of the nursing process in health information databases.

The breadth of nursing practice in this setting was reflected in the diversity of the concepts identified, with 147 terms identified for the 566 concepts abstracted from the text. The most frequent occurring concept, "educating", was identified only 37 times, speaking to the need to further examine this classification system using an even larger data set.

Despite the limited number of community level and class/group level charts included in the sample (7.4% of the total, n=6), it was clear that the documented nursing activities for these types of practice were very difficult to code into the classification system. This was due to the different nature of the documentation style in some cases, such as the minutes from a support group meeting, and the different focus of the documented activities which tended to reflect collaborative, community driven activities rather than the nurse initiated interventions expressed more commonly in individual or family based care. Activities such as seeking external funding and collaboratively planning programs or classes fall outside of traditional one-on-one nursing interventions and did not have matches within the ICNP. In order to fully explore the ability of the ICNP to capture nursing interventions at this level a more detailed study would be needed and may need to move beyond documentation of activities which likely only touched on the surface of the nursing services provided. A more qualitatively focussed study would be beneficial for determining how nurses view their role as group facilitators

and in community development in order to identify standards for documentation and standardized terms for inclusion in classification systems to better reflect these roles.

The process of matching the nursing concepts to terms in the ICNP for this study was a difficult one. While the hierarchical structure of the ICNP is intuitively useful and provides multiple options for classifying some aspects of practice in detail (for example, "informing" versus "teaching" versus "educating"), the structure is complex and requires complete immersion to become familiar with the terms. While this level of detail gives the classification system more flexibility and scope, it would not be possible for practising nurses to take the extensive time required to pick and choose appropriate terms to capture each client interaction. The use of computerized client records or data entry terminals, rather than the paper-based client charts and statistical sheets currently used in most care settings, would make the process of selecting appropriate terms more user-friendly and practical for a clinical setting.

One other difficulty experienced during the coding was that not all of the definitions for terms were consistent with the intended meaning of the term when commonly used in this practice setting. For example, discussing was one of the words most commonly used in the nursing text however, it was only coded as a match twice as the definition, "...examining something by argument" (Mortensen, 1996, p.228), was incongruous with the information sharing context in which the term was usually used. This difficulty would also be mediated through the use of computer-based client records which could provide prompts for the appropriate terms and show terms as they are commonly used in each practice setting as the face language is less important than the

intended meaning. This would allow the classification system to be customized to each setting yet remain comparable between settings.

While definition of terms in the ICNP required careful matching with the intended meaning of terms, terms without definitions also posed difficulties. Objects of nursing interventions included in the ICNP such as "leg", "infant", "strategies of prevention" or "psychotherapy services" do not include any definitions. For terms such as "leg" the lack of a definition was not a problem. Broader concepts such as "strategies of prevention" could be used to code many different types of practice. As a result, it was difficult to say conclusively that some terms without definitions did or did not match the identified concept. This potentially resulted in fewer matches than were possible as concepts were coded as "unmatched, but relates to a term on the hierarchy" when it was unclear whether the term was being used appropriately.

An additional source of confusion was that many of the undefined terms occurred twice in the ICNP, once under "Nursing Interventions Taking as Object: Other Objects" and once under "Nursing Interventions Using:...". It was often impossible to determine whether a concept such as "learning material" was an object or something that was being used as the term is duplicated in each arm of the hierarchy. For simplicity, the distinction between the two parts of the hierarchy was not made for this analysis and the focus was on whether the term was represented in the ICNP.

The Beta version of the ICNP may overcome these problems as the structure has been changed somewhat. Nursing interventions have been renamed "nursing actions" and will have three axes: action types, objects, the target or recipient of the action and the

method used (ICN, 1998). To illustrate this, the following chart (ICN, 1998, p.6) is

excerpted (see Table 4):

Table 4

Relevant Beta Version Axes

Relevant Axes	Select Terms		
Action types	Alleviating	Reducing	Teaching
Objects	Pain	Anxiety	Nutrition
Target or recipient	Individual	Individual	Family
Methods	Cold Pack	Guided-imagery techniques	Instructional materials
Interventions: Alleviating an individual's pain by applying a cold pack. Reducing anxiety using a guided imagery technique. Teaching the family about nutrition using instructional materials.			

Unfortunately, the Beta version is currently only available through the Telenurse web site

which provides limited access to terms making detailed analysis with this newer version

impossible (Telenurse, 1998).

Conclusions

Community health nursing includes a diverse range of nursing phenomenon and

interventions with education and information related interventions making up the

majority of interventions found in this sample. This study has shown that the ICNP has

great potential for capturing community health nursing practice , particularly when

delivered to individual clients, as 68.9% of concepts identified were considered to be a

match. This suggests that the ICNP is consistent with other classification systems for capturing health care practice which have shown a match range of 60-72% (Campbell et al., 1997; Chute, Atkin & Ihrke, 1992; Cimino, 1996; Henry, Holzemer, Reilly & Campbell, 1994, Humphreys, McCray & Cheh, 1997; Lange, 1996). Only one study, which focussed exclusively on nursing interventions found a markedly higher level of coverage with the Nursing Interventions Classification categorizing all of the nursing activity terms identified in the sample (Henry, Holzemer, Randell, Hsieh, & Miller, 1997). Unlike the studies cited above, this study focussed on community health nursing making definitive comparisons impossible. Further studies are needed to capture both institutional and community-based nursing and to determine the suitability of this classification system in both care settings. The concepts (31.3%) that were not matched in the classification system, highlight the need to continue to develop and test the ICNP prior to adopting it in a community-based setting.

<div align="center">Implications for Nursing Practice</div>

Nursing Documentation

One of the most striking results of this study was the amount of documented practice that was excluded from the sample as it reflected subjective and objective assessment data. Approximately 5,400 of the approximately 9,700 words documented, over half, were removed from the sample for this reason. The documentation certainly fell within the accepted standards for documenting practice and nurses were often filling in standardized flow sheets which identified the assessment data expected. When the assessment notes were compared with the interventions chosen by the nurse, there was

little question the nurse had formulated priority diagnoses and used these to guide the

care provided however, without an actual statement of the phenomenon identified, this

information was lost within the ICNP. While assessment is an important first step in the

nursing process, the extensive detail of this information over-shadowed the nursing

diagnoses and interventions in this data set and it is unlikely this is unique to this practice

setting. Future studies are needed to determine the extent to which assessment data

dominates documentation by community-based nurses and institutionally-based nurses

and the extent to which this data is required as a focus in the client record. The dearth of

documented nursing phenomena/diagnoses also suggests the need to focus on standards

for documentation in community health settings.

While the documentation of assessment data is advisable, as it will provide a

clear record of nursing actions in the case of litigation and documents baseline

assessments for comparison in future contacts, nurses must reexamine the current

priorities used for documentation. In particular, a focus on assessment data without

including summary statements identifying the final nursing phenomena/diagnoses results

in the loss of another important step in the nursing process, a step which better reflects

the domain of nursing knowledge. It also resulted in a significant loss of valuable

nursing knowledge for analysis in this study. It is possible that the high level of match

found for nursing phenomena/diagnoses would have been lower if these were stated for

each client contact, particularly those with communities and groups. The use of

standardized classification systems such as the ICNP, particularly if these are

computerized, may be useful as triggers for nursing documentation to ensure that nursing

phenomena/diagnoses are documented and recognized as a key aspect of nursing's

unique knowledge set.

Potential for Use in Clinical Practice

While the ICNP did demonstrate an ability to capture approximately two thirds of

the concepts identified in the nursing text, the coding was a time-consuming and at times,

confusing process. In order for the system to be useful in clinical practice, the process

for identifying and selecting terms needs to be less complex. One of the criteria

identified for the ICNP is that it be "simple enough to be seen by the ordinary

practitioner of nursing as a meaningful description of practice and a useful means of

structuring practice" (Clark & Lang, 1992, p. 111). The structure used for the Beta ICNP

on the internet (Telenurse, 1998) does provide an easier mechanism for finding and

organizing the terms however, this structure requires access to a computer system,

something which is not readily available to many community health nurses. The

structure used on the ICNP web site could guide the development of flow-sheets which

might make the use of the classification system more user-friendly.

During the preliminary information sessions at the community health site, staff

made the observation that, as they have an existing classification system, their

documentation is guided somewhat by the expectations and structure of that system.

This insightful observation required some reflection on the part of the researcher during

the analysis of the data for the study as identification of minimum concepts and coding

was very much guided by the structure of the ICNP and the existing codes in the ICNP.

This was mediated somewhat by ensuring that the minimum concepts were defined prior

to finding a matching code in the ICNP however, the idea that documentation is guided

by the classification systems in use emphasizes the need to ensure that classification

systems are designed using a conceptual framework similar to the one identified for the

ICNP, and for this study, where the development of classification terms originates in

clinical practice. It also confirms the need to test classification systems extensively using

clinically driven data sets prior to adopting them for use in clinical settings.

<u>Implications for Nursing Education</u>

While not a focus of the study, the process of developing this proposal, presenting

the plans for this study, and discussing the study with colleagues has revealed how many

nurses, and nurse educators, are still unaware of the basic concepts of classifying nursing

practice or even that any work is being done in this area. Many are unaware of the major

classification systems currently in use such as NANDA. Even fewer are aware of the

terms "Nursing Minimum Data Set" and "Health Information: Nursing Components".

This suggests a need for nursing educators to begin a focus on nursing informatics that

extends beyond a knowledge of word processors or using the internet to access health

resources. Without a basic knowledge of the informatics work that is being done, nurses

are unable to respond to developments in this area and provide valuable input into the

development of these systems.

Nurse educators are in an ideal position to influence whether nurses view

informatics and classification systems, "as a form of menu-driven nursing that is without

context and/or is atheoretical in nature, or...embrace the technology as showing the

results of their interactions with patients, which are based on theory and represent, for the

time, 'best practice'" (Giovanetti & O'Brien-Pallas, 1998, p. 6). Of primary importance

is education which emphasizes that classification systems are not intended to replace

critical thinking and nursing knowledge. One criterion guiding the ICNP, which should

be reflected in any nursing classification system, is that it be, "consistent with a clearly

defined conceptual framework but not dependent upon a particular theoretical

framework or model of nursing" (Clark & Lang, 1992, p.111). Classification systems do

not guide nursing practice but rather are guided by nursing practice. They provide a

means of capturing the work that nurses do within the broader context of the health care

system. There is a need for nursing educators to take up the challenge to integrate this

knowledge into nursing education at all levels.

<div align="center">Implications for Nursing Research</div>

As almost one third of nursing practice documented in this sample was not

matched with terms in the ICNP, it is clear that further research is needed to develop

systems that reflect community health and other types of nursing practice. In addition to

documented practice, which provided the data set for this study, studies need to focus on

nurses' perceptions of the care they provide. As classification systems, such as the ICNP,

are refined and tested, the focus must move to trials of these classification systems in

practice comparing actual practice to the nursing activities captured in the classification

systems to ensure they are user-friendly, clinically useful, and accurate reflections of

nursing practice.

As classification systems were not intended to result in endless lists of nursing

activities, research must also focus on linking nursing interventions to client and system

outcomes to further enhance our ability to identify best-practices for specific care settings and client populations (Giovanetti & O'Brien-Pallas, 1998). Early studies in this area, such as the study by Blewitt and Jones (1996), have been hampered by missing documentation and untested classification systems. As classification systems are validated and shown to be reflective of the nursing process, it will be appropriate to use this data to link practice to outcomes. The development of outcome measures for the ICNP and other classification systems, such as the Nursing Outcomes Classification, is integral to identifying practice outcomes. As with other aspects of the nursing process in classification systems, testing nursing outcomes for relevance in community health settings must not be overlooked. The potential ability of classification systems, and the resulting health care databases, to move beyond administrative listings of activities toward the identification of best practices and, ultimately, improve the health of populations, is the strongest argument for continuing research in this area.

<u>Conclusion</u>

As we further refine the ability of classification systems to capture nursing practice in all settings, provincial, national, and international standards must be developed for the use of this new source of data. These standards must include the expectation that nursing information is not viewed and collected in isolation but rather, as an integrated part of all health care information systems. In addition, information from community health settings must be integrated with information from acute care settings and data that reflect population health status. While data systems may provide a rich source of data for research and evaluation activities, the usefulness of this data is

limited unless the data are comparable between providers and settings and used

consistently.

Rich databases, developed using standardized classification systems, such as the

ICNP, have the potential to guide nursing and health care policy. This new data source

may allow for informed decision making about health care practices, particularly if it can

be linked to other data sources which reflect population health status, allowing

researchers and policy analysts to critically examine the impact of various methods of

health care delivery. The nursing profession must take advantage of opportunities to

participate actively in the development of nursing-specific and interdisciplinary

databases to ensure that nursing practice is adequately represented in these data systems.

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Appendix A

Summary of Major Taxonomies

Classification Scheme	Published By*	Major Focus	Number of Terms	Data Elements		
				Problems	Interventions	Outcomes
ICNP - International Classification for Nursing Practice (Mortensen, 1996)	The Danish Institute for Health and Nursing Research	Nursing phenomena and, nursing interventions expected to include outcomes in the future	approx. 287 nursing phenomenon (includes client type, and environmental modifiers); approx. 790 nursing interventions organized across 6 axis: action types; objects; approaches; means; body sites; time/place	Nursing phenomena	Nursing interventions	Under development
NANDA Taxonomy	North American Nursing Diagnosis Association	Nursing diagnoses	104 diagnoses	Nursing diagnoses		
Nursing Intervention Classification (NIC) (2nd Ed.) (McCloskey & Bulechek, 1996)	Mosby-Year Book	Nursing interventions	400 interventions; 26 classes; 6 domains		Nursing interventions	
Home Health Care Classification System		Home health care	147 diagnoses; 166 interventions; 20 home health care components	Nursing diagnoses	Nursing interventions	Discharge status

Classification Scheme	Published By*	Major Focus	Number of Terms	Data Elements		
				Problems	Interventions	Outcomes
Nursing Intervention Lexicon and Taxonomy		Community health	10 categories of nursing interventions		Nursing interventions	
Omaha Community Health System		Community health	40 client problems; 4 intervention categories and 62 targets of interventions; 3 outcome measures	Client problems	Nursing interventions	Knowledge, behaviour, patient status
Nursing Outcomes Classification (Johnson & Maas, 1997)		Patient outcomes related to nursing care	190 defined outcomes for individual patients with 16 measurement scales			Outcome specific measure-ment scales
ICD-9-CM - International Classification of Diseases, ninth edition, Clinical Modification	Practice Management Information Corporation	Morbidity data for indexing medical records	18,307 preferred terms; 15,847 abbreviations; 130,071 index terms; 180 hierarchical titles	Diseases, factors influencing health status, external causes of injury	Diagnostic and therapeutic procedures	

Classification Scheme	Published By*	Major Focus	Number of Terms	Data Elements		
				Problems	Interventions	Outcomes
DSM-III-R - Diagnostic and Statistical Manual of Mental Disorders	American Psychiatric Association	Mental disorders	267 preferred terms; 100 hierarchical titles	Clinical syndromes, personality and developmental disorders, physical condition, psychosocial stressors, psychological functioning		
SNOMED III - Systematized Nomenclature of Human and Veterinary Medicine	College of American Pathologists	Terms used in human and veterinary medicine	Topography, 12,385; morphology, 4,991; function, 16,352; living organisms, 24,265; chemicals, drugs, and biological products, 14,075; physical agents, forces, and activities, 1,355; occupations, 1,886; social context, 433; diseases/diagnoses, 28,622; procedures, 25,000 (estimated); general linkage-modifies, 1,176	Signs and symptoms; medical diagnoses; nursing diagnoses; changes found in cells, tissues, and organs; bacteria and viruses; occupations, devices, and activities associated with disease	Administrative, diagnostic, and therapeutic procedures; drugs; nursing interventions	Discharge disposition

Classification Scheme	Published By*	Major Focus	Number of Terms	Data Elements		
				Problems	Interventions	Outcomes
UMLS - Unified Medical Language System**	National Library of Medicine	To help retrieve and integrate electronic biomedical information	Three UMLS component knowledge sources: a Metathesaurus, interrelating biomedical concepts (which incorporates NANDA, OCS, HHCC, NIC); a semantic network of categories; and an information sources map			
Physicians' Current Procedural Terminology (CPT)	American Medical Association	Procedures performed by physicians	7,299 preferred terms; 8,944 abbreviations or expanded abbreviations; 771 hierarchical titles		Diagnostic and therapeutic procedures or services	

Table format based on, unless otherwise indicated, information obtained from Henry, Holzemer, Reilly, & Campbell (1994)
* Source McCloskey & Bulechek (1996)
** Source Chute, Cohn, Campbell, Oliver & Campbell, 1996); Lange (1996)

Appendix B

<u>Summary of Existing Studies</u>

Study	Purpose	Design	Sample	Results
Blewitt & Jones, 1996	To determine the extent to which nursing activities link to patient outcome achievement	Exploratory descriptive Data abstracted from charts, interviews with nurses and patients	20 patients. undergoing para-thyroidectomy	Unable to link diagnoses to outcomes as nurses did not document the diagnoses they most frequently cited in the interviews
Campbell et al., 1997	To compare READ codes version 3.1 SNOMED International and, Unified Medical Language System (UMLS) version 1.6 based on the variables of completeness, taxonomy, administrative mapping, term definitions and clarity	Comparative descriptive	1,929 patient records from 4 sites	SNOMED seen as significantly (p<.00001) most complete, coding 70% of the source material
Chute, Atkin, & Ihrke, 1992	Evaluation of SNOMED-II, ICD-9-CM, and UMLS (Experimental Version 8)	Comparative descriptive	Randomized sample of 1,000 lines of computerized surgical record of the Mayo Clinic, 1990	SNOMED outperformed other classifications but none captured more than 60% of the clinical content.

Study	Purpose	Design	Sample	Results
Chute, Cohn, Campbell, Oliver, and Campbell (1996)	Studied whether existing clinical coding systems can cover the content of most patient conditions and events in both inpatient and outpatient settings. They reviewed seven coding systems: ICD-9-CM, ICD-10, CPT, SNOMED III, Read V2, UMLS 1.3, and NANDA.	Comparative descriptive	Inpatient and outpatient Clinical text from four medical centres - total of 14,247 words	SNOMED scored highest overall with a score of 1.74 out of 2, NANDA scored lowest overall at 0.02.
Cimino, 1996	Determine suitability of UMLS for coverage of clinical laboratory terminology	Descriptive	The medical entities dictionary at Columbia Presbyterian Medical Centre provided a total of 1,460 terms	UMLS (released September, 1990) contained exact matches for 30% of the terms and near matches for an additional 42% for an overall match rate of 72%.
Coenen, Marek, & Lundeen, 1996	to examine the usefulness of nursing diagnoses (in the OCS) for explaining utilization of primary care services in a CNC	Descriptive, predictive	331 client records using OCS taxonomy - all clients over a 14 month period	Nursing diagnoses regardless of client demographics were a significant predictor of CNC utilization
Cox, Wood, Montgomery, & Smith, 1990	explored the usefulness of using patient record data classified into ICD-9 and DRG (Diagnosis-Related Group) to predict resource use in a home health care setting.	Retrospective longitudinal descriptive study	50 patients (total 93 admissions and readmissions) to a home health care organization	Patient record data was not as sensitive as professional nursing judgement (prognosis) in predicting resource usage. More qualitative data such as capacity for self-care and nurse determined prognosis were the most sensitive in predicting patient outcomes

Study	Purpose	Design	Sample	Results
González Carrión, Sánchez Garcia, de Dios Luna de Castillo, Ruiz, & Ruiz (1997)	To determine applicability of NANDA diagnoses in the neonatal setting in Spain	Used a nominal group technique to identify NANDA diagnoses and tested then with a concordance study	Two nurses who observed 40 patients in the first 24 hours of admission	36 NANDA diagnostic categories identified, 5 found to have excellent concordance and 2 average concordance. The remaining 29 did not occur with enough frequency to determine concordance.
Henry, Holzemer, Randell, Hsieh, and Miller (1997)	compared the frequency of nursing activity terms could be categorized into NIC and Current Procedural Terminology (CPT) codes.	Retrospective descriptive study	Used a sample of 201 patients' "Nursing activity terms" (n=21,366)	NIC found to be superior for categorizing nursing activities emphasizing the importance of discipline-specific classifications. The NIC was able to classify all the terms identified versus 60% which were classifiable by CPT codes - this was significantly greater (p<.0001).
Henry, Holzemer, Reilly and Campbell (1994)	examined frequencies of the types of terms (NANDA diagnosis, medical diagnosis, sign/symptom, patient goal, or other) used by nurses to describe patient problems and the feasibility of using SNOMED III to represent these terms.	Prospective research design with manual matching of terms to SNOMED III vocabulary.	Describes patients (201) hospitalized for pneumocystis carinii pneumonia. schemes and their capacities resulted in total of 4,262 problems.	Sign/symptom terms were most frequently used verbally. NANDA terms were used to describe 15% of problems in interview, 13% in intershift report, 35% in nursing care plan. Medical diagnoses used infrequently in written data. Most frequently occurring problems identified by 25 terms (representing 969 patient problems) -overall 69% of terms in test subset matched one or more SNOMED III terms.

Study	Purpose	Design	Sample	Results
Humphreys, Hole, McCray & Fitzmaurice (1996) Humphreys, McCray & Cheh (1997)	To determine extent of coverage provided by combined existing health terminologies	Descriptive study allowed 63 participants to search UMLS using a web-based interface	The 63 participants searched a total of 41,127 terms	80% of the terms related to the patients' condition, 58% had an exact match within the UMLS, 41% had related concepts and only 1% were not found. Only 8% (3,239) of the terms related to public health and the percentage of exact meanings was lowest for this group (50%). Nursing-specific results: 6,745 nursing terms were submitted with an exact match percentage of 63%, only 3% of the terms had no related concept found.
King, Chard, & Elliot (1997)	Document the use of nursing diagnoses in nursing care plans in Australia	Descriptive chart audit	Obtained 198 Nursing care plans from a three-day audit of wards in three hospitals	398 nursing diagnoses recorded on the 198 care plans. Only 189 or 47.5% identified as NANDA diagnoses. Cultural preferences in phrasing and terminology identified as one potential reason.
Lange (1996)	determine whether "everyday" language of nurses represented in UMLS and SNOMED	Descriptive	Used shift-notes of 14 RNs working on four medical-surgical units (627 clinically meaningful phrases)	More exact matches found in UMLS (56.4%) than in SNOMED, fewer unmatched terms in UMLS (19.1%) than SNOMED (25.3%), Good matches highest in UMLS (70%) vs. SNOMED (60%).

Appendix C

<u>Staff Information Sheet</u>

Introduction to Research Project
To All Staff

Project Title: The Use of the International Classification of Nursing Practice (ICNP)
for Capturing Community-Based Nursing Practice

What is the study about?
The purpose of this study to determine the extent to which an international classification system, the ICNP initially developed by the International Council of Nurses captures community health practice. The study will use nursing notes documented in client charts about individuals, families, groups, schools, classes, and communities randomly selected from the files housed at [this clinic]. The practice of individual nurses is not being evaluated, the study will focus on the ability of the classification system to capture nursing practice. This study has been approved by the Research Review Committee of [this clinic], the [Regional Health Authority] Research and Evaluation Unit, and the Ethical Review Committee of the Faculty of Nursing.

When will the study take place?
I will be on site during the last week of January, 1999 collecting data for the study.

Who is the researcher?
My name is Liz Loewen and I am a Registered Nurse doing this study for my Masters thesis in the Faculty of Nursing at the University of Manitoba. I will wear a name tag when I am on site so that I can be easily identified.

Will this affect me?
Support staff at the front desk will asked to pull the charts using a systematic system and file them after use. Nurses will not be identified individually although a note will be made about whether the nurse was a public health nurse or community health nurse to ensure that both types of practice are included. Confidentiality will be maintained except in rare incidences that contravene legislation.

Where will this take place?
As space at Youville Centre is limited, I will be working wherever there is space to set up a lap top computer and possibly moving from desk to desk on occasion for a period of about a week. If I am in your way or if you would like to ensure that I do not work in your space, please don't hesitate to speak with me in person or call me in advance. I will make every attempt to ensure this study does not disrupt your practice. If I am using a

chart that you require, please let me know and I will return it to you immediately.

Is my client's information going to be kept confidential?
Yes. Some demographic information will be collected in order to describe the sample used for the study but this will be presented in aggregate form only and kept separate from the nursing notes recorded. As this study uses a retrospective chart review methodology, consent will not be sought from each individual, however the study has been carefully reviewed and approved by the University of Manitoba Faculty of Nursing Ethical Review Committee to ensure that no threat exists to your client's privacy or confidentiality. As a registered nurse, I value your client's confidentiality and will make every effort to ensure that is not jeopardized in any way.

What are the benefits to this study?
As information systems for tracking health care become commonplace, it is important to ensure that all types of practice are represented within these systems. Testing the ICNP in a community health setting is an opportunity to determine how well your practice could be captured within this system and will help the developers of this system to plan future versions.

What will happen to the information collected in this study?
A summary of the findings of this study will be forwarded to the nurses working on the ICNP and may be published in nursing or health informatics journals. Again, the identity of the client's whose charts are used will be protected as the analysis will use only small portions of text.

What should I do if I have more questions?
Please don't hesitate to contact myself at 926-8040 or my thesis chairperson Dr. Annette Gupton at 474-7135 if you have any questions or concerns about this project. I will endeavour to address all of your concerns and will also make any concerns known, without revealing your identity if you prefer, to the Research Review Committee of [this clinic] or the [Regional Health Authority] Research and Evaluation Unit, as appropriate, and will strive to find a mutually agreeable solution.

Thank you very much for your attention to this notice.

Appendix D

Demographic Data Collection Template

Name	Type	Variables
ID# - Identification Number, assigned chronologically	Nominal	
NRSTYP - Nurse Type	Nominal	1. Public Health Nurse 2. Community Health Nurse
CLTTYP - Client type	Nominal	1. Individual 2. Family 3. Group 4. Community
AGE - Individual client age	Ratio	Age in years
SEX - Individual client gender	Nominal	1. Male 2. Female
REASON - Reason for contact	Open Ended - Nominal	
LOCAT - Location of contact	Nominal	1. Clinic 2. Home 3. Telephone 4. Other (specify)

Appendix E

Sample Coding

1 + Chart Number 7	**Lines Coding:**
2	
3 Notes: **Mother states she is afraid**	3-11 **Assessment Data**: A type of examining
4 **baby will have apneic**	with the following specific
5 **episodes at home and may**	characteristics: Examining by asking
6 **die of SIDS, reports two or**	questions and eliciting spoken responses
7 **three apneic episodes daily**	2. Conceptual match
8 **when in hospital with**	11-12 **Verifying**: A type of determining with
9 **breathing resumed**	the following specific characteristics:
10 **following gentle**	establishing the truth or correctness of
11 **stimulation. None seen**	something.
12 **during exam**. Diagnosis:	2. Conceptual match
13 **Knowledge deficit r/t**	13 **Lack of Knowledge**: Lack of knowledge
14 **apneic episodes**. Plan:	is a nursing phenomena pertaining to
15 **Teach mother** about the	thinking with the following specific
16 **disease process, causes,**	characteristics: Lack of specific content
17 **and treatment** of apnea of	of thinking
18 prematurity, and **provide**	2. Conceptual match
19 **appropriate teaching**	14 **Ineffective Airway Clearance**
20 **handouts.**	3. no match, but relates to a term on the
21	hierarchy
22 Memo: client is 3 weeks old, born	15 **Teaching**: Teaching is a type of
23 at 35 weeks gestation.	Informing with the following specific
	characteristics: Giving systematic
text excerpt from: Cohen, S.M.,	information to somebody about health
Kenner, C.A., & Hollingsworth,	related subjects
A.O. (1991). <u>Maternal, neonatal and</u>	1. Exact match
<u>women's health nusring</u>.	16-17 **Disease Conditions** not defined
Springhouse, PA: Springhouse	2. Conceptual match
Corp.	18-20 **Learning Material** not defined
	2. Conceptual match

Appendix F

Instructions for Expert Reviewers

Dear Panel Member:

Please find attached five sheets of coding for your review. Three different terms from the International Classification of Nursing Practice (ICNP) have been selected: advising, educating, and informing.

As you are aware, I have taken text from nursing notes verbatim and have been coding it into minimum concepts and matching these with defined terms in the ICNP to determine the extent to which the ICNP can capture the nursing practice documented.

The attached coding is organized using the following format. The corresponding ICNP term and definition are provided at the top of each section. The actual text excerpt as written in the chart is indicated with the actual words coded to match the ICNP terms marked in bold, the non-bold sections have been provided to give you some context for their usage.

The "level of match" given to that coding follows each excerpt. Each of the concepts has been ranked as an "exact match" which indicates that the words used and the context match the ICNP term and definition exactly, or as a "conceptual match" which indicates that the words used are different but the term in context would match the definition.

Please mark yes or no in the next column to indicate whether you agree (yes) or disagree (no) with both the coding of this excerpt under that particular ICNP definition and the level of match indicated. If you disagree and mark no, please indicate why in the comments.

Once you have finished scoring all of the attached coding, please return the sheets to me by Friday, April 30th, 1999.

Once again, thank you for agreeing to participate in this study as an expert reviewer. Please don't hesitate to contact me at 926-8040 (w) or 774-2068 (h) if you require any further information or clarification.

Sincerely,

Liz Loewen

Appendix G

Sample External Reviewer Excerpt Sheet

Advising: Advising is a type of Guiding with the following specific characteristics:
Suggesting that the course of action being promoted should be followed.

Nursing Text -Verbatim	Level of Match	Agree Y/N	If No, suggestion/comments
Advised to monitor	Exact match		
Advised to rest and decrease...	Exact match		
Recommended [clt] call PHN	Conceptual match		
Suggested giving her son and	Conceptual match		
Sugg'd exploration of uncle's ability	Conceptual match		
Advised to discontinue pablum	Exact match		
Suggested use of OU for ht/wt check in	Conceptual match		
Suggested school or Louis Riel Library	Conceptual match		
Encouraged father to contact the day care office as a resource	Conceptual match		
Suggested she encourage mom to call herself	Conceptual match		

Educating: Educating is a type of Teaching with the following specific characteristics: Giving knowledge of something to somebody.

Nursing Text -Verbatim	Level of Match	Agree Y/N	If No, suggestion/comments
Reviewed abnormal signs/symptoms	Conceptual match		
Discussed variations in sleep patterns	Conceptual match		
Discussed alternatives	Conceptual match		
Discussion of self-care	Conceptual match		
Discussed natural ways of identifying fertile period	Conceptual match		
Discussed when to see a gynecologist	Conceptual match		
Discussed recommendations to supplement with fortified formula	Conceptual match		
Discussed controlling BP	Conceptual match		
Discussed asthma	Conceptual match		
Reviewed current recommendations	Conceptual match		
Reviewed use of reading stories to [baby] in her crib	Conceptual match		
Discussed hot/cold cabbage leaves	Conceptual match		
Discussed mark after birth likely to recede	Conceptual match		
Discussed resoulution (of jaundice)	Conceptual match		
Discussed resolution of jaundice	Conceptual match		
Discussed birth mark reducing	Conceptual match		
Reviewed fact sheets	Conceptual match		
Reviewed briefly cervical fluid, basal body temperature	Conceptual match		
Discussed ways and approaches to wean	Conceptual match		
Discussed alternative ways to giving milk	Conceptual match		

Discussed which feeds of the day to start with	Conceptual match		
Discussed recovery from yeast and nipple trauma	Conceptual match		
Discussed abstinence	Conceptual match		
Reviewed management of engorgement	Conceptual match		
Discussed basic communication skills	Conceptual match		
Discussed some guidelines for determining baby's readiness for a care seat	Conceptual match		
Discussed plantar warts being localized	Conceptual match		
Explained diff b/t viral and bacterial meningitis	Conceptual match		
Several **issues were discussed** with client	Conceptual match		
Reviewed contagion, incubation and infectious period	Conceptual match		
Reviewed position and latch	Conceptual match		
Reviewed care of cracked nipples	Conceptual match		
Discussed and offered written materials for potty training	Conceptual match		
PHN **review of care** re: breast infection	Conceptual match		
Discussed the importance of responding to early symptoms	Conceptual match		
Reviewed latch and positioning	Conceptual match		
Discussed developmental progress	Conceptual match		

Informing: Informing is a type of Nursing Intervention with the following specific characteristics: Telling somebody about something.

Nursing Text -Verbatim	Level of Match	Agree Y/N	If No, suggestion/comments
Discussed philosophy/services etc. offered at YC	Conceptual match		
Informed of stop smoking program	Exact match		
[Circumcision plasti-bell] should fall off on its own within approx 1 week	Conceptual match		
Outlined YC work and counselling team	Conceptual match		
discussed YC counselling form	Conceptual match		
Informed [clt] of 6-week wait for counsellor	Exact match		
Advised when this CHN is next working evenings	Conceptual match		
Mom made aware of babies weight and length	Conceptual match		
Described Young Expectations group	Conceptual match		
Discussed possible supports for wife	Conceptual match		
Provided info re: kids health stop	Conceptual match		
Counselling intake process **explained** to client	Conceptual match		
Discussed accessing of financial services	Conceptual match		
Discussed services offered at ...	Conceptual match		
Discussed walk-in therapy	Conceptual match		
Discussed possibility of calibrating and using control solution to verify accuracy	Conceptual match		
Explained that test should be repeated with a morning sample.	Conceptual match		
Discussed services on Dakota at Youville site	Conceptual match		
Decribed hx of existing parent support group	Conceptual match		

Informed of breastfeding support drop in	Exact match		
PHN advised [father] that it is unlikely that there are day cares that are open on the weekends	Conceptual match		
PHN also mentioned the services of the Family Centre of Winnipeg	Conceptual match		

Appendix H

Summary of Concepts Identified in Nursing Text

Concept	# Matched	1=Exact	2= Conceptual	3=No match but links to term	4=No match
Advising	24	3	21		
Advocating	1		1		
Allergic Responses	2			2	
Allowing to vent	1				1
Antibacterial/antibiotics	2				2
Appointment	1		1		
Arm	2	2			
Arranging	2	1	1		
Assessing	6	3	3		
Bandages	1			1	
Birth Control methods	2				2
Bleeding	1		1		
Blood Pressure	5	5			
Body - Internal Parts	1			1	
Body Length	7	2	5		
Body Surface	2			2	
Body Weight	7	5	2		
Bonding	1	1			
Breast	1	1			
Breast Feeding	2	1	1		
Breast Feeding Habits	10		9	1	
Caring Capacity	1		1		
Checking	5		5		
Clinic	6	6			
Cold Wrapping	2		2		
Collaborating	4		4		
Communicating	1	1			
Communication skills	1				1
Contracting	1	1			

Concept	# Matched	1=Exact	2= Conceptual	3=No match but links to term	4=No match
Coordinating	2		2		
Counselling	2		2		
Cream	1	1			
Crisis Therapy	1		1		
Cultural Brokerage	1		1		
Depression	1	1			
Describing	2	1	1		
Determining	5		5		
Devices	7			7	
Diet	7	2	5		
Discussing	2	1	1		
Disease Conditions	11			11	
Distributing	1		1		
Disturbed Family Relationship	1		1		
Eating Habits	2		2		
Educating	37		37		
Elimination Habit	3		2	1	
Emergency Services	1	1			
Emotional Support	1			1	
Empowering	29			29	
Encouraging	4	3	1		
Energy use	1		1		
Establishing Report With	1	1			
Examining	2		2		
Exercising Habit	2	2			
Facilitating	1		1		
Feeding Bottle	2	2			
Feeding Technique	8		2	6	
Funding sources	1				1
Genetic Disposition	1		1		
Group Therapy	2			2	
Guiding	1		1		

Concept	# Matched	1=Exact	2= Conceptual	3=No match but links to term	4=No match
Healing process	3				3
Health Care Activity	2		2		
Health Care Environment	2			2	
Health care system access	2				2
Health Condition	1		1		
Health Habit	1			1	
Health Seeking Action	2		2		
Heat Wrapping	2		2		
Human Conducts	2		2		
hydration	2				2
Immunization	1			1	
Implementing	2		2		
Inducing	1			1	
Infant	6	1	5		
Infection	3	3			
Informing	22	3	19		
Inhalation Technique	2	1	1		
Inhalation Therapy	2		2		
Interpreting	1		1		
Lack of Knowledge	1	1			
Learning Material	8		8		
Learning Readiness	1			1	
Life Span Events	4			4	
Listening	7		7		
Lung	2	2			
Materials	5			5	
Measuring	6	3	3		
Medical Services	13		13		
Medication regime	8	5		3	
Medicine	7			7	
Montoring	2			2	
Nipples	2	2			
Noncompliance	1	1			

Concept	# Matched	1=Exact	2=Conceptual	3=No match but links to term	4=No match
Nursing Services	13		13		
Nursing Therapies	2			2	
Nutrients	1		1		
Parenting	4	4			
Planning	1		1		
Positioning Technique	4	4			
Post Partal	3	3			
Pregnancy testing	1				1
Programming	2				2
Providing	19	4	15		
Psychotherapy Services	8			8	
Reading Material	2		2		
Recording	1	1			
Reduced Will to Live	1		1		
Referring	16	9	7		
Reinforcing	5		4	1	
Remedies	1		1		
Removing	1	1			
Resting Habit	1		1		
Roles	1			1	
Safety Measures	1		1		
Screening	1			1	
Self Care	3	2		1	
Self care skills	2				2
Self Development	1	1			
Services Other than Medicine and Nursing	21			21	
Sexual Activity Habits	2			2	
Sibling	1	1			
Signs	10	4		6	
Situational Low Self-Esteem	1		1		
Sleeping Habits	4		2	2	
Soaking	1	1			
Soap	1	1			
Social Support	1		1		

Concept	# Matched	1=Exact	2= Conceptual	3=No match but links to term	4=No match
Social supports (not as diagnosis)	1				1
Solution	1			1	
Spouse	1		1		
Strategies of Prevention	13		2	11	
Stress	2	2			
Sucking Reflex	4			4	
Suicide	1	1			
Supporting	8	3	4	1	
Suturing Material	2	2			
Teaching	9	5	4		
Testing	3	3			
The Family	1	1			
Training	3		3		
Transferring	1		1		
Treatment goals/objectives	2				2
Treatment Sequelae	3		3		
Verifying	1		1		
Weaning	1			1	
Weighing	1	1			
Totals	566	123	267	154	22