

# Nursing diagnosis in the chronically ill: methodology for clinical validation

The identification and validation of nursing diagnoses that describe the phenomena of concern to nursing is a critical task. Methodological issues revolving around the conceptualization of nursing and the research approach have hampered this effort. This study used the human needs framework as a guide for the assessment and formulation of nursing diagnoses. A two-phase study was conducted. In Phase 1 five judges derived 51 nursing diagnoses using data from direct clinical observations of 50 subjects. In Phase 2 data from a second sample of 108 subjects were compared to Phase 1 data via computer analysis. Fifty of the 51 diagnoses were confirmed.

**Lois M. Hoskins, RN, PhD**  
*Associate Professor*

**Elizabeth A. McFarlane, RN, DNSc**  
*Assistant Professor*

**M. Gaie Rubenfeld, RN, MS**  
*Assistant Professor*

**Mary B. Walsh, RN, MSN**  
*Associate Professor*

**Ann M. Schreier, RN, PhD**  
*Assistant Professor*  
*Department of Nursing*  
*Catholic University*  
*Washington, DC*

**B**EGINNING WITH the First National Conference on the Classification of Nursing Diagnosis in 1973, nurses have been making a concerted effort to specify and describe the problems they treat. An outcome of the national conferences has been the development of a working list of labels and descriptors for some of those problems. These have been specified as nursing diagnoses or diagnostic categories. While the list of diagnoses (labels and descriptors)<sup>1</sup> is being used in the practice arena to describe the problems for which nursing care is planned, the specific diagnoses have not been tested sufficiently to determine their validity. While testing the diagnoses has been identified as a priority, the need for descriptive research to identify additional nursing diagnoses has been established.

The testing of the list developed at the national conferences and the research that will contribute to the expansion of that list is difficult due to the relative infancy of research in the area of nursing diagnosis.

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Problems inherent in such endeavors include a paucity of models to guide the research and the lack of a method for managing the massive amount of data that could relate to the identification and description of nursing diagnoses in clinical settings.

Gordon and Sweeney<sup>2</sup> specified two major conceptual issues that impact on these problems when one attempts to study nursing diagnoses and proposed three research models that could be used. The first conceptual issue concerns the operational definition of nursing diagnosis. Gordon's often-cited definition of nursing diagnosis provides structural and competency referents. Nursing diagnosis is a "concise term representing a cluster of signs and symptoms and describing an actual or potential health problem or state-of-the-patient which nurses, by virtue of their education and experience, are licensed and able to treat."<sup>2(p2)</sup> A conceptual referent for the definition, however, is less easy to specify, because there are many conceptualizations of nursing. Gordon suggested several, including those that focus on human needs.<sup>3(p77)</sup>

The second conceptual issue relates to the approaches used to identify diagnoses or diagnostic categories. With an inductive approach the nursing diagnoses that are observed or have been observed in clinical practice are identified. The deductive method uses a conceptual framework from which nursing diagnoses may be deduced. The lack of a unified conceptual approach to nursing is cited again as an obstacle to the deductive approach.

Gordon and Sweeney showed a preference for the inductive approach in their proposed models for identifying and vali-

dating nursing diagnoses. They presented three models: the retrospective identification model, the clinical model, and the nurse-validation model. The focus of the retrospective model is on nurses' descriptions of health problems they have treated in the past. The clinical model advocates direct observation of patient situations where data are gathered from which diagnoses can be generated. The nurse-validation model is advocated for use "following identification of diagnostic categories but prior to standardization."<sup>2(p8)</sup> The focus is on the validation of the cluster of signs and symptoms that defines the diagnoses.

## PURPOSE

These prototypes were used in planning and implementing a study to identify the nursing diagnoses of a chronically ill population. Specifically the objectives were to: (1) derive the nursing diagnoses in a sample of chronically ill medical outpatients; (2) validate these diagnoses in a second comparison sample; and (3) identify the defining characteristics of the nursing diagnoses. The primary focus of this article will be the methods used to derive and validate the nursing diagnoses.

## THEORETICAL FRAMEWORK

The framework chosen to provide guidelines for the assessment of the patients and for the formation of nursing diagnoses was derived from human need and motivation theories. The basic belief expressed in these theories is that a person is an integrated entity who experiences drives and motivations in the activities of living, and these drives direct the person in seeking resources to meet human needs.<sup>4-6</sup>

A human functions as a complete entity, an integrated whole; each unique person experiences human needs that can be classified according to:

- physiological needs (air, nutrition, elimination, mobility, sex, sleep, and rest);
- needs for safety and security (clothing, health practices, and shelter);
- needs for love and belonging;
- esteem needs; and
- self-actualization needs.

In addition to these needs, people experience needs that are cognitive (knowledge, understanding) and esthetic (beauty, order, simplicity).

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Maslow<sup>4</sup> presents a logical organization of needs that includes a consideration of need alteration as well as need satisfaction. When need alteration is experienced as deprivation, or when the alteration moves from a deprived to an improved state, some identifiable changes in human behavior usually result. Observing and identifying these behavioral manifestations and relating them to human needs is a legitimate responsibility of nursing.

## DEFINITION OF TERMS

Chronically ill patients were defined as those patients 25 years of age and older diagnosed as having chronic disease. Chronic disease was defined by the Com-

mission on Chronic Illness as comprising "all impairments or deviations from the normal which have one or more of the following: are permanent, leave residual disability, are caused by non-reversible pathological alteration, require special training of the patient for rehabilitation, and may be expected to require a long period of supervision, observation or care."<sup>7 (p14)</sup>

Nursing diagnosis was described as a label given to a cluster or group of signs or symptoms that indicates the absence of fulfillment or alteration of fulfillment of a human need. To be included as a specific nursing diagnosis, the cluster of signs and symptoms was agreed on by 80% of the panel of judges.

Defining characteristics were those signs and symptoms or behavioral manifestations presented by the patient that indicated the absence of fulfillment or alteration of fulfillment of a human need. For this study these included responses to questionnaire items indicating abnormal behavior in comparison to an accepted standard or normative value, a change in the subject's usual behavior, or a risk factor as determined by the judges.

## METHODOLOGY

### Design

The study was descriptive in approach, using a cross-sectional survey. The design incorporated two phases and was based on two methodological models, the clinical model and the nurse-validation model, described by Gordon and Sweeney.<sup>2</sup> The clinical model involves direct observation of patient behaviors as the source of information for forming diagnostic labels, and the nurse-validation model involves deter-

mining the presence of preidentified clusters of defining characteristics in a sufficient number of cases to be considered valid diagnoses. The results of Phase 1 in this study were the formation of the nursing diagnoses and the identification of their defining characteristics including those considered critical or essential to making the diagnosis. These results became the preidentified clusters of defining characteristics used as predictors for diagnoses in Phase 2 of the study. The result of the second phase was the cross-validation of these clusters and diagnoses in a second comparable group.

### Subjects

Interviews were conducted with a convenience sample of 169 subjects from a population of patients attending the medical outpatient clinic of a 900-bed health care facility serving a large metropolitan area of the mideastern region of the United States. The subjects ranged from 25 years to 90 years of age with a median age of 68 years, and all had one or more medical diagnoses of chronic illness. The majority were female, black, and of a low socioeconomic status; many were widowed. Selection and interviewing were completed over a six-month period ending in the spring of 1982.

The first 11 subjects interviewed were used to test the interrater reliability and were excluded from further analysis. From the remaining sample of 158 interviews, 50 were randomly selected for the purpose of identifying clusters of signs and symptoms from which nursing diagnoses were identified. The data from the remaining 108 subjects were analyzed by computer for the presence of these identified clusters of signs and symptoms. The former 50 consti-

tuted Group 1 and the latter 108 were identified as Group 2.

### Needs assessment tool

Ten human needs were selected to be assessed in this study:

1. air, breathing;
2. nutrition;
3. elimination;
4. activity and mobility;
5. sleep and rest;
6. sexual integrity;
7. safety and security;
8. love and belonging
9. self-esteem; and
10. self-actualization.

Each of the needs was theoretically defined and content was developed to address the five human dimensions of each need: physiological, psychological, social, cultural, and spiritual. This information was then operationalized in the form of an interview guide containing 13 sections: ten for the needs and one section each for physical examination and laboratory data, demographic data, and medication information. Physical examination and laboratory data were obtained from the subject's health record. Some items on the tool were simple yes-no statements and some required explanatory responses, but the majority were multiple-choice with forced responses. The final tool contained 226 questions with a total of 444 variables.

### Content validity

Content validity for the tool was obtained through expert review. Eight nurses whose credentials supported their expertise in knowledge of the chronically ill and the human needs framework evaluated the items on a 5-point rating scale for clarity, completeness, and applicability.

Validity was supported and the only revisions they suggested in their comments were minor additions.

### *Pilot testing*

Two pilot studies were conducted. The first was primarily to determine the feasibility of the procedures to obtain subjects and to determine the length of time necessary to conduct the interview. Findings indicated that some questions were unclear to the subjects and required explanation from the investigators, and the interview time ranged from one to one and a half hours. As a result some items were revised to improve clarity and more forced choice responses were incorporated to ensure consistency among the interviewers.

In preparation for the second pilot study, training exercises were given to five Master's-prepared nurses, all enrolled in doctoral study, who were selected to be the data collectors. Readings and the techniques of interviewing were discussed, and they practiced the use of the interview guide on each other. One of the investigators, using the assessment guide, videotaped an interview with a chronically ill subject. This was used by the investigators and data collectors for training. Finally, two of the investigators, one acting as participant and the other as observer, conducted taped interviews of two clients in the actual research setting. The two audiotapes were independently rated by each of the five data collectors. There was 95% agreement by the five raters and the two investigators; this concluded the training period.

### *Interrater reliability*

The second pilot study was to determine the interrater reliability of the data collec-

tors. Interviews were conducted with the first 11 subjects by the five data collectors during a one-month period. They worked in pairs, one as the interviewer and the other as observer. They alternated partners so that each data collector worked with each of the other four, as interviewer and as observer. The interviews were audiotaped. Data were analyzed by computer. Agreement of the direct observations of the five pairs was calculated with a mean percent of agreement being 0.92. The audiotaped interviews were rated by the three nonparticipant data collectors with an average agreement of 0.91. The average percent of agreement for ratings was 0.91. The sample included five raters each assessing 11 interviews for a total of 55 comparisons.

### **Panel of judges**

The five investigators (authors) served as the panel of judges for deriving the diagnoses for Group 1. All five of the investigators were prepared in the clinical specialty of medical-surgical nursing and were experienced in caring for chronically ill patients. Walsh, a member of the panel, is one of the authors of *Human Needs and the Nursing Process*.<sup>6</sup> Another member had published a self-instructional module on nursing diagnosis.<sup>8</sup> All panel members have conducted workshops on use of the nursing process and nursing diagnosis. Each of the five had developed particular areas of expertise among the ten needs.

### **DATA ANALYSIS PROCEDURE**

All data were entered into the computer and a frequency analysis was done of all responses. Data analysis was subsequently divided into two phases.

### Phase 1

During Phase 1 the investigators acted as judges. The data from Group 1 were analyzed independently by each of the five judges for clusters of signs and symptoms. Each judge reviewed the responses to all questionnaire items and recorded significant responses on index cards. There were 13 index cards for each judge on each subject: ten cards to address each of the needs and one card each for the demographic data, medication data, and physical examination and laboratory data. Responses to questionnaire items were considered significant if they indicated abnormal behavior in comparison to an accepted standard or normative value, a change from the subject's usual behavior, or a risk factor. These abnormal responses were considered signs and symptoms and were clustered within each need. Abnormal findings from the physical examination and laboratory tests could also be indicators. Clustering was determined by each judge based on a perceived relationship among the signs and symptoms providing cues to an alteration in need fulfillment. There was no limit to the number of clusters but each cluster had to contain two or more item responses. Information from one need could be used to support a problem in another need. For example, information regarding the diagnosis of threat to self-esteem could be supported by body image disturbance data used from the assessment of the need for nutrition, in which the subject saw himself or herself as being overweight or underweight. The decisions of each judge were graphically displayed on a tally sheet for an initial comparison of agreement.

The five judges then met to discuss their reasoning and to arrive at a consensus on

the clustering of signs and symptoms: four of the five judges had to reach agreement. In the initial stages of this effort cursory examination of the tally sheets showed that at least three of the five judges agreed on the majority of items chosen as significant. They asked each other why they had chosen a particular response and why they had clustered items as they did. As the process continued and extended over the 50 patients, reasoning became more sharp and consensus was reached more rapidly. Items were quickly identified that actually contributed to a diagnostic cluster as opposed to those things that were nice to know but were not necessary for problem identification. After agreeing on the cluster of signs and symptoms within a need, the judges as a group determined the label or nursing diagnosis to be assigned to the cluster. In this manner, for each of the 50 patients, clusters of signs and symptoms were formed, agreed on, and labeled. Each subject with the same given diagnosis did not necessarily have the same number of signs and symptoms or exactly the same signs and symptoms. There were a total of 87 labeled nursing diagnoses.

After having looked at each subject individually, it was recognized that there was overlap in some of the diagnoses. The next step then was to group the data to see how often a particular diagnosis had occurred and to determine the frequency of each of the signs and symptoms in the cluster. A cross-tabulation was done. Infrequently occurring and/or similar diagnostic labels were reviewed by the judges and were either collapsed or dropped; in the end 51 nursing diagnoses remained.

Items or signs and symptoms appearing infrequently were dropped. The remainder were labeled as the defining characteristics

for the associated nursing diagnosis—some of these were declared critical. Characteristics with a high probability of occurrence can be considered predictive or critical for making a particular diagnosis. Gordon defined critical characteristics as those "signs and symptoms that permit discriminations or differentiations between categories."<sup>9(p340)</sup> For this study it was decided that characteristics were critical if they had to be present, either alone or in a combination, to make a diagnosis. Critical characteristics were identified for 47 of the 51 nursing diagnoses. In the 4 remaining diagnoses, since there were no critical characteristics, a statistical calculation was performed to determine how many of the particular defining characteristics had to be present to assign the diagnosis. A mean proportion was calculated of the number of characteristics present in subjects in Group 1 with the diagnosis. This number became the minimum for the number of defining characteristics that had to be present for these four diagnoses.

In summary, at the conclusion of Phase 1 the judges had agreed on the presence of 51 nursing diagnoses in Group 1 and the defining and critical characteristics for each of these diagnoses. This information was then written into a computer program to be used as a prediction model for Group 2. The boxed material presents a summary of steps of the data analysis procedure.

## Phase 2

In Phase 2 the data from the remaining 108 subjects, Group 2, were searched by computer for comparable sets of defining characteristics. Subjects were identified as having a particular diagnosis when its critical characteristic(s) was present. If the

diagnosis was present a comparison was also made of the other defining characteristics possible for the diagnosis (but not essential). Frequencies were determined and a comparison made of the number and occurrence of diagnoses in the two groups.

## RESULTS

In Phase 1 51 nursing diagnoses for the 50 subjects in Group 1 were identified and agreed on by the five judges. In Phase 2 data from the 108 subjects in Group 2 were compared, using a computer. If the critical characteristics for a given diagnosis were present, then the diagnosis was assigned and the defining characteristics were tabulated. A chi-square analysis was done to compare the frequencies in each group for each diagnosis. There were no significant differences found between the two groups for all diagnoses except one, loneliness. There was no significant difference in the mean number of diagnoses in each group by *t* test; the mean in Group 1 was 11.56 and in Group 2, 11.43. These two tests provided support for the conclusion that 50 of the 51 diagnoses derived in Group 1 were present in the same proportion in Group 2.

Table 1 presents the list of 51 diagnoses categorized by need. This list was compared to the list of diagnostic categories accepted for testing by the Fourth National Conference on Nursing Diagnoses.<sup>10</sup> Twenty-three of the labels were similar and are indicated by an asterisk.

## DISCUSSION

Data were collected in this study by nurses who were not involved in the data

### Summary of Steps of Data Analysis Procedure

1. Each of the 158 subjects was interviewed and the data were recorded on the Needs Assessment Tool.
2. Fifty interviews (Group 1) were randomly selected from the 158. The remaining 108 constituted Group 2.
3. Each judge independently analyzed the 50 interviews. Item responses interpreted as signs and symptoms (*s* and *sx*) of a problem related to the ten needs, the physical examination and laboratory tests, medication information, and demographic data were indexed on separate cards. Each judge clustered the *s* and *sx* within a need and suggested a label.
4. Agreement of the judges was sought at three stages:
  - Choice of significant items. Items checked by each judge were displayed on a grid for visualization and tabulation to facilitate this step.
  - Forming different clusters of items within a need. The judges met to discuss their analyses and to arrive at consensual agreement.
  - Labeling the clusters. The judges composed a diagnostic label describing the theme inherent in the cluster.
5. The diagnoses and their *s* and *sx* were listed for each subject.
6. For each diagnosis, a graph was made with subject number on one axis and item number on the other to determine the frequency of the items for the particular diagnosis. This produced a list of all possible *s* and *sx* for a diagnosis and the frequency of their occurrence.
7. This list was reviewed by the judges. Infrequently occurring and similar diagnostic labels were collapsed.
8. Items that occurred infrequently and that the judges considered unnecessary were dropped. The remaining items became the defining characteristics for the given diagnoses.
9. The judges, based on clinical expertise, determined which items were critical by looking at frequency of occurrence (100%).
10. A computer program was written to identify diagnoses in subjects by the presence of the critical characteristics. If present, the diagnoses were assigned and the data were searched for the presence of the other designated defining characteristics.
11. Computer analyses based on the above program were run on Group 1 and Group 2.
12. Cross-tabulations were done of diagnoses by defining characteristics in each group. The resulting frequencies were tested for significant differences by chi-square analysis. A *t* test for the difference between groups on the average number of diagnoses per subject was also done.

analysis, and the judges had no interaction with the subjects. This was deliberate to remove any bias the judges might have developed had they done the interviewing. This was a one-time initial assessment, and diagnoses were not confirmed by the subjects. An interesting observation was that much of the data collected would be

useful for planning care but was not essential for identifying the problem.

In developing the methodology for this study the original plan was to develop a reference guide for clustering the signs and symptoms. For each of the ten needs signs and symptoms of alteration in need fulfillment were to be listed and labeled with a nursing diagnosis. These diagnoses were to be derived from the literature, the conceptual framework of human needs, and the expertise of the researchers. This literature would have included the list of diagnoses and the defining characteristics as accepted for study at the Fourth National Confer-

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**Table 1.** Nursing diagnoses by need category

<p><b>Air</b></p> <ol style="list-style-type: none"> <li>1. Alteration in tissue perfusion*</li> <li>2. Impaired circulation, uncontrolled hypertension</li> <li>3. Altered breathing pattern, respiratory difficulty*</li> <li>4. Health management deficit: respiratory self-care</li> <li>5. Potential decreased tissue oxygenation*</li> </ol> <p><b>Nutrition</b></p> <ol style="list-style-type: none"> <li>1. Obesity*</li> <li>2. Nonadherence to prescribed diet</li> <li>3. Inconsistency in data reporting</li> <li>4. Potential for uncontrolled diabetes</li> <li>5. Knowledge deficit: diet</li> <li>6. Overweight*</li> <li>7. Potential for nutritional deficiency</li> <li>8. Dysphagia*</li> <li>9. Dysfunctional digestion pattern*</li> </ol> <p><b>Elimination</b></p> <ol style="list-style-type: none"> <li>1. Constipation*</li> <li>2. Perceived constipation</li> <li>3. Potential fluid imbalance</li> <li>4. Perceived urinary pattern problem*</li> <li>5. Diarrhea</li> </ol> <p><b>Sleep and rest</b></p> <ol style="list-style-type: none"> <li>1. Impaired sleep/rest pattern*</li> <li>2. Potential impaired sleep/rest pattern</li> </ol> <p><b>Activity/mobility</b></p> <ol style="list-style-type: none"> <li>1. Impaired mobility*</li> <li>2. Potential for social isolation</li> <li>3. Inadequate physical activity</li> <li>4. Interference with activity/mobility: pain</li> <li>5. Decreased tolerance for physical activity</li> </ol>	<p><b>Safety and security</b></p> <ol style="list-style-type: none"> <li>1. Potential for eye/vision alteration*</li> <li>2. Limited health care follow-up</li> <li>3. Inadequate dental care</li> <li>4. At risk for illness: stress, grief*</li> <li>5. Potential health management deficit: financial insecurity</li> <li>6. Potential for injury: sensorimotor alterations*</li> <li>7. Potential for communication deficit: hearing loss*</li> <li>8. Threatened safety: noise*</li> <li>9. Threatened safety: crime*</li> <li>10. Threatened safety: rats, roaches, pests*</li> <li>11. Threatened safety: structural hazards*</li> <li>12. Threatened safety: quality of air*</li> </ol> <p><b>Love and belonging</b></p> <ol style="list-style-type: none"> <li>1. Potential for loneliness</li> <li>2. Loneliness†</li> <li>3. Lack of spiritual support</li> </ol> <p><b>Sexual integrity</b></p> <ol style="list-style-type: none"> <li>1. Illness-imposed changes in sexual activity</li> <li>2. Threat to sexual integrity</li> <li>3. Impotence*</li> </ol> <p><b>Self-esteem</b></p> <ol style="list-style-type: none"> <li>1. Threat to self-esteem: loss of control*</li> <li>2. Low self-esteem*</li> <li>3. Threat to self-esteem: body image disturbance*</li> </ol> <p><b>Self-actualization</b></p> <ol style="list-style-type: none"> <li>1. Imbalance of inner/outer-directed self</li> <li>2. Lack of purpose in life</li> <li>3. Self-management deficit: medications</li> <li>4. Self-management deficit: diet, exercise*</li> </ol>
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\*Similar to list of diagnostic categories from Fourth National Conference, 1980.

†Not validated.

ence on Classification of Nursing Diagnoses.<sup>10</sup> None of the diagnoses on the list had been validated through research. With the advice of consultants, the researchers chose the methodology described in Phase 1 to determine the defining characteristics. This methodology incorporated the use of interview questions to elicit the signs and symptoms commonly identified, incorporated the use of an expert panel of judges to identify and cluster the signs and symptoms, and determined the frequency of

occurrence of those signs and symptoms based on subject response. The final product of this phase was then tested, or cross-validated in the second phase of the study.

One outcome of using this approach was that the diagnostic labels applied by the judges were not necessarily consistent with the wording of those listed by the Fourth Conference. Gordon and Sweeney stated, "... validation of a diagnosis involves determining if the preidentified defining

characteristics occur as a cluster in a sufficient number of cases. Whether nurses agree on the appropriateness of labels for the clinically validated cluster is of secondary concern.<sup>112 (p8)</sup>

### IMPLICATIONS AND RECOMMENDATIONS FOR RESEARCH

A valid list of nursing diagnoses for one group of chronically ill patients was identified. Further efforts to validate diagnoses need to be conducted and comparisons

made across studies. Other groups of chronically ill patients need to be assessed and compared to this one. The nursing diagnoses here were based on examination of ten needs and certainly are not exhaustive.

The methodology used in this study required extensive resources. However, this methodology could be replicated on a smaller scale looking at individual needs or at individual diagnoses. Such efforts are necessary to lead to the development of a standardized nomenclature and a taxonomy of nursing diagnoses.

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