Cognitive ability and functional status

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Significant confusion exists in the literature about functional status. Despite its importance, little attention has focused on developing and substantiating frameworks that detail the underpinnings of functional status, which has resulted in lack of agreement about its definition and dimensions. The purpose of this literature review was to examine the development of functional status and to describe the inclusion of its cognitive dimension. Cognition is one key dimension of functional status. One must 'know how' to perform to be successful in an activity. While cognitive capacity is generally considered in relation to functional status, the nature of the cognitive dimension is poorly described and poorly understood. Three databases were selected for review: Citations in Nursing and Allied Health (CINAHL), Psychology Literature (PsychLit), and the Medical data base known as MedLine. Key word searches identified thousands of sources. This analysis includes an extensive sampling of these sources from the 1960s through to 1998. The sources sorted into four primary categories and demonstrate a growing recognition of the cognitive dimension of functional status in the literature. Despite this recognition, the lack of conceptual clarity of both the term functional status and its cognitive dimension limits communication among disciplines and limits comparisons of functional status outcomes across studies. Functional status models are needed that include cognition as a core dimension. Population specific descriptions of the cognitive dimension should be guided by knowledge in the neurosciences.

Keywords: functional status, functional ability, cognitive status, cognitive ability, function, cognition, concept analysis

INTRODUCTION

There is confusion in the literature about the definition and meaning of functional status. In general, functional status has been defined through measurement with the items and domains of function in a chosen instrument, defining the features of the concept. Functional status has been used to describe motor function, ability to perform activities of daily living (ADL) and the ability to perform instrumental activities of daily living (IADL). The term functional status is often used interchangeably with the term functional ability.

There are differences in functional status and functional ability. Functional status is the actual performance of an activity and the level or degree of performance. Functional ability is the capacity to perform a given function or activity. An individual may not use all available capacity in the actual performance of a function or activity, and functional status may be limited by a person's capacity to perform (Leidy 1994). However, while there are important differences between these two concepts, a distinction is often not made in the literature. Instead, in the literature, one finds a series of ideas and measurement methods that

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represent an individual author's unique perspective of functional status for a particular population.

Keith (1994) notes that functional status measures were first devised to measure performance for the determination of disability. Currently, functional status and functional ability have become important outcome measures for community living. The outcomes focus in United States of America (USA) health care necessitates identifying outcomes that are of critical importance, such as self-care and instrumental abilities, which are often included in functional status measures. The elderly, disabled, handicapped, technology-dependent and chronic mentally ill are growing in number and have a variety of functional deficits, many of which are poorly understood. This increase has led to attempts to define functional status by population and to identify those 'functions' which are most often associated with successful or unsuccessful outcomes.

Despite change from a disability focus to an outcome focus in the functional status literature, little attention has been given to theoretical frameworks to study functional status (Keith 1994). This lack of focus has probably contributed to the diverse use of the term and disagreement regarding the definition of functional status, its dimensions, and their proposed relationships. Instead, 'functional status' becomes a 'catch all' outcome measure for health, wellness and disability. This lack of conceptual clarity is a significant problem for all disciplines interested in functional status and functional ability. Communication within and among disciplines becomes difficult and information retrieval becomes nearly impossible.

In this literature review, the identification of cognition as an important variable related to functional status was a primary focus. Functional status sources are organized into four primary categories: functional status as behavioural, cognitive function as a separate construct from functional status, cognitive function assumed via the method chosen to measure functional status and finally, cognitive function as one domain of overall functional status. A distinction will not be made between functional status and functional ability, nor will an argument for differences in these terms be put forth. Instead, the use of the term and the emergence of cognition as a core dimension of functional status and functional ability will be described.

FUNCTIONAL STATUS AS BEHAVIOURAL

As described by Keith (1994) and previously noted, functional status as a concept grew out of the early literature on disability determination. The focus on ability or disability in action, movement and performance of activities set the stage for functional status as an outcome to be based on performance as well. While the number of sources which address functional status as strictly behavioural and performance-based is relatively small, given the extensive body of literature on the topic, it is apparent across several clinical disciplines, including nursing, medicine and physical therapy.

Functional status as behavioural studies often focus on activities of daily living (ADLs), such as bathing, dressing and feeding, motor performance and identifying which symptoms or problems might interfere with a positive outcome (Jette & Cleary 1987, Lord *et al*. 1987, Carr *et al*. 1990, Tedesco *et al*. 1990, Allen *et al*. 1991, Elam *et al*. 1991, Malloy *et al*. 1991, Weaver & Narsavage 1992, Branch *et al*. 1994, Osterweil *et al*. 1994, Sarna 1994, Vogt *et al*. 1994, Beurskens *et al*. 1995, Horwitz *et al*. 1995, Idler & Kasl 1995, Osterweil *et al*. 1995, Steffen & Mollinger 1995, Beurskens *et al*. 1996, Carter & Nicotra 1996, Corey-Bloom *et al*. 1996, Novak *et al*. 1996, Skelton & McLaughlin 1996, Bernard *et al*. 1997). These sources spanned specialty areas such as cardiology (Gentry 1987), pain (Weinberger *et al*. 1986), chronic illness (Nicassio *et al*. 1993), and paediatrics (Saigal 1994), as well as clinical fields.

Weaver & Narsavage (1992) used the Health Assessment Questionnaire (HAQ) to measure arthritis patients' function. The HAQ (Fries *et al*. 1980) measures changes in clinical symptoms, pain and mobility. Beurskens *et al*. (1995) used activities of daily living as a marker in individuals with lower back pain and Skelton & McLaughlin (1996) evaluated improving functional ability in old age through exercise. Functional ability was measured through reaching, walking, lifting, stair climbing, balance and flexibility. Steffen & Mollinger (1995) used the Barthel Index of Function in a study on knee flexion contractures. The Barthel Index (Mahoney & Barthel 1965) is a measure of physical disability and uses basic ADLs to indicate functional status. These illustrations demonstrate the lack of clarity in concept.

Several sources in the 'function as behavioural' category include psychological variables in relation to functional status. While cognitive ability is not addressed in these studies, the recognition that functional status may depend on other factors, particularly psychological factors, is significant (Silberfarb *et al*. 1980, Weinberger *et al*. 1986, Roach & Van Dillen 1988, Farquhar *et al*. 1993, Jirovec & Maxwell 1993).

Jette & Cleary (1987) used the Functional Status Questionnaire (FSQ) in ambulatory services. The FSQ assesses physical, psychological (nervousness, downheartedness) and social functions (ability to work the usual number of hours, social visiting patterns and isolation). These authors note that the FSQ should be used only for mentally competent clients. Therefore, while their tool has no cognitive component *per se*, they recognize that underlying mental competence is an important factor in performance.

The Short Form 36 (SF-36) Health Survey (Ware & Sherbourne 1992) is a recent example of a functional status survey which addresses psychological but not cognitive aspects of health. Psychological variables generally include mood, affect and anxiety. Cognitive variables may have been assumed within the psychological domain in these studies as thoughts and perceptions.

Lack of attention to the cognitive aspects of function may in some cases be related to sample-specific considerations, and in others related to the nature of the research question. Sample-specific issues may include the assumption of cognitive capacity as intact and therefore not an issue in the assessment of function. Research questions focusing on selected aspects of function or comparing the effect of an intervention on function may not include cognitive function as a variable. However, these omissions lead to confusion regarding the nature of functional status.

COGNITIVE FUNCTION AS A SEPARATE CONSTRUCT FROM FUNCTIONAL STATUS

In many studies, cognitive function is an important variable in relation to functional status. These studies see cognitive ability as a completely separate construct from functional ability in client assessment and functioning (Mysiw *et al.* 1989, Kaye *et al.* 1990, Huber & Kennard 1991, Phipps 1991, Foster 1996, Morris *et al.* 1992, Wanich *et al.* 1992, Kujawinski *et al.* 1993, Scanland & Emershaw 1993, Yu 1993, Auer *et al.* 1994, Cress *et al.* 1995, Grabbe *et al.* 1995, Hamilton & Lyon 1995, Greiner *et al.* 1996, Marchi-Jones *et al.* 1996, Rissanen *et al.* 1996, Pasacreta 1997, Patrick 1997).

Kaye *et al.* (1990) predict independent functioning and behaviour in geriatric patients via cognitive performance. Although distinctly separate measures are used, the discussion leads to the assumption that cognition underlies functional ability. Similarly, Auer *et al.* (1994) tested a new instrument to measure cognitive impairment in Alzheimer's disease, hoping that it would indicate functional performance. Still another group of studies treats cognition as a separate construct, looking to describe the relationship between cognition and performance or cognition and physical ability (Mysiw 1989, Huber & Kennard 1991, Phipps 1991, Morris *et al.* 1992, Kujawinski *et al.* 1993, Scanland & Emershaw 1993, Chiodo *et al.* 1994, Cress *et al.* 1995, Greiner *et al.* 1996, Marchi-Jones *et al.* 1996, Patrick 1997). Many found strong relationships between cognitive ability and functional status.

In many nursing studies, ADLs continue to be used as indicators of functional ability (Morris *et al.* 1992, Kujawinski *et al.* 1993, Scanland & Emershaw 1993, Grabbe *et al.* 1995, Hamilton & Lyon 1995). Many studies in nursing which separate cognitive abilities from functional abilities use the Katz ADL scale (Katz & Lyerly 1963) to measure a person's ability to perform five self-care activities: bathing, dressing, eating, walking and toileting.

Nursing does contribute to the trend to connect cognition to functional status. Scanland & Emershaw (1993) and Hamilton & Lyon (1995) both studied the relationship of an intervention to cognitive and functional outcomes. While these authors did not evaluate the effect of the relationship between the two outcome variables, they recognized that both variables might respond to an intervention. Wanich *et al.* (1992) describe an intervention in an elderly population, noting the importance of cognition to functional status in all subjects. Sisson's (1995) study notes a strong positive relationship between the two, with cognition explaining 69% of the variance in functional status.

The evaluation of cognitive status in this set of studies suggests the significance of cognition in research that is primarily evaluating functional status, even as defined through ADLs. This suggested relationship is important from a conceptual perspective because it may represent the first in a series of necessary steps that will ultimately identify specific relationships between cognitive and functional variables. However, the problem of measurement remains prominent.

The deciding factor regarding the relationship of these variables may be the complexity of the instruments or methods of measurement. Further, while cognitive ability may be related to functional status, only significant deficits such as those evident in dementia or other neurobehavioural conditions will be likely to impair routine activities of daily living. Routine activities of daily living are generally performed so frequently that they remain automatic. Other problems that must be considered with this type of approach are related to sample selection (intact cognition), and research questions that do not reflect cognitive ability.

At this point, however, a critical element is the movement towards the inclusion of cognition as a variable which might affect performance. This integrative approach, either through the assumption of cognitive intactness or through the use of measures that include a cognitive component, has become the standard.

COGNITIVE FUNCTION ASSUMED THROUGH INSTRUMENTAL ACTIVITIES

In the middle to late 1980s, as providers became more focused on shorter hospital stays and outcomes which reflected an individual's ability to be at home, measures began to emerge addressing usual daily activities other than simply self-care. Functional status became a descriptor for instrumental activities of daily living (IADLs) such as shopping, cooking and cleaning. In addition, functional status was used to describe broad functioning in major aspects of living such as the social,

occupational and psychological. Many studies that focus on functional status and functional ability, while not measuring cognitive capacity *per se*, assume cognition by virtue of the activities chosen to evaluate functional status or functional ability.

As early as 1982, Pfeffer *et al.* recognized that ADLs did not adequately describe functional ability and therefore used an alternative method to evaluate functional ability, the Functional Activities Questionnaire (FAQ). The FAQ rates individuals in 10 activities such as writing cheques, paying bills or playing a game; these activities assume a large degree of cognitive ability. Lowenstein *et al.* (1989) used a similar instrument (Direct Assessment of Functional Status) to evaluate functional status in individuals with Alzheimer's disease.

The Older Americans Resources and Services Multidimensional Functional Assessment (OARS) (Duke University 1978) is another well-known method of evaluating functional status which assumes cognitive capability through the ability to perform IADLs. The Duke UNC Health Profile (DUHP) and the subsequent 10-item DUHP both have social and emotional dimensions (Blake & Vandiver 1986) which assume cognitive ability. Questions such as 'Do you get your work done as carefully and accurately as usual?' clearly indicate an underlying capacity to attend and concentrate.

The Sickness Impact Profile (SIP) is another well-known measure used to assess functional status (Bergner *et al.* 1976). While cognitive capacity is not assessed directly, it can be assumed through household activities, social and recreational activities, and the psychosocial area of evaluation.

Instrumental activities of daily living (IADLs) must assume the 'knowing what to do' in spite of the actual criterion of 'performance'. Individuals cannot perform IADLs such as shopping or cooking if they cannot discriminate, choose, concentrate and otherwise 'know what to do'. Therefore, these studies, by virtue of their choice of measurement scale, assume cognitive ability as an underlying factor of activity or role performance (Frederiks *et al.* 1990, Tulman & Fawcett 1990, Tulman *et al.* 1990, Weaver & Narsavage 1992, Wilson *et al.* 1992, Camacho *et al.* 1993, Crimmins & Saito 1993, Hughes 1993, Sarna *et al.* 1993, Lenderking *et al.* 1994, Lindsey *et al.* 1994, Mui 1995, Smith-Hanrahan & Deblois 1995, Marchi-Jones *et al.* 1996, Newsom & Schulz 1996, Patrick & D'Eon 1996, Sandstrom *et al.* 1996, Waters & Lee 1996, Menec & Chipperfield 1997, Pohjasvaara *et al.* 1997, Weaver *et al.* 1997). This assumption then, limits the utility of IADL measures to the study and evaluation of cognitively competent individuals. When cognitive competence is in question, the problems interfering with task completion cannot be known.

While nurses followed the trend to use functional status measures with IADLs as indicators of function, Conn *et al.* (1995) noted potential difficulty. These authors measured functional status using the Biggs Elderly Self Care Assessment Tool (BESCAT)(Biggs 1990). Items addressing breathing, intake, elimination, rest, social interaction, and the promotion of normalcy, are included. While the BESCAT was developed to evaluate critical daily activities and functions, the authors of this study noted that many of the items addressed both cognitive and physical function capabilities. In other words, the individual's cognitive ability may not be overtly considered, but it naturally underlies many functional skills.

The utilization of IADLs as indicators of functional status demonstrates the broad scope and complexity of activities necessary for community function. While the assumption of an intact cognitive capacity may be appropriate in considering the functional status of individuals in certain populations, it may not be appropriate in others. For example, while using this type of measure to evaluate the elderly, mentally ill, post-trauma or post-head injury individual will indicate whether or not the task or activity can be accomplished, cognitive, motor or psychological factors that support or impede the performance of the activity will remain largely unknown. Serious methodological issues arise regarding the use of IADL measures in particular populations where cognitive problems may be present.

COGNITION AS A DIMENSION OF FUNCTIONAL STATUS

Recognition in the early 1980s of the complexity of functional status and the role of cognition did not lead to agreement on how to address the cognitive component. A handful of theoretical approaches to functional status have appeared in the literature along with multiple works that attempt to delineate the role of cognition in performance through measurement. A significant number of essays appeared in the geriatric literature, including many pieces focused on dementia. Comprehensive assessment of multiple domains of function became an important consideration in functional status evaluation in two predominant ways. First, acknowledging the multidimensional nature of functional status, another wave of instruments was developed, identifying several dimensions of function, including a cognitive one. Second, many authors struggled with specific dimensions of function and their interactions in an effort to better understand the complex dimensions underlying functional status.

Granick (1983) presented an argument for incorporating a psychological assessment into the functional assessment of elderly individuals. He proposes that memory, learning and problem solving be specifically incorporated. Granick's (1983) work suggests important conceptual issues regarding the assumption that 'knowing what to do' must underlie the use of measures which focus on IADLs.

Granick's (1983) work set the stage for efforts to incorporate cognitive ability into functional assessment. Further, this conceptual analysis probably influenced several disciplines.

Moinpour *et al.* (1988 p. 24) proposed one of the earliest comprehensive definitions of functional status in nursing. These authors defined functional status measurement as 'any systematic attempt to measure the level at which a person is functioning in any variety of areas, such as physical health, quality of self-maintenance, quality of role activity, intellectual status, social activity, attitude toward the world and toward self, and emotional status'. Here, the inclusion of cognitive and intellectual functioning is clear.

Also in nursing, Leidy (1994) noted the confusion in the literature regarding the term 'functional status'. She constructed a framework of functional status with four dimensions: capacity, performance, reserve and capacity utilization. Cognitive ability is included in the dimension of 'capacity' along with psychological, physical, social and spiritual capacities. Leidy (1994) explained that a person's capacity cannot be directly translated into performance, yet an individual's level of performance is constrained by his or her capacity. This is a useful proposition when beginning to consider the relationship between underlying capacities and the actual ability to perform a task.

Allen (1985), an occupational therapist, believed that impairment in cognition led to impairment at the social and interpersonal level. Based on this notion, Allen (1985) developed a craft-based assessment which evaluates the individual's cognitive function. The evaluation is based on the individual's ability to follow directions and solve problems presented in the activity.

Fisher (1990), also an occupational therapist, hypothesized that motor and process skills are required for IADL performance. Motor skills are the observed actions; process skills are the observed operations that are used to logically organize and adapt actions to effective, efficient and timely completion of a specific IADL task (Fisher 1993). The Assessment of Motor and Process Skills (AMPS) (Fisher 1992) was developed to evaluate individuals in the performance of IADL activities that were familiar to them. Individuals would be asked to prepare the table for lunch or wrap a parcel for mailing. Individuals would subsequently be rated on a scale of 1–4 on 16 separate motor activities (aligns, reaches, coordinates) and 20 separate process activities (chooses, attends, organizes). Fisher (1993) believed this method of evaluation to be superior to traditional ones as it allowed for the evaluation of both motor and cognitive skills across any activity or task. This kind of functional status assessment represents a unique contribution to the literature and, while it has yet to break into measurement paradigms of other disciplines, Fisher and colleagues provide a scholarly description of the motor and process components of functional status.

These authors (Allen 1985, Fisher 1992, 1993) are not anticipating a global measurement of function but an evaluation of particular skills as both cognitive and performance, a perspective which will yield detailed information regarding functional status. Most other functional status literature went the way of global measurement, evaluating broad skills from a 'multidimensional' perspective.

In all disciplines, researchers who originally viewed function in terms of mobility and activities of daily living seemed to move forward with the idea of including cognitive ability as a dimension of functional status quite readily. Wilkerson *et al.* (1992) noted that functional status assessment tools were becoming more global, including cognitive, social and psychological aspects of functioning. These authors identified the Functional Independence Measure (FIM), the Level of Rehabilitation Scale (LORS), and the Patient Evaluation and Conference System (PECS) as three of the most prominent assessments. To date the FIM has received the most attention in the literature and is described here as an example of a comprehensive global assessment of functional status. The FIM is an 18-item assessment instrument that measures patients' capacities in activities of daily living (eating, dressing, bathing, toileting), continence and cognitive functions such as communication and problem solving (Hamilton *et al.* 1994, Williams *et al.* 1997). Analytical tests of the instrument support the construct as having two primary dimensions, motor and cognitive (Granger *et al.* 1993). The development of this particular functional assessment instrument brought forward the major components of overall function, cognitive ability and instrumental ability.

A large number of studies used instruments which have cognition as a component in their evaluation of functional status (Cadman *et al.* 1984, Pasquale 1987, Garrard *et al.* 1990, Wood-Dauphinee *et al.* 1990, Rao & Kilgore 1992, Sager *et al.* 1992, Arronson & Vroonland 1993, Krach 1993, Lubeck & Fries 1993, McGill & Paul 1993, Lurie *et al.* 1994, Morris *et al.* 1994, Rose *et al.* 1994, Cowen *et al.* 1995, Hartmaier *et al.* 1995, Heinemann *et al.* 1995, Cartwright *et al.* 1996, Diamond *et al.* 1996, Hanks & Lichtenberg 1996, Przybylski *et al.* 1996, MacNeil & Lichtenberg 1997, Morris *et al.* 1997, Williams *et al.* 1997, Roach *et al.* 1998). While the choice of specific instruments may have been based on the dimensions of function the individual authors wished to study, such as cognition, not all studies examined the cognitive component and its relationship to other components of functional status.

A few of these studies did look specifically at the role of cognitive impairment on outcome and independent living in the elderly population (Diamond *et al.* 1996, MacNeil & Lichtenberg 1997). Cartwright *et al.* (1996) used the FIM to

evaluate improvement in functional status of cognitively impaired elders. They found that despite the level of cognitive impairment on admission, all areas of functional status improved with rehabilitation, including cognition. Diamond *et al.* (1996) found that individuals with serious cognitive impairment were less likely to be functionally independent, while those with mild or even moderate impairment were able to manage independently. Similar findings by MacNeill & Lichtenberg (1997) emphasized the importance of cognition on independent functioning. Yu *et al.* (1993) found a strong relationship between cognitive measures and functional abilities (ADL Index) among institutionalized elderly women.

A number of studies attempted to describe and understand in a more detailed manner, the complex relationship between cognition and other dimensions of functional status. Winogrond & Fisk (1983) studied the relationship between cognitive status, psychological status and behaviour. These authors pointed out the importance of identifying changes in behaviour with corresponding changes in cognitive status. A similar study (Fitz & Teri 1994) examined the role of depression in people with dementia and its relationship to cognition and behaviour. Klapow *et al.* (1997) compared the functional status of schizophrenic individuals with a non-schizophrenic control group. There were significant differences between the two groups in overall functional status, but the cognitive sub-score was the best predictor of functional status. Here we begin to appreciate the significant effect cognitive ability has on activity performance.

Other instruments illustrate the relationship of cognition to performance. The Structured Assessment of Independent Living Skills (SAILS) (Mahurin *et al.* 1991) includes IADL activities such as writing a cheque, but also includes items which deal with language expression and language comprehension. Arronson & Vroonland (1993) used the Arronson Shopping List Subset in an elderly population to evaluate competence and learning through functional skills. Royall *et al.* (1993) noted that executive processes orchestrate goal-directed behaviours such as IADLs. These authors developed an instrument to capture the executive functions in nursing home patients through specific behavioural sequelae.

In nursing, many sources also cited the importance of a comprehensive assessment when evaluating functional ability, including mental status or cognitive ability (Boyd 1988, Dalton 1989, Kolanowski 1996). Kolanowski (1996) details the use of appropriate neuropsychological measures to aid in the evaluation of functional status.

The cited studies are significant. Thinking about the direct relationship of cognition and specific behaviours is articulated clearly. With these detailed descriptions, we can begin to consider each behavioural function in a dimensional perspective. These studies add depth to the literature and begin to demonstrate that the concept of functional status can have meaning across populations once the contribution of the cognitive component is clarified.

CONCLUSIONS

This analysis of functional status has provided a description of the term as it has evolved. Enough evidence is present to indicate that functional status has both cognitive and instrumental components. The ability to perform instrumental activities of daily living must include 'knowing what to do' as these activities require choosing, attending, and problem solving.

The focus on outcomes in health care has led some researchers away from a conceptual focus on functional status. The literature reflects functional status being defined through the method chosen to evaluate outcomes. These multiple methods of functional status evaluation and therefore definitions contribute to the problem of delineating the concept. Failure to carefully articulate the concept has impeded movement towards developing consensus within and across disciplines as to what underlies an individual's ability to perform those activities and skills that are necessary in every day life.

What is needed first is a re-focus identifying the primary components of functional status from a theoretical perspective. This must include at a minimum, the conceptualization of functional status as having cognitive, behavioural and psychological dimensions. Each of these dimensions can then be specified to identify any number of specific components. For example, the psychological dimension might include components such as mood, affect and motivation. Next, client populations must be analysed regarding their particular functional problems or limitations. This will elucidate those dimensions and components which have more or less meaning for that population. Comparisons of functional status within specific populations and across studies will then be possible.

Finally, the cognitive dimension must be more carefully delineated. This is particularly critical in populations where cognitive deficits underlie the functional ones. Components such as attention, concentration, memory and problem solving each contribute to the 'knowing what to do'. Knowledge related to the type of cognitive impairment will allow for the development and implementation of interventions directed at explicit cognitive problems. For example, assisting an individual with poor short-term memory in the construction of a grocery list will be very effective while the individual with an inability to think flexibly and solve problems may need help planning how to get to the grocery store. Both problems (memory and problem solving) lead to the same functional deficit (inability to get groceries), yet the same intervention would not be effective in both situations. This situation illustrates

similar functional outcomes across individuals and populations may have substantially different meaning.

In summary, as the health care community continues to focus on broad outcomes, practitioners must have frameworks for identifying the critical elements necessary to plan care for people in a community. In the future, life-expanding technology will increase the numbers of chronically ill, disabled and elderly individuals in nearly all countries. This increase anticipates the need for effective and comprehensive methods of functional status evaluation.

References

Allen C.K. (1985) *Occupational Therapy for Psychiatric Diseases: Measurement and Management of Cognitive Disabilities*. Little Brown, Boston.

Allen J.K., Becker D.M. & Swank R.T. (1991) Impact of spouse concordance of psychological adjustment on functional status after coronary bypass surgery. *Journal of Nursing Quality Assurance* **5**, 69–74.

Arronson H. & Vroonland J.P. (1993) The residual cognitive competence of elderly females. *Journal of Clinical Psychology* **49**, 724–731.

Auer S.R., Sclan S.G., Yaffee R.A. & Reisberg B. (1994) The neglected half of Alzheimer's disease: cognitive and functional concomitants of severe dementia. *Journal of the American Geriatric Society* **42**, 1266–1272.

Bergner M., Bobbitt R., Pollard W., Martin D. & Gilson B. (1976) Sickness impact profile: validation of health status measure. *Medical Care* **14**, 57–67.

Bernard S.L., Kincade J.E., Konrad T.R. *et al.* (1997) Predicting mortality from community surveys of older adults: the importance of self-rated functional ability. *Journal of Gerontology: Social Sciences* **52B**, S155–S163.

Beurskens A.J.H.M., de Vet H.C.W. & Koke A.J.A. (1996) Responsiveness of functional status in low back pain: a comparison of different instruments. *Pain* **65**, 71–76.

Beurskens A.J.H.M., de Vet H.C.W., Koke A.J.A., Van der Heijden G.J. & Kinpschild P.G. (1995) Measuring the functional status of patients with low back pain. Assessment of the quality of four disease-specific questionnaires. *SPINE* **20**, 1017–1028.

Biggs A. (1990) Family caregiver versus nursing assessments of elderly self care abilities. *Journal of Gerontological Nursing* **16**(8), 11–16.

Blake R.L. & Vandiver T.A. (1986) The reliability and validity of a ten-item measure of functional status. *Journal of Family Practice* **23**, 455–459.

Boyd J.A. (1988) Assessing functional ability and the team approach in the home. *Journal of Home Health Care Practice* **1**, 11–24.

Branch L.G., Katz S., Kniepmann K. & Papidero J.A. (1984) A prospective study of functional status among community elders. *American Journal of Public Health* **74**, 266–268.

Cadman D., Goldsmith C. & Bashim P. (1984) Values, preferences, and decisions in the care of children with developmental disabilities. *Journal of Developmental and Behavioral Pediatrics* **5**, 60–64.

Camacho T.C., Strawbridge W.J., Cohen R.D. & Kaplan G.A. (1993) Functional ability in the oldest old. *Journal of Aging and Health* **5**, 439–454.

Carr D., Jackson T. & Alquire P. (1990) Characteristics of an elderly driving population referred to a geriatric assessment center. *Journal of the American Geriatric Society* **38**, 1145–1150.

Carter R. & Nicotra B. (1996) The effect of exercise training and rehabilitation on functional status in patients with chronic obstructive pulmonary disease (COPD). *International Journal of Rehabilitation and Health* **2**, 143–167.

Cartwright D.L., Madill H.M. & Dennis S. (1996) Cognitive impairment and functional performance of patients admitted to a geriatric assessment and rehabilitation center. *Physical and Occupational Therapy in Geriatrics* **14**, 1–21.

Chiodo L., Kanten D., Gerety M., Mulrow C. & Cornell J. (1994) Functional status of Mexican American nursing home residents. *Journal of American Geriatric Society* **42**, 293–296.

Conn V.S., Taylor S.G. & Messina C.J. (1995) Older adults and their caregivers: the transition to medication assistance. *Journal of Gerontological Nursing* **21**, 33–38.

Corey-Bloom J.C., Widerholt W.C., Edelstein S. *et al.* (1996) Cognitive and functional status of the oldest old. *Journal of the American Geriatric Society* **44**, 671–674.

Cowen T.D., Meythaler J.M., DeVivo M.J. *et al.* (1995) Influence of early variables in traumatic brain injury on functional independence measure scores and rehabilitation length of stay and charges. *Archives of Physical Medicine Rehabilitation* **76**, 797–803.

Cress M.E., Schechtman K.B., Mulrow C.D. *et al.* (1995) Relationship between physical performance and self-perceived physical education. *Journal of the American Geriatric Society* **43**, 93–101.

Crimmins E.M. & Saito Y. (1993) Getting better and getting worse. *Journal of Aging and Health* **5**, 3–36.

Dalton M.M. (1989) Physiologic changes and functional ability in the older patient: a challenge for the creative ET nurse. *Journal of Enterostomal Therapy* **16**, 167–170.

Diamond P.T., Gelsenthal G., Macciocchi S.N., Butler D.H. & Cassady D.L. (1996) Effect of cognitive impairment on rehabilitation outcome. *American Journal of Physical Medicine and Rehabilitation* **75**, 40–43.

Duke University Center for the Study on Aging (1978) *Multidimensional Functional Assessment: The OARS Methodology*. Duke University Press, Durham, North Carolina.

Elam J.T., Graney M.J., Beaver T. *et al.* (1991) Comparison of subjective ratings of function with observed functional ability of frail older persons. *American Journal of Public Health* **81**, 1127–1130.

Farquhar M., Bowling A., Grundy E. & Formby J. (1993) Functional ability of very elderly people. *Nursing Standard* **7**, 31–36.

Fisher A. (1990) Assessment of Motor and Process Skills. Unpublished test manual. Department of Occupational Therapy, University of Illinois, Chicago.

Fisher A. (1992) Assessment of motor and process skills. Unpublished test manual. Occupational Therapy Department, Colorada State University, Fort Collins.

Fisher A.G. (1993) The assessment of IADL motor skills: an application of many-faceted rasch analysis. *American Journal of Occupational Therapy* **47**, 319–329.

Fitz A.G. & Teri L. (1994) Depression, cognition, and functional ability in patients with Alzheimer's disease. *Journal of the American Geriatrics Society* **42**, 186–191.

Foster J. (1996) Predicting resource use for patients with traumatic brain injury. *AACN Clinical Issues* **7**, 168–174.

Frederiks C.M.A., Wierik M.J.M., Visser A.P. & Sturmans F. (1990) The functional status and utilization of care of elderly people living at home. *Journal of Community Health* **15**, 307–317.

Fredericks C.M.A., Wierk M.J.M., Visser A.P. & Sturmans F. (1991) A scale for the functional status of the elderly living at home. *Image: Journal of Nursing Scholarship* **16**, 287–292.

Fries J., Spitz P., Kraines R. & Holman H. (1980) Measurement of patient outcomes in arthritis. *Arthritis and Rheumatism* **23**, 137–145.

Garrard J., Kane R.L., Radosevich D.M. *et al.* (1990) Impact of geriatric nurse practitioners on nursing-home residents functional status, satisfaction, and discharge outcomes. *Medical Care* **28**, 271–283.

Gentry W., Aronson M., Bloomenthal J. & Costa P. (1987). Behavioral, cognitive and emotional considerations. *Journal of the American College of Cardiology* **10**, 38A–41A.

Grabbe L., Demi A.S., Whittington F. *et al.* (1995) Functional status and the use of formal home care in the year before death. *Journal of Aging and Health* **7**, 339–364.

Granger C., Hamilton B., Linacre J., Heinemann A. & Wright B. (1993) Performance profiles of the functional independence measure. *American Journal of Physical Medicine and Rehabilitation* **72**, 62–66.

Granick S. (1983) Psychologic assessment technology for geriatric practice. *Journal of the American Geriatrics Society* **31**, 728–742.

Greiner P.A., Snowdon D.A. & Greiner L.H. (1996) The relationship of self-rated function and self-rated health to concurrent functional ability, functional decline, and mortality: findings from the nun study. *Journal of Gerontology: Social Sciences* **51**, S234–S241.

Hamilton B.B., Laughlin J.A., Fiedler R.C. & Granger C.V. (1994) Interrater reliability of the 7-level functional independence measure (FIM). *Scandinavian Journal of Rehabilitation Medicine* **26**, 115–119.

Hamilton L. & Lyon P.S. (1995) A nursing-driven program to preserve and restore functional ability in hospitalized elderly patients. *Journal of Nursing Administration* **25**, 30–37.

Hanks R.A. & Lichtenberg P.A. (1996) Physical, psychological, and social outcomes in geriatric rehabilitation patients. *Archives of Physical Medicine Rehabilitation* **77**, 783–792.

Hartmaier S.L., Sloane P.D., Guess H.A. *et al.* (1995) Validation of the minimum data set cognitive performance scale: agreement with the mini-mental state examination. *Journal of Gerontology: Medical Sciences* **50A**, M128–M133.

Heinemann A.W., Hamilton B., Linacre J.M., Wright B.D. & Granger C. (1995) Functional status and therapeutic intensity during inpatient rehabilitation. *American Journal of Physical Medicine and Rehabilitation* **74**, 315–326.

Horwitz G.J., Tariot P.N., Mead K. & Cox C. (1995) Discontinuation of antipsychotics in nursing home patients with dementia. *American Journal of Geriatric Psychiatry* **3**, 290–299.

Huber M. & Kennard A. (1991) Functional and mental status outcomes of clients discharged from acute gerontological versus medical/surgical units. *Journal of Gerontological Nursing* **17**, 20–24.

Hughes K.K. (1993) Psychosocial and functional status of breast cancer patients. *Cancer Nursing* **16**, 222–229.

Idler E.L. & Kasl S.V. (1995) Self-ratings of health: do they also predict change in functional ability? *Journal of Gerontology: Social Sciences* **50B**, S344–S353.

Jette A.M. & Cleary P.D. (1987) Functional disability assessment. *Physical Therapy* **67**, 1854–1859.

Jirovec M.M. & Maxwell B.A. (1993) Nursing home residents' functional ability and perceptions of choice. *Journal of Gerontological Nursing* **19**, 10–14.

Katz M. & Lyerly S. (1963) Methods for measuring adjustment and social behavior in the community: rationale, description, discriminative validity and scale development. *Psychological Reports* **13**, 503–535.

Kaye K., Grigsby J., Robbins L.J. & Korzun B. (1990) Prediction of independent functioning and behavior problems in geriatric patients. *Journal of the American Geriatric Society* **38**, 1304–1310.

Keith R.A. (1994) Functional status and health status. *Archives of Physical Medicine Rehabilitation* **75**, 478–483.

Klapow J.C., Evans J., Patterson T.L. *et al.* (1997) Direct assessment of functional status in older patients with schizophrenia. *American Journal of Psychiatry* **154**, 1022–1024.

Knight M.M. (2000) Cognitive function and food preparation ability in chronic schizophrenia. Unpublished doctoral dissertation, University of Rhode Island, Kingston.

Kolanowski A. (1996) Everyday functioning in Alzheimer's disease: contribution of neuropsychological testing. *Clinical Nurse Specialist* **10**, 11–18.

Krach P. (1993) Nursing implications of functional status of older persons with schizophrenia. *Journal of Gerontological Nursing* **19**, 21–27.

Kujawinski J., Bigelow P., Diedrich D. *et al.* (1993) Research considerations: geropsychiatry unit evaluation. *Journal of Gerontological Nursing* **19**, 5–10.

Leidy N. (1994) Functional status and the forward progress of merry-go-rounds: toward a coherent analytical framework. *Nursing Research* **43**, 196–202.

Lenderking W.R., Worth J.L. & Beckett A. (1994) Quality-of-life assessment in HIV-infected psychiatric outpatients: perceived health, functional status, symptoms, and preferences for cardiopulmonary resuscitation. *Psychology and Health* **9**, 51–64.

Lindsey A.M., Larson P.J., Dodd M.J., Brecht M. & Packer A. (1994) Comorbidity, nutritional intake, social support, weight, and functional status over time in older cancer patients receiving radiotherapy. *Cancer Nursing* **17**, 113–124.

Lord J.P., Lieberman J.S., Portwood M.M., Fowler W.M. & Carson R. (1987) Functional ability and equipment use among patients with neuromuscular disease. *Archives of Psychiatric Medicine Rehabilitation* **68**, 348–352.

Lowenstein D.A., Amigo E., Duara R. *et al.* (1989) A new scale for the assessment of functional status in Alzheimer's disease and related disorders. *Journal of Gerontology: Psychological Sciences* **44**, 114–121.

Lubeck D.P. & Fries J.F. (1993) Health status among persons infected with human immunodeficiency virus. *Medical Care* **31**, 269–276.

Lurie N., Christianson J., Finch M. & Moscovice I. (1994) The effects of capitation on health and functional status of the Medicaid eldery: a randomized trial. *Annals of Internal Medicine* **120**, 506–511.

MacNeill S.E. & Lichtenberg P.A. (1997) Home alone: the role of cognition in return to independent living. *Archives of Physical Medicine Rehabilitation* **78**, 755–758.

Mahoney F. & Barthel D. (1965) Functional evaluation: the Barthel Index. *MD State Medical Journal* **14**, 61–65.

Mahurin R., DeBettignies B. & Pirozzolo F. (1991) The structured assessment of independent living skills: preliminary report on a performance measure of functional abilities in dementia. *Journal of Gerontology: Psychological Sciences* **46**, P58–P66.

Malloy D., Clarnette R., McIlroy W. *et al.* (1991) Clinical significance of primative reflexes in Alzheimer's disease. *Journal of the American Geriatric Society* **39**, 1160–1163.

Marchi-Jones S.M., Murphy J.F. & Rousseau P. (1996) Caring for the caregivers. *Journal of Gerontological Nursing* **22**(8), 7–13.

McGill J.S. & Paul P.B. (1993) Functional status and hope in elderly people with and without cancer. *Oncology Nursing Forum* **20**, 1207–1213.

Menec V.H. & Chipperfield J.G. (1997) The interactive effect of perceived control and functional status on health and mortality among young-old and old-old adults. *Journal of Gerontology: Psychological Sciences* **52B**, P118–P126.

Moinpour C.M., McCorkle R. & Saunders J. (1988) Measuring functional status. In *Instruments for Clinical Nursing Research* (Frank-Storomberg M. ed.), Appleton & Lang, Connecticut, pp. 23–45.

Morris A., Browne G. & Saltmarche A. (1992) Urinary incontinence: correlates among cognitively impaired elderly veterans. *Journal of Gerontological Nursing* **18**, 33–40.

Morris J., Fries B., Mehr D., Hawes C., Phillips C., Mor V. & Lipsitz L. (1994) MDS Cognitive Performance Scale. *Journal of Gerontology* **49**, M174–M182.

Morris J.N., Fries B.E., Steel K. *et al.* (1997) Comprehensive clinical assessment in community setting: applicability of the MDS-HC. *Journal of the American Geriatric Society* **45**, 1017–1024.

Mui A. & C. (1995) Perceived health and functional status among spouse caregivers of frail older persons. *Journal of Aging and Health* **7**, 283–300.

Mysiw W.J., Beegan J.G. & Gatens P.F. (1989) Prospective cognitive assessment of stroke patients before inpatient rehabilitation: the relationship of the neurobehavioral cognitive status examination to functional improvement. *American Journal of Physical Medicine and Rehabilitation* **68**, 168–171.

Newsom J.T. & Schulz R. (1996) Social support as a mediator in the relation between functional status and quality of life in older adults. *Psychology and Aging* **11**, 34–44.

Nicassio P.M., Radojevic V., Weisman M.H. *et al.* (1993) The role of helplessness in the response to disease modifying drugs in rheumatoid arthritis. *Journal of Rheumatology* **20**, 1114–1120.

Novak S., Johnson J. & Greenwood R. (1996) Barthel revisited: making guidelines work. *Clinical Rehabilitation* **10**, 128–134.

Osterweil D., Martin M. & Syndulko K. (1995) Predictors of skilled nursing placement in a multilevel long-term-care facility. *Journal of the American Geriatrics Society* **43**, 108–112.

Osterweil D., Mulford P., Syndulko K. & Martin M. (1994) Cognitive function in old and very old residents of a residential facility: relationship to age, education, and dementia. *Journal of the American Geriatric Society* **42**, 766–773.

Pasacreta J.V. (1997) Depressive phenomena, physical symptom distress, and functional status among women with breast cancer. *Nursing Research* **46**, 214–221.

Pasquale D.K. (1987) A basis for prospective payment for home care. *Image: Journal of Nursing Scholarship* **19**, 186–191.

Patrick L. & D'Eon J. (1996) Social support and functional status in chronic pain patients. *Canadian Journal of Rehabilitation* **9**, 195–201.

Patrick L. (1997) Depressive symptoms and treatment outcome in geriatric rehabilitation: a three-point perspective. *Topics in Geriatric Rehabilitation* **13**(2), 42–49.

Pfeffer R.I., Kurosaki T.T., Harrah C.H., Chance J.M. & Filos S. (1982) Measurement of functional activities in older adults in the community. *Journal of Gerontology* **37**, 323–329.

Phipps M.A. (1991) Assessment of neurologic deficits in stroke. Acute-care and rehabilitation implications. *Nursing Clinics of North America* **26**, 957–971.

Pohjasvaara T., Erkinjuntti T., Vataja R. & Kaste M. (1997) Comparison of stroke features and disability in daily life in patients with ischemic stroke aged 55–70 and 71–85 years. *Stroke* **28**, 729–735.

Przybylski B.R., Dumont E.D., Watkins M.E. *et al.* (1996) Outcomes of enhanced physical and occupational therapy service in a nursing home setting. *Archives of Physical Medicine Rehabilitation* **77**, 554–561.

Rao N. & Kilgore K.M. (1992) Predicting return to work in traumatic brain injury using assessment scales. *Archives of Physical Medicine and Rehabilitation* **73**, 913–916.

Rissanen P., Aro S., Sintonen H., Slatis P. & Paavolainen P. (1996) Quality of life and functional ability in hip and knee replacements: a prospective study. *Quality of Life Research* **5**, 56–64.

Roach K.E. & Van Dillen L.R. (1988) Development of an acute care index of functional status for patients with neurologic impairment. *Physical Therapy* **68**, 1102–1108.

Roach K.E., Ally D., Finnerty B. *et al.* (1998) The relationship between duration and physical therapy services in the acute care setting and change in functional status in patients with lower-extremity orthopedic problems. *Physical Therapy* **78**, 19–24.

Rose L., Bakal D.A., Fung T.S., Farn P. & Weaver L.E. (1994) Tactile extinction and functional status after stroke. *Stroke* **25**, 1973–1976.

Royall D.R., Roderick K.M., True J.E. *et al.* (1993) Executive impairment among the functionally dependent: comparisons between schizophrenic and elderly subjects. *American Journal of Psychiatry* **150**, 1813–1819.

Sager M.A., Dunham N.C., Schwantes A. *et al.* (1992) Measurement of activities of daily living in hospitalized elderly: a comparison of self-report and performance-based methods. *Journal of the American Geriatric Society* **40**, 457–462.

Saigal S., Rosenbaum P., Stoskopf B. *et al.* (1994) Comprehensive assessment of the health status of extremely low birth weight children at eight years of age: comparison with a reference group. *Journal of Pediatrics* **125**, 411–417.

Sandstrom V., Bjorvell H. & Olofsson P. (1996) Functional status and well-being in a group of patients with abdominal aortic aneurysm. *Scandinavian Journal of Caring Science* **10**, 186–191.

Sarna L. (1994) Functional status in women with lung cancer. *Cancer Nursing* **17**, 87–93.

Sarna L., Lindsey A.M., Dean H., Brecht M. & McCorkle R. (1993) Nutritional intake, weight change, symptom distress, and functional status over time in adults with lung cancer. *Oncology Nursing Forum* **20**, 481–489.

Scanland S.G. & Emershaw L.E. (1993) Reality orientation and validation therapy: dementia, depression and functional status. *Journal of Gerontological Nursing* **19**, 7–10.

Silberfarb P.M., Maurer H. & Crouthamel C.S. (1980) Psychosocial aspects of neoplastic disease: I. Functional status of breast cancer patients during different treatment regimens. *American Journal of Psychiatry* **137**, 450–455.

Sisson R.A. (1995) Cognitive status as a predictor of right hemisphere stroke outcomes. *Journal of Neuroscience Nursing* **27**, 152–156.

Skelton D.A. & McLaughlin A.W. (1996) Training functional ability in old age. *Psychotherapy* **82**, 159–167.

Smith-Hanrahan C. & Deblois D. (1995) Postpartum early discharge. *Clinical Nursing Research* **4**, 50–66.

Steffen T.M. & Mollinger L.A. (1995) Low-load, prolonged stretch in the treatment of knee flexion contractures in nursing home residents. *Physical Therapy* **75**, 886–897.

Tedesco C., Manning S., Lindsay R. *et al.* (1990) Functional assessment of elderly patients after percutaneous aortic balloon valvuloplasty: New York Heart Association classification versus functional status questionnaire. *Heart and Lung* **19**, 118–125.

Tulman L. & Fawcett J. (1990) A framework for studying functional status after diagnosis of breast cancer. *Cancer Nursing* **13**, 95–99.

Tulman L., Fawcett J., Groblewski L. & Silverman L. (1990) Changes in functional status after childbirth. *Nursing Research* **39**, 70–75.

Vogt A.R., Funk M. & Remetz M. (1994) Comparison of symptoms, functional ability, and health perception of elderly patients with coronary artery disease managed with three different treatment modalities. *Cardiovascular Nursing* **30**, 33–38.

Wanich C.K., Sullivan-Marx E.M., Gottlieb G.L. & Johnson J.C. (1992) Functional status outcomes of nursing intervention in hospitalized elderly. *Image: Journal of Nursing Scholarship* **24**, 201–207.

Ware J. & Sherbourne C. (1992) The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Medical Care* **30**, 473–483.

Waters M.A. & Lee K.A. (1996) Differences between primigravidae and multigravidae mother in sleep disturbances, fatigue, and functional status. *Journal of Nurse-Midwifery* **41**, 364–367.

Weaver T.E. & Narsavage G.L. (1992) Physiological and psychological variables related to functional status in chronic obstructive pulmonary disease. *Nursing Research* **41**, 286–291.

Weaver T.E., Richmond T.S. & Narsavage G.L. (1997) An explanatory model of functional status in chronic obstructive pulmonary disease. *Nursing Research* **46**, 26–31.

Weinberger M., Hiner S.L. & Tierney W.M. (1986) Improving functional status in arthritis: the effect of social support. *Social Science Medicine* **23**, 899–904.

Wilkerson D.L., Batavia A.I. & DeJong G. (1992) Use of functional status measures for payment of medical rehabilitation services. *Archives of Physical Medical and Rehabilitation* **73**, 111–120.

Williams B.C., Li Y., Fries B.E. & Warren R.L. (1997) Predicting patient scores between the functional independence measure and the minimum data set: development and performance of a FIM-MDS 'crosswalk.'. *Archives of Physical Medicine and Rehabilitation* **78**, 48–54.

Wilson A.A., Hartnett M. & Ferrari P. (1992) Outcome measurement from the functional status perspective. *Home Healthcare Nurse* **10**, 32–46.

Winogrond I.R. & Fisk A.A. (1983) Alzheimer's disease: assessment of functional status. *Journal of the American Geriatrics Society* **31**, 780–785.

Wood-Dauphinee S.L., Williams I. & Shapiro S.H. (1990) Examining outcome measures in a clinical study of stroke. *Stroke* **21**, 731–739.

Yu L., Johmson K., Kaltreider D., Craighead W. *et al.* (1993) The relationship between depression, functional status, and cognitive status among institutionalized elderly women. *Behavior, Health and Aging* **3**, 23–32.