

Measures and Instruments

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Nursing focuses on changing or modifying human behaviors and responses in order to positively impact the quality of life. Nursing's role in acute and chronic disorders and in the organization of nursing care within health care agencies and systems is directed toward preventing illness and disability and promoting health in physical, psychological, and social realms. Not only are such actions done on behalf of individuals, but the profession recognizes that positive outcomes for groups, such as families and communities, are also important if the state of the nation's health is to be optimally affected.

The ultimate proof of the effectiveness of any nursing intervention or program is the nature of the outcomes that result. However, a major challenge that confronts nursing (as in other health professions) is demonstration of the worth of its interventions and programs through research with clear and tangible evidence of the effectiveness of its clinical practice. But, one cannot study well what cannot be measured well. Although much work has been done to refine the measurement of nursing outcomes, unfortunately, there are still several measurement issues that need to be addressed for the assessment of the impact of nursing practice outcomes (Strickland & Waltz, 1986; Waltz & Strickland, 1989).

Various concepts have been selected for measurement of nursing outcomes, however, nurses as well as other health care providers have most often focused

on the measurement of health status, functional status, patient satisfaction, and quality of life to determine the effectiveness of their care. The consideration of these concepts for the evaluation of practice outcomes make sense because they reflect the overall health goals of improving health status, functional ability, life satisfaction, and ultimately the quality of one's life. Although the focus on these concepts are intuitively appropriate, there are a number of conceptual, methodological, and practical issues associated with their use for the assessment of nursing practice outcomes. The primary focus of this paper is to provide an overview of measures and instruments used to measure quality of life, functional status and health status; and to address the major measurement issues that need to be dealt with if clear and unequivocal evidence of these outcomes of nursing practice is to be generated.

Conceptual Issues

Lack of clarity regarding the definitions of health status, functional status, patient satisfaction, and quality of life is a major problem in outcomes measurement. The theoretical definitions of these concepts are very important because they provide the fundamental basis upon which their approach to operationalization or measurement should be derived. Although some authors use these terms interchangeably as if they have a common meaning, and therefore, a common basis for measurement, these concepts are not construed as the

same by all authors. In general, health status and functional status tend to be used interchangeably, however, quality of life and patient satisfaction are usually conceptualized differently. Whereas health status and functional status conceptualizations tend to focus on patient limitations and capabilities, quality of life is a much broader concept that may include spiritual, social, economic and family dimensions as well as health and physical functioning dimensions. Functional and health status conceptualizations are considered among the many dimensions of quality of life and are often referred to as "health-related quality of life." Patient satisfaction measures are used to assess quality of life in multiple domains with a focus on the patient's perceptions.

Table 1 presents examples of the variety of dimension of quality of life. However, one caveat should be noted regarding conceptualizations of quality of life. Some researchers have broadened their conceptualization of quality of life to include concepts that may well be covariates of quality of life rather than dimensions of quality of life (Molzahn, 1991). For instance, coping ability, self-esteem, and lifestyle changes have been included among the dimension of quality of life (Jalowiec, 1990). These may be highly correlated with one's quality of life, but are necessarily dimensions of the concept.

Health Status and Functional Status

Health status and functional status are often conceptualized with three dimensions: (a) physical, (b) psychological, and (c) social functioning. Hence, functional status and health status measures may be general or generic, disease specific, system specific or organ specific.

Generic or general instruments were developed to reflect the health status and functional ability of people in a wide variety of populations. They often focus on function, disability, and distress. General functional or health status instruments often provide health profiles. As such, these single instruments measure different as-

pects of functioning and are used in a wide variety of conditions. A major limitation of general instruments are that they may be insensitive to disease specific, clinically important change (Bell et al, 1990). Commonly used health profiles include the Rand Health Insurance Study Questionnaire (Brook et al, 1979), and the Sickness Impact Profile (Bergner, Babbitt & Pollard, 1976).

Activities of daily living (ADL) scales are used by some researchers and clinicians to assess general health and functional status. However, activities of daily living is not completely synonymous with function. ADL scales usually measure ones' basic human functioning (such as eating and brushing teeth), and range hierarchically upward to higher functions (such as dressing and talking). In actuality, ADL scales measure basic capacity for self-care and hence assess a narrower range of performance than most general health and functional status measures (Applegate, Blass & Williams, 1990). Some ADL scales, however, assess somewhat high levels of performance, such as the person's ability to drive a car, perform household chores, or go shopping (Lawton, Moss, Fulcomer & Kleban, 1982; Lawton & Brody, 1969).

Disease specific instruments measure variables or dimensions that are particularly called into question by specific diseases or health conditions. For example the Arthritis Impact Measurement Scale (Meenan, Gertman & Mason, 1980) includes a physical disability dimension that addresses mobility, physical activity, dexterity, activities of daily living, and household activities in a manner of particular concern to those with arthritis. It also has a pain dimension because this is a common problem experienced by persons with arthritis.

System specific instruments measure the functional status of identified body systems. For example, a neurologic examination may be done to measure the functional status of the neurologic system. One's psychological functioning may be assessed through the use

of personality tests, such as the Million Multiaxial Clinical Inventory (Millon, 1987). Given one's purposes, a single instrument may be appropriate for the assessment of a system or several instruments may be needed. For example, in addition to a personality test it may be appropriate to also use a depression or anxiety measure to determine a person's psychological status.

Organ specific functional or health status measures assess the capacity of an identified organ such as the heart, liver, or brain. Careful monitoring for jaundice and for excessive bilirubin in the blood, and dye recreation tests may be used as approaches for determining the functional status of the liver. For example quantitative electroencephalography (QEEG) may be used to determine the functional capacity of the brain. Given the variety of approaches that are possible for measuring the functional status of specific systems or organs, a large number of instruments and approaches have already been developed and used for these types of assessments. Such approaches and measures include physical assessments or examinations, biochemical laboratory tests, pathological evidence, clinical diagnoses, or use of bioinstrumentation.

A major limitation in the conceptualization of most health status and functional status measures is that they have focused primarily on the negative aspects of health, such as disability, dysfunction and the like. Since nursing interventions are designed to prevent illness and to promote health and well-being, more measures are needed to address positive as well as negative health status variables. With the focus on health promotion and preventive interventions, instruments are desirable that measure enhanced health status and functioning, such as increasing energy and strength, resilience or physiologic reserve, productivity and stamina (Patrick & Bergner, 1990).

The definition and measurement of health and functional status also need to clearly distinguish between state and trait aspects of positive health status variables. Fitness, hardiness, and resilience, for example, may characterize a personality trait as well as transitory behaviors that are the focus of health status measures. When assessment of health status is the focus, instruments that are selected to measure such variables should be state measures because health and functional status are transitory in nature and are amenable to change over time.

Researchers and clinicians who seek to measure health and functional status need to be consciously aware of whether they desire to measure *current* or *potential* functional capacity or performance (Applegate et al, 1990). These are quite different since measures of current functioning seek to determine what is the functional or performance ability at the time of measurement, whereas potential capacity or performance measures aim to determine what the future ability of the person could be if proper care and therapeutics are implemented.

Quality of Life

While health status and functional status measures tend to focus on health problems and what a patient can and cannot do, quality of life measures may also include patient perceptions of their satisfaction with various aspects of their life including health and functioning. Grant, Padilla, Ferrell and Rhiner (1990, p. 261) noted that "quality of life can be defined as a personal statement of the positivity or negativity of attributes that characterize one's life." Ferrans (1990) concurred with this view and indicated that definitions of quality of life can be grouped into the following categories:

(1) *normal life* which focus on client perceptions of the ability to live a normal life similar to healthy persons or typical persons in the same age category, as espoused by the Karnofsky Performance Status Scale (Karnofsky, Abelmann, Craver et al, 1948);

(2) *happiness/satisfaction* which consider patient contentment, happiness and satisfaction with various aspects of their life (Hornquist, 1982; Ferrans, 1990);

(3) *achievement of personal goals* which focus specifically on the clients perception of success or failure in goal achievement, examples of which include definitions by Gerson (1976) and Calman (1989);

(4) *natural capacity* which focuses on a person's actual or potential physical and/or mental capabilities (McCormick, 1974; Shaw, 1988); and

(5) *social utility* which focuses on one's ability to live a socially "useful" life.

Ferrans (1990) also carefully notes that the various definitions have certain limitations and that instruments based on a particular definition may fit some situations but not others. A concern with normal life definitions is that it is not consistently clear whose criteria for "normal" should be used. When using happiness/satisfaction definitions one needs to understand happiness has been found to decrease with age, whereas satisfaction tends to increase with age and they are not necessarily synonymous (Campbell, 1976). Natural capacity definitions are used primarily for assisting with clinical decision making, such as whether to try to prolong a person's life or to allow him/her to die.

Since social utility conceptualizations of quality of life focus on whether the patient can satisfactorily fulfill valued roles in society (such as parent, teacher, citizen, employee), data important to planners and policy makers are generated by such measures to allow for a cost-utility analysis and decisions regarding allocation of resources for health care. The Quality of Well-Being (Lang et al, 1986), also known as the Index of Well-Being, uses this approach. For example, the Quality of Well-Being instrument has been shown to be useful for measuring the change in rheumatoid arthritis patient status and the cost-utility of total joint replacement (Bell, Bombardier & Tugwell, 1990).

Specifying Variables to be Measured

As noted previously, there are a variety of dimensions of quality of life and a large number of potential outcome variables exist that could be used as indicators of quality of life, functional status, and health status. The first step that must be taken to build evidence of the impact of nursing practice is to specifically identify the outcome variable(s) to be measured that are the best indicators given one's purposes and focus. Clearly, this is an extremely important task and one that must be done carefully and seriously because these concepts are multidimensional and can be measured with a single instrument or a variety of multiple measures. So how does one know which are the correct or most important quality of life or health status variables to measure in a given particular situation, and when should these measurements be made? In order to address this question there needs to be a full understanding of the following: (a) the problems or potential problems that are the focus of the specified nursing interventions or strategies, (b) the components of the nursing interventions and their anticipated effects, (c) the consistency of the conceptual and practical links between the problems and interventions, and (d) the adequacy of specific variables and measures for monitoring desired outcomes. In essence, one cannot select the most sensitive quality of life and health status outcome variables to measure if health problems are not clearly identified and understood. Understanding of the problem helps the nurse to know what needs to be changed. The components of nursing interventions or strategies reflect the actions that are taken to bring about planned change or desired outcomes. The nature and temporality of these actions are relevant not only for the selection of specific variables and instruments, but also and the proper time to assess or measure such outcomes. It should be noted that in a particular situation a wide array of variables may be appropriate and that outcomes can be measured at various times

during and after nursing interventions have been implemented (Waltz, Strickland & Lenz, 1991). The conceptual and practical links between the health problem and implementation of various components of nursing interventions dictate the nature of the outcomes that would be best to measure at a particular point in time. Some quality of life and health and functional status outcomes would be expected to be rather immediate, while others would be intermediate, and still others long-term. The variables selected for measurement should clearly reflect the changes or outcomes that are intended by nursing actions at specified points in time, and measurement approaches must be properly timed and sensitive enough to monitor changes in variables. Therefore, quality of life and health and functional status outcome variables should be selected that reflect desired changes associated with specified problems, that are affected by nursing actions designed to address those problems, that can be practically measured at times when resultant changes would be expected to occur, and for which measuring instruments have been developed that a reliable, valid and responsive to variations in the variables under study. When appropriate measures are not available, qualitative approaches may be used to help document outcomes.

Issues in Selecting Health Status, Functional Status and Quality of Life Instruments

Whenever a researcher or clinician selects instruments to measure nursing outcome variables several issues should be given priority for consideration. These include conceptual and practical issues, which if ignored, could lead to compromised results and conclusions.

Conceptual Compatibility

Given the conceptual issues discussed above, several guiding principles should be followed when selecting functional status, health status, and quality of life instruments. First, the researcher should be fully aware of the concept, i.e. health status, functional status or quality of life, that he/she wants to measure as well as its

appropriate breadth given the focus and purpose of the study. The selected concept needs to be theoretically defined to clarify the dimensions that comprise the concept for the study at hand and the most appropriate approaches to measurement. There should also be consistency between the conceptual definition of the outcome variable and the way that it is measured. For example, if the conceptual definition of health status indicates that there are physical, psychological, and social dimensions then the measurement approach should address each of these dimensions. It may be necessary to use more than one instrument in some instances to bring about conceptual and operational congruency. This idea is particularly relevant when measuring quality of life because it can be defined so broadly with multiple dimensions. Care also should be taken that there is consistency between the conceptual background of the study, the conceptual framework of the instrument(s) selected, and the items or measurement approaches employed by the instrument(s).

Consistency of Purpose

When selecting an instrument one must be clear about its purpose and focus, and its match with one's own purposes. There is no quality of life, patient satisfaction, or functional status instrument that can be used to assess patient outcomes in every situation. Careful consideration should be given to the population for which the instrument was designed to assess, the setting for which it was developed, and the instrument's time perspective.

The population for whom an instrument is designed needs to be clearly specified and consistent with the population with whom the researcher intends to use it. If the focus of measurement is on disease specific, clinically important change, then a disease specific measurement approach for the assessment of health or functional status must be employed. Generic instruments such as health profiles would not be able to provide the

discrete information required. Careful consideration should also be given to whether the mode of administration and the nature of the items or tasks on the instrument are appropriate for the proposed sample. Self-report questionnaires assume that the population can read and respond to items or tasks on the instrument. In situations where reading ability is of concern then interviewer scoring or observations may be better administration approaches. Cognitive impairment, educational level, age, gender and cultural differences could bias results, particularly for self-administered instruments.

Marshall's (1990) article on perceived quality of life is enlightening regarding cultural issues that could impact upon the measurement of patient perceptions of quality of life. Cultural experience and ethnic background influence the meaning associated with illness, responses to pain, what is considered appropriate and acceptable health behaviors, and appropriate health care. For example, although obesity is socially stigmatized in most U.S. subcultures, in many countries fatness is associated with health, prosperity and a "good" quality of life (Lock, 1984). Also, some dimensions of quality of life, such as satisfaction with relationships with extended family members, may be more or less relevant for some subcultures than others (Marshall, 1990).

In a society that is becoming increasingly culturally diversified, researchers often find a need to translate quality of life instruments for populations in which subjects speak a variety of languages. Translation should be done carefully since literal translations do not necessarily communicate "underlying semantic structures, idiomatic expressions, and cultural interpretation of response categories (Marshall, 1990, p. 280)." Even among English speaking societies from different parts of the world, the meaning and nuances attributed to some concepts can vary considerably. Also, differences between an interviewer and respondent's cultural background can result in misconceptions and bias results.

An instrument designed for one setting may not be practical for another. A patient satisfaction or quality of life instrument designed for an acute care setting is not likely to be appropriate for a long-term care or community setting because indicators that are important to patient contentment and happiness often vary from setting to setting. Likewise, dimensions of quality of life that are highly influenced by societal norms and mores that change over time, such as social roles, should be reviewed carefully for consistency of items with current societal viewpoints. For example, an instrument designed to assess one's satisfaction with paternal role function in the 1970's may not be appropriate for use in the 1990's. When assessing whether there might be setting or time perspective influences that affect the usefulness of a quality of life instrument, a careful review of the items can help determine if they are appropriate for the purposes intended.

Sensitivity/Responsiveness to Change

A key question that any investigator or clinician who is interested in measuring patient outcomes should ask is: "Is the instrument or measure I intend to use capable of eliciting small changes or different amounts of the outcome variable?" This is a crucial question because it is desirable to determine even the smallest amount of change in a patient outcome. Regrettably, however, this is one of the most serious problems that face clinicians and investigators who wish to measure changes in functional status, health status, and quality of life. Most global health-related quality of life measures lack the sensitivity or responsiveness to detect subtle change. Although some measures may record changes in scores in the expected direction, this does not indicate the ability to distinguish between patients who improve and those who do not (Deyo, 1988). Instruments that are coarsely scaled with limited gradations for noting change are not likely to have a high level of sensitivity to variations (Applegate et al, 1990). Also,

when an instrument has too few items or very large inter-item correlations it will not be sensitive enough to detect true score variance.

Approaches to Data Collection

The method of administration of an instrument or measure can affect the quality of data collected. Consider the nature of the measure and who is administering the instrument—nurses, therapists, patient, or physician and who is being assessed. It is not uncommon for some patients to consult family members when completing self-administered instruments. This can result in consensus responses that do not accurately reflect the patient's own views (Applegate, et al., 1990). Item formats that respondents find difficult can affect the quality of the data obtained, as well as poor reading ability, and cognitive impairment. Observational measures more accurately assess a patient's level of performance, particularly when patients are confused, very young, or unconscious (Guralnik, Branch, Cummings & Curb, 1989). Lack of motivation, clinical depression, and temporary illness create disparity between performance and actual capacity. Nurses and other therapists who make trained clinical judgments can influence data by introducing bias arising from their clinical interactions and impressions of the patient. Self-administered and interviewer administered instruments tend to confound capacity with performance (Applegate, et al, 1990).

Few studies have been conducted regarding the efficiency and accuracy of different modes of administration approaches. However, Rubenstein and colleagues (1984) found that patients tended to rate their own function higher than nurses, and family members rated patients function lower than nurses. Elam and colleagues (1989) found that patient self-assessments were reasonably accurate when compared to actual timed measures of physical performance. Family member assessments were intermediate in accuracy, and physicians were the least accurate. In terms of quality of life, there is grow-

ing consensus that the individual is the only proper judge. As suggested by Ferrans (1990, p. 252) "a disability that makes life not worth living to one person may only be a nuisance to another."

Approaches to Scoring

The way in which scores will be interpreted and used will determine the measurement framework that should be employed by an instrument. In addition, the measurement framework of an instrument needs to be commensurate with the study's purposes and hypotheses. A criterion-referenced instrument should be used if the intent is to classify individual patients or research subjects based on some criterion of health status, functional status, or level of quality of life. Health and functional status inherently imply that a criterion-referenced framework should be used. Such instruments should be able to indicate what a patient can and cannot do, and in what areas of life they have achieved satisfaction. For example, if it is important to interpret individual scores on a health status measure as "normal" or "abnormal" or as "poor," "good," or "excellent health" then an instrument that uses a criterion-referenced approach is required. This point is particularly cogent for studies of functional and health status with an emphasis on the determination or documentation of limitations, disability or morbidity. However, if the conceptual framework and study purposes and hypotheses do not require interpretation of individual scores, and the focus is directed toward comparison of scores within the sample through statistical analysis, then a norm-referenced measurement approach would be appropriate.

When scores provide summaries of individual items or variables, they may conceal important specific information regarding function or health status (Deyo & Inui, 1984). When multiple variables or instruments with subscales are used to assess health-related quality of life, care should be taken to examine all measures and dimensions within a measure to detect changes. It

is possible that a change in one variable or subscale within an instrument could provide important information regarding a key patient outcome (Applegate, et al., 1990).

When scoring quality of life instruments, a related concern is whether all dimensions that are measured should be weighted equally. Different areas of life may predominate or be given more preference, depending upon the individual concerned (Flanagan, 1982). Currently, there is some controversy regarding whether preference weighted or non-preference weighted scores should be derived for health status and quality of life measures. In preference weighting states of health and quality of life scores are weighted according to different rules and procedures such as paired comparisons, magnitude estimation, and category scaling for example. These approaches allow the respondent's preferences regarding areas of life and functioning that is most important to them to be more highly weighted in the scoring procedure. In non-preference weighting the investigator assigns weights to items, often using Likert-type items that are summated (Patrick & Bergner, 1990). Few empirical studies have investigated the contribution of preference-weighting to reliability and validity, however.

Metric Properties of the Instrument

The reliability and validity of a measure or instrument is paramount in determining whether it will be useful for one's purposes. The literature should be carefully checked to determine if the instrument measures quality of life, and physical, emotional, cognitive, or social health and functioning consistently and validly, particularly with a population similar to the one for which the clinician or researcher intends to use it. The researcher should question how well the instrument has performed with populations with similar age, gender, socioeconomic and cultural backgrounds as those for which it will be used. The results of prior studies that have employed the instrument should be evaluated in

order to further assess its utility. The type of reliability and validity evidence available should be examined including the methods or approaches used and coefficients and other statistical or information obtained.

Feasibility and Practicality

The ultimate value of any instrument is determined by whether it is likely to work well in the situation desired. The issues of feasibility and practicality deal with whether the subject and researcher costs associated with using an instrument or measure are reasonable given the data that will be obtained. Will the instrument overburden the researcher or respondents? When the instrument or measure is used in combination with other instruments will the demands be too much for subjects? Instruments that are too long and cumbersome may be reliable and valid, but not useful for collecting data in a frail or severely ill clinical population. Even in a healthy population long demanding instruments can result in patient fatigue that can compromise scores. Does the researcher have adequate resources to use the instrument? This question refers to skill as well as financial resources and staff. Highly sophisticated laboratory and technological instruments can be very expensive. Many observational measures require skill and training to implement reliably and validly.

Future Needs

Although several concerns have been identified related to quality of life, health status and functional status instruments and measures, several advancements have been made in the area over the past three decades. While the development of new instruments should be encouraged where indicated, it is important to build upon what already exists. A variety of useful quality of life instruments are already available for some purposes. Where possible these should be used, modified and further developed as indicated. However, there are some areas where a great deal of work still needs to be done. These are as follows:

1. Better definitions and measures of community health status are required (Patrick & Bergner, 1990). A major focus of nursing is to assess community health status. This is done to monitor local populations to assist with health planning, priority setting, analyses of care delivery needs and patterns of utilization. There needs to be clear indicators of quality of life for residents in defined geographical regions.

2. Better approaches for measuring organizations and their outcomes are needed. Since most measures are designed to measure outcomes at the individual level, it is difficult to ascertain system or organizational change. Approaches to measuring and statistically handling organizational data to reflect organizational outcomes rather than changes in individuals alone are indicated.

3. There is a need to develop child health status profiles that reflect dimensions of importance to childhood quality of life. Few measures are designed to provide a generic profile or index of child health status. Most tools now assess specific domains, diagnostic groups, or stages of development. Well-developed child health status profiles could provide information that could help identify the impact of nursing care and services on children's health and quality of life.

In conclusion, there are many issues that must be considered when quality of life, functional status, and health status are the focus of outcome measurement. No instrument will be useful for all situations. Variables and instruments for the measurement of these concepts must be selected carefully and be compatible with the purposes, situations, interventions, and populations for which they will be used. Although generic or global health status and quality of life instruments can be useful in many situations, during the 1980's much attention has been given to improving the sensitivity and applicability of measures to reflect clinically important changes in specific organs, systems, and diseases as well as across health conditions. Many instruments and approaches

used to measure various dimensions of quality of life, functional status and health status have been in use for other purposes for quite some time. Although reliable a valid instruments already exist that measure dimensions of quality of life, functional status, and health status, further development in this area will enhance the ability to monitor changes in patient status in response to nursing interventions.

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