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An Evaluation of the Utility of the Home Health Care Classification for Categorizing Patient Problems and Nursing Interventions from the Hospital Setting

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The purpose of this study is to evaluate the utility of the Home Health Care Classification for categorizing patient problems and nursing interventions from the hospital setting. The data set comprised 5,844 problem terms and 20,055 interventions terms. All terms could be categorized using the Nursing Components and Major Categories for Nursing Diagnoses and Interventions. A total of 1,767 (30.2%) patient problem terms could be placed into Major Nursing Diagnosis categories, but not subcategories even though there were subcategories related to the major category. All intervention terms whether they were classified at the Intervention Category or Subcategory could be coded according to Type of Nursing Action. These findings demonstrate that the Home Health Care Classification, at the level of Nursing Components and Major Categories, was domain complete for the data set. The fact that not all terms could be classified according to the existing subcategories suggests some areas for future development, but is also a reflection of the level of detail expressed in the data set itself. The results suggest that the Home Care Classification will be adequate and appropriate for categorizing problems and interventions across settings for the next phases of the research project.

Introduction

Standardized coding and classification systems are important building blocks for all types of computer-based systems.[1-5] Standardized coding and classification systems vary along many dimensions including the domain covered, the degree of abstract versus atomic-level data, and the structure, thus, the selection of a standardized coding and classification system must match its intended purpose.[6-8] Ingenerf has defined four types of taxonomic vocabularies for health care based on the underlying structure and related knowledge representation formalism.[9] *Thesauri* are defined as lexical vocabularies containing definitions and cross-references. *Classification systems* such as the Omaha System,[10] the Nursing Interventions Classification,[11-13] the International Classification of Nursing Practice,[1] and the Home Health Care Classification,[14-15] have as a main emphasis, the disjunctive and exhaustive classification of terms. More structurally complex are *nomenclatures* (e.g., SNOMED)[16] and *formal terminologies* (e.g., GRAIL representation language)[17] which are necessary to represent primitive concepts using knowledge formalisms such as description logic or conceptual graphs.

A *classification system* is best suited to meet the need of this particular research project to collapse terms used for patient problems and nursing interventions into a manageable number of categories in order to examine linkages among problems, interventions, and patient outcomes. Three nursing classification systems that have undergone extensive development and testing were considered: the Omaha System,[10] the Nursing Interventions Classification,[11-13] and the Home Health Care Classification.[14-15] Henry et al. previously reported on the utility of the Nursing Interventions Classification for categorizing nursing intervention terms from the

hospital setting.[18] The evaluation of the Home Health Care Classification (HHCC) was undertaken for several reasons. First, the parent research project (Quality of Nursing Care of People with AIDS, NR02215) was expanded to include data collection in non-hospital settings including home care and skilled nursing facilities, and the research team desired to use a single system across settings if possible. The report by Ozbolt and associates on the utility of HHCC for the hospital setting suggested that this might be feasible.[7] Second, the ability to code both problems and interventions using a single system and to aggregate to common Nursing Components will potentially provide useful comparisons for subsequent data analyses. Third, it was thought that the discrimination among Types of Nursing Actions would be useful when linking interventions with problems and outcomes (including those related to resource utilization).

Therefore, this study was undertaken to evaluate the utility of the HHCC for categorizing problems and nursing interventions in the hospital setting. Three questions were of particular interest in the evaluation: 1) Is the HHCC domain complete for the hospital setting? 2) To what level of the HHCC can the problem data be classified (Nursing Component, Major Category, Subcategory)? and 3) To what level of the HHCC can the intervention data be classified (Nursing Component, Major Category, Subcategory, Type of Nursing Action)?

Methods

The data for this analysis represents more than 600 patient encounters for 201 patients living with AIDS who were hospitalized for *Pneumocystis carinii* pneumonia. The data were collected as part of a larger study aimed at examining the linkages among patient problems, nursing interventions, and patient outcomes (NR02215). The data were collected from three hospital settings which had three different types of care planning systems and three types of nurses' notes. In the first institution, the care plans were computer-based and the nurses' notes were written in narrative style. In the second institution, the care plans were handwritten and the nurses' notes were written on a flowsheet using charting by exception. A standardized printed care plan with a flowsheet and once-daily narrative note were used in the third institution. Data were collected near hospital admission, approximately midpoint in hospitalization, and near discharge. Patients who had shortened lengths of stay had fewer than three hospital data collection points. Patient interview data were also collected at three and six months after hospitalization for those patients receiving follow-up care.

There are two unit of analysis for this study, terms used to describe patient problems and terms related to nursing interventions. These data were collected from multiple data sources: 1) patient interview, 2) nurse interview, 3) chart audit of nurses notes, flowsheet, and care plan, and 4) intershift report. The resultant sample size for this analysis is 5,844 patient problem terms and 20,055 nursing intervention terms.

Data from the multiple data sources was entered verbatim into a relational database for analysis. The patient problem terms and nursing intervention terms were placed into categories of the HHCC by Master's prepared nurse research assistants after they were trained in the use of the system. Discrepancies in classification among raters was resolved through consensus of the research team.

Results

All terms in the data set could be classified into the HHCC nursing components (Table 1). The frequencies of the problems classified by nursing components ranged from less than 1% (Fluid Volume and Tissue Perfusion) to 16% (Respiratory). The nursing components least frequently used to classify interventions were Coping, Metabolic, Role Relationship, and

Tissue Perfusion. Nursing components used to classify at least 10% of the terms for interventions were Fluid Volume, Medication, Physical Regulation, and Respiratory.

Table 1
Frequencies of patient problems and nursing interventions in the hospital data set categorized by HHCC nursing components

Nursing Component	*Problems*		*Interventions*	
	n	(%)	n	(%)
Activity	548	(9.4)	1282	(6.4)
Bowel Elimination	525	(9.0)	502	(2.5)
Cardiac	102	(1.7)	213	(1.1)
Cognitive	347	(5.9)	358	(1.8)
Coping	284	(4.9)	176	(<1)
Fluid Volume	46	(<1)	2073	(10.3)
Health Behaviour	60	(1.0)	1686	(8.4)
Medication	111	(1.9)	2153	(10.7)
Metabolic	313	(5.4)	52	(<1)
Nutritional	412	(7.0)	641	(3.2)
Physical Regulation	689	(11.8)	3136	(15.6)
Respiratory	933	(16.0)	2886	(14.4)
Role Relationship	134	(2.3)	98	(<1)
Safety	62	(1.0)	862	(4.3)
Self-Care	116	(2.0)	845	(4.2)
Self-Concept	428	(7.3)	788	(3.9)
Sensory	522	(8.9)	536	(2.7)
Skin Integrity	145	(2.5)	1464	(7.3)
Tissue Perfusion	9	(<1)	33	(<1)
Urinary Elimination	58	(1.0)	271	(1.4)
Total	*5844*	*(100)*	*20055*	*(100)*

Problem data were classified into major nursing diagnosis categories and into subcategories when they existed and fit the data. As shown in Table 2, the six nursing diagnosis subcategories for Activity Alteration were aggregated to obtain the frequency of the major nursing diagnoses, Activity Alteration, in addition to the frequencies of the subcategories. Further aggregation to the Nursing Component level would also include combining the frequency of the other major diagnosis, musculoskeletal Alteration (n= 1), with that of Activity Alteration (n = 547) resulting in a total of 548 for the Nursing Component of Activity (Table 1). In other instances, e.g., Comfort Alteration, not all of the terms could be classified into a subcategory, so the total frequency for Comfort Alteration included the frequencies for the subcategories of Acute Pain, Chronic Pain, and Unspecified Pain, as well as an additional 226 not otherwise specified Comfort Alterations. A total of 1,767 (30.2%) patient problem terms could be placed into Major Nursing Diagnosis categories, but not subcategories even though there were subcategories related to the major category.

All the hospital intervention terms could be classified at least to the level of Intervention Category. The frequencies of terms classified at the Category versus Subcategory level of the taxonomy varied greatly by intervention. In the instance of Activity Care, 65.9% of the terms were classified at the Intervention Category as opposed to the Subcategory level. In contrast,

for Nutrition Care, 87.1% of the terms could be subcategorized. As shown in Table 3, all terms whether they were classified at the Intervention Category or Subcategory could be coded according to Type of Nursing Action. The majority of the terms were categorized as Assess (53.3%).

Table 2
Example of frequencies of nursing diagnosis terms classified by subcategory and major category

Diagnosis subcategories	
A01.1 Activity intolerance	25
A01.2 Activity intolerance risk	93
A01.3 Diversional activity deficit	0
A01.4 Fatigue	305
A01.5 Physical mobility impairment	72
A01.6 Sleep pattern disturbance	52
Diagnosis major category	
A01 Activity alteration	547

Table 3
Frequencies of hospital intervention terms categorized by type of nursing action

Type of nursing action	n	(%)
Assess	10683	(53.3)
Care	7316	(36.4)
Teach	1432	(7.1)
Manage	624	(3.1)

Discussion

The findings of these analyses demonstrate that the HHCC, at the level of Nursing Components and Major Categories, was domain complete for the data set. Not all problem and intervention terms could be subcategorized even when Subcategories existed for Major Diagnosis and Intervention Categories. This finding suggests some areas for subcategory development, but also is a reflection of the level of detail in the data set so it is not inherently a weakness of the HHCC. The ability to categorize interventions according to Type of Nursing Action had been identified as a potentially useful attribute by the research team for future comparisons among care settings. The study findings indicate that the intervention terms in the data set could be classified into the four categories.

No single existing standardized coding and classification system can meet all needs. The selection of a system must match the purpose for which it is to be used. The results presented here demonstrate the utility of the HHCC to classify large numbers of atomic-level data into a limited number of abstract categories for subsequent analyses thus it is well-suited to meet the needs of the current research project.

Future studies are needed not only to evaluate the manner in which these abstractions are useful, but also to examine the impact of the data abstractions in terms of loss of potentially useful information. What level of granularity of the data needs to be preserved in order to link problems, interventions, and outcomes? Is it possible that abstractions will result in the inability to detect potential process of care differences that could affect outcomes? What is the role of *nomenclatures* and *formal terminologies* as complements to the current existing nursing *classification systems*? These types of questions can best be answered by a broad-based approach to the development, validation, and implementation of standardized coding and classification systems for nursing.

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