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MOBILITY, FUNCTIONAL STATUS, AND PERSONAL CARE IN LATE LIFE

Physical mobility, the capability of movement, is necessary for the health and well-being of all persons, but is especially important in older adults because a variety of factors impinge upon mobility with aging. Hogue (1984) identified mobility as the most important functional ability that determines the degree of independence and health care needs among older persons population. Katz and colleagues (1983, 1985) have advocated the use of life table techniques to describe the health of people in terms of function, or activities of daily living (ADL). By focusing on physical function, rather than mortality rates, Katz and colleagues believe that emphasis can be placed appropriately on quality of life rather than on quantity of life. This review focuses on the prevalence of impaired mobility in older persons population, predispositions to and causes of impaired mobility, consequences of impaired mobility, and interventions that have been effective in enhancing mobility.

State of the Science

Prevalence

Few studies exist that examine impaired mobility separately from that of other functional disabilities present in elderly populations. Major activity limitations are present in 45.7 percent of those 65 and older who reside in the community (U.S. Department of Health and Human Services [US DHHS], 1982), and it appears that there is an increased chance of becoming disabled with increasing age. The prevalence rates of ADL impairments for those 65-74, 75-84, and 85+ are 6.9 percent, 16.0 percent, and 43.6 percent, respectively (US DHHS, 1983).

In a recent review, Maas (1989) reported that impaired mobility was one of the most frequent nursing diagnoses for elderly residents of long-term care facilities and ranged from 26 to 35 percent. High prevalence in the nursing home population is corroborated by the fact that over 86 percent of elderly nursing home residents are impaired in at least one activity of daily living (US DHHS, 1982).



In the acute care setting, impaired mobility was found to be significantly associated with increasing age (Mion, McClaren, & Frengley, 1988; Warshaw, Moore, Friedman, Currie, Kennie, Kane & Mears, 1982). In a sample of patients 75 years and older, 60 percent were found to have some degree of mobility impairment while 34 percent were unable to walk (Mion, Frengley, & Adams, 1986).

Two schools of thought exist that give very different views on the future prevalence of disability and on mobility impairments with advancing age. The first view (Fries, 1980, 1984), the Compression of Morbidity theory, stipulates that

the human life span is relatively fixed and that morbidity (chronic diseases) can be delayed. Thus, one can lead a healthy, vital life with a relatively short time of illness prior to death. The other view poses that the incidence of chronic disease will not be delayed and will result in longer periods of chronic illness (Myers & Manton, 1984; Schneider & Brody, 1983). Either case, given the increased number of older adults in our society, would result in a large burden of disease and disability with serious implications for both research and long-term care.

Predispositions and Causes of Impaired Mobility

Body reserves of the musculoskeletal system diminish with aging. Lean muscle mass decreases 20 to 30 percent by age 70 and bone demineralization begins in the third decade (Berman, Haxby, & Pomerantz, 1988; Brocklehurst & Hanley, 1976; Katz, Dube, & Calkins, 1986). The number and individual bulk of muscle fibers decrease with age and are replaced by fibrous tissue. Although muscle atrophy from aging may appear to be quite prominent, as evidenced by thin, flabby arm and leg muscles, surprisingly little weakness occurs; the weakness is not in proportion to the degree of wasting (Brocklehurst & Hanley, 1976; Grob, 1978). Maintenance of balance also is affected with increased age. Changes in the musculoskeletal and nervous systems cause an increase in sway and a decreased ability to adequately and quickly correct movements affecting the center of gravity (Brocklehurst & Hanley, 1976; Overstall, Exton-Smith, Imms, & Johnson, 1977).

The aging process per se does not cause impaired mobility. Several predisposing factors in addition to age-related changes can lead to impaired mobility. Chronic disease, sedentary life style, smoking, and nutrition are thought to have as many, if not more, detrimental effects on function as the aging process itself (Brocklehurst & Hanley, 1976; Rowe & Kahn, 1987).

Diseases directly affecting mobility include acute or chronic conditions that affect the muscular, skeletal, or neurological systems and limit the person's ability to move; and, those conditions that require restricted mobility as a therapeutic regime. Calkins and colleagues (1986) report that the most frequent complaints of older persons involve the musculoskeletal system. This system is affected by a number of diseases that increase in frequency with aging, tend to linger for years, and tend to accumulate (Calkins et al., 1986). Other conditions that may directly or indirectly affect mobility are reduced visual acuity, hearing impairments, cognitive impairments, and social isolation (Maas, 1989). All of these conditions increase in frequency within the older population.

Consequences of Impaired Mobility

The effects of impaired mobility can be categorized broadly into four areas: falls, physiological consequences, psychological consequences, and social and economic consequences (Maas, 1989). Thus, impaired mobility is a threat to the overall health and well being of older adults.

Falls. Falls are a major source of morbidity and mortality for older persons population. Because variations in reporting the fall rate or incidence exist in the literature, making comparisons and conclusions are difficult. Incidence rates of falls among elderly individuals residing in the community range from 15 percent to 44.9 percent; in general, about one-third of aged persons residing in the community are likely to fall. Falls in the hospital setting have received much attention because they are the most common type of patient accident (Morgan, Mathison, Rice, & Clemmer, 1985). Hospital fall rates based on the number of falls per patient days range from 1.2 to 25 falls/1000 patient days (Catchen, 1983; Hernandez, 1986; Morgan et al., 1985; Morse, Prowse, Morrow, & Federspeil, 1985a; Sehested & Severin-Nielsen, 1977; Walshe & Rosen, 1979); fall rates as the number of falls per patients at risk range from 23.7 to 422/1000 patients at risk (Brown, 1983; Morris & Isaacs, 1980); and, the incidence rate of falls in the hospital setting is approximately two percent (Morgan et al., 1985). Similar to hospital settings, nursing home

studies have provided a variety of fall rates as 2.6 to 42.7/1000 patient days, 1292/1000 patients at risk, and 22 to 53 percent incidence rates (Berry, Fisher & Lang, 1981; Colling & Park, 1983; Granek et al., 1987; Kustaborder & Rigney, 1983; Louis, 1983; Robbins et al., 1989; Venglarik & Adams, 1985). Despite the various fall rate calculations and the differences among settings, it is apparent that falls are a common occurrence in this age group. Hip fractures among elderly persons are usually a result of falls; additional fall-related injuries include other types of fractures, soft tissue injury, and psychological distress (Baker & Harvey, 1985; Morris Rubin, Morris & Mandel, 1987). Furthermore, falls are the leading cause of injury-related deaths for older persons (Baker & Harvey, 1985; Hindmarsh & Estes, 1989).

Falls can lead to impaired mobility either as a result of physical injury or from psychological distress following the fall. Tinetti and colleagues (1988) reported that elderly persons in the community restricted their activities following a fall because of fear and anxiety, regardless of physical injury. Conversely, impaired physical function has been demonstrated to be an important risk factor for falling in all settings (Blake et al., 1988; Brody et al., 1984; Campbell et al., 1981; Campbell et al., 1989; Granek et al., 1987; Lund & Sheafor, 1985; Mion, Gregor, et al., 1989; Morse et al., 1985a; 1985b; Morse et al., 1987; Robbins et al., 1989; Sobel & McCart, 1983; Tinetti et al., 1986; Tinetti et al., 1988).

The occurrence of a fall in older persons is usually a result of a complex interaction of personal and environmental factors (Hindmarsh & Estes, 1989; Hogue, 1984). This etiological complexity has been supported in the literature; Campbell and associates (1989) reported that 79 percent of falls were multifactorial in nature. The high rate of morbidity and mortality as a direct consequence of falling makes it imperative to implement and evaluate intervention programs aimed at prevention. To effectively plan and implement preventive programs, a thorough understanding of the antecedents or predisposing factors and the components of falling is prerequisite.

Physiological Consequences. Although periods of rest or decreased mobility are used as a therapeutic regime for a variety of illnesses and conditions, prolonged immobility or inactivity has serious and well-known deleterious effects on the body. Studies of young populations have shown that prolonged immobilization causes a variety of biochemical and physiological changes that include an increased excretion of nitrogen, calcium, phosphorous, sulfur, sodium, and potassium (Miller, 1975). Few studies exist that examine immobility effects in older persons. Lehmann and associates (1989) examined three groups of subjects: fit old, fit young, and immobile old to study the effects of age and immobility on protein breakdown and turnover. They found that the fit old had significant reductions in protein turnover, synthesis, and breakdown compared to the fit young, but that the overall protein balance was unaltered. The immobile group, however, had significantly higher levels of protein turnover and breakdown with a decrease in protein balance.

Other physiological changes that occur with prolonged immobility include bone demineralization; hypercalcemia; metabolic acidosis; renal insufficiency; venous pooling; decreased maximal uptake of oxygen; higher levels of growth hormone and plasma cortisol; decreased muscle strength, endurance, and coordination; increased cardiac output and stroke volume; decreased basal metabolic rate; muscle contractures; constipation; weakened immune system; and decubitus ulcers (Harper & Lyles, 1988; Lehmann, Johnston, & James, 1989; Miller, 1975; Rubin, 1988).

Psychological Consequences. The greatest impact of impaired mobility on the person's psychological well-being is the effect on self-concept and self-esteem (Hogue, 1984; Maas, 1989). The inability to move about freely and independently can have negative consequences for the person's sense of autonomy and independence. Several studies have demonstrated the reciprocal relationship of physical disability and depression in elders living in community and institutional settings (Gurland, Wilder, & Berkman, 1988; Harris, Mion, Patterson, & Frengley, 1988).

Prolonged immobilization to a small, confined area may result in reduced sensory input and resultant behaviors of listlessness, withdrawal, irritability, or anxiety (Harper & Lyles, 1988; Rubin, 1988). Reduced sensory input can cause sensory alterations such as visual and auditory hallucinations and abnormal physical sensations (Harper & Lyles, 1988; Downs, 1974; Phillips, 1981; Rubin, 1988). Time perception also is altered; time is usually perceived as passing slowly (Mellilo, 1980).

Social and Economic Consequences. Sociologically, impaired mobility can lead to decreased contact with others and change in social roles (Hogue, 1984; Maas, 1989; Rubin, 1988). Limited contacts or socialization with others can occur in the home setting as well as in the institutional setting (Maas, 1989; Phillips, 1981).

Economic consequences of immobility are experienced at both societal and individual levels. The resources required to care for elderly persons who are impaired are escalating; as a result, there is much debate and concern in society over the costs of health care services. At the individual level, the loss of mobility can lead to loss of work with resultant reduction in income accompanied by increased expenses in terms of needed health care services (Maas, 1989).

Interventions Related to Impaired Mobility

Prevention of Falls. Intervention strategies to prevent falls can be categorized broadly into two areas: those that focus on the person, and those that focus on the environment (Figure 1). Few studies exist that test the effectiveness of interventions to reduce falls. Such testing is difficult primarily because of the multifaceted nature of falls in older adults. Lund (1984) reported on bed stabilizers, a specific furniture alteration used in the hospital setting to prevent the bed from rolling. With this device, no further falls occurred as a direct result of the bed rolling or moving away from the patient getting in or out of bed. Kustaborder and Rigney (1983) identified environmental factors contributing to falls within their institution that could be corrected by the nursing staff. They instituted four interventions: 1) change in staff relief times to maintain adequate staffing levels on the floors at all times; 2) use of long signal cords for easy patient access anywhere in the room; 3) pairing of nursing assistants who were responsible for one another's patients when one left the unit; and 4) constant supervision of patients on the toilet when the patient was confused, sedated, or on oxygen therapy. Unexpectedly, falls increased nine percent after instituting these changes.

Fife and associates (1984) instituted a prevention program in two units of a general community hospital and compared their findings with two control units. The program included staff education, an assessment form to identify patients at high risk of falling, and "18 nursing interventions" for high risk patients. No significant differences were apparent in the fall rate between the experimental and the control units. Conversely, Innes (1983, 1985) described a multifaceted hospital-wide fall program including staff education, assessment of high risk patients, use of warning devices (such as leg alarms), measures to reduce environmental hazards, and patient and family involvement. The program resulted in a 44 percent reduction in the fall rate.

Rehabilitation Services. Interventions aimed at maintaining or improving mobility in elders are often multidimensional in nature because so many factors affect mobility in aged persons. The use of intensive interdisciplinary rehabilitation services has been shown to be effective in promoting mobility in those persons who have suffered major or catastrophic illnesses (Gregor, McCarthy, Chwirschak, Meluch & Mion, 1986; Henriksen, 1978; Lefton, Bonstelle, & Frengley, 1983), although the greatest benefit may be for certain subgroups of elders (Rubenstein, Wieland, Josephson, Rosbrook, Sayre & Kane, 1988). Rubenstein and colleagues (1988) reported that subgroups of elders, either those with cardiac disease or those with stable medical diagnoses who required rehabilitation or treatment of one or more common geriatric problems (such as falls or in-

continence), had significantly prolonged survival rates when associated with a comprehensive geriatric unit.

Schuman and associates (1981) examined the effect of the patient's mental status on the outcomes of a rehabilitation program. They found that a standard rehabilitation program had little benefit for those with a mild degree of mental impairment and had no benefit for those with a significant degree of mental impairment.

Figure 1
Intervention Recommended to Reduce or Prevent Falls

<u>PERSON FACTORS</u>	<u>ENVIRONMENTAL FACTORS</u>
DETECTING UNDERLYING DISEASES	ASSESS SETTING FOR HAZARDS
CHANGING MEDICATION	EDUCATION IN COMMUNITY ON HAZARDS
COUNSELING ON MEDICATIONS	ALTERATIONS OF FURNITURE
PROMOTING EXERCISE	USE OF SAFETY DEVICES*
PHYSICAL THERAPY, BALANCE AND GAIT TRAINING	

*These are environmental devices such as grab bars, walkers, etc. This does not refer to physical restraints.

Ory and Williams (1989), noting the limited interest in providing rehabilitation to older persons, suggested some reasons that may relate to ageism and the belief that elders cannot benefit from it. In many situations the only healthcare provider is the nurse (Carlson, 1988). Heller and colleagues (1984) demonstrated that nurses' attitudes were significantly associated with perceptions of the kind of care institutionalized elders should receive. Those with positive attitudes believed that a rehabilitative approach was appropriate for the care of institutionalized elderly residents, while those with negative attitudes preferred a custodial approach. Similarly, Kosberg and Gorman (1975) found that the nursing personnel in a long-term care institution viewed elderly residents as incapable of benefitting from rehabilitation. These studies point to a need for research on the quality and effectiveness of clinical care delivery and on interventions programs for older persons in institutional settings.

Exercise. The intervention of choice to maintain or increase mobility is exercise (Maas, 1989). Gorman and Posner (1988) presented a detailed review of studies focusing on exercise in older persons population. They stated that healthy older people can be started on an exercise program and obtain short-term physiological effects. Almost nothing is known about the long-term effects of exercise in this age group. Associations have been found in retrospective epidemiological studies that link an active lifestyle with good health. It is not known, however, whether activity causes good health or results from good health. Information also is lacking on the effects of initiating exercise programs for those 75 years and older. One author has extrapolated findings from younger populations and applied them to those over 75 years (Shephard, 1990).

Of the four chronic diseases that cause the greatest impairment to mobility in older persons population (heart disease, diabetes mellitus, chronic lung disease, and arthritis) only aged persons with heart disease and diabetes mellitus have been examined for the use of exercise as a factor in

prevention and control (Gorman & Posner, 1988). Exercise programs have been shown to decrease resting systolic blood pressures, improve lipid profiles, improve glucose tolerance, and increase insulin sensitivity (Gorman & Posner, 1988; Tamai, Nakai, Takai, et al., 1988). There have been no controlled clinical trials, however, that test the effect of exercise on the control of diabetes in older persons (Gorman & Posner, 1988). There is some evidence that regular activity prevents loss of bone mineral content and enhances mental function. However, other studies have shown that there is no significant improvement in psychomotor function with exercise in elders (Panton, Graves, Pollock, Hagberg & Chen 1990). Foster and colleagues (1989) recently demonstrated that low-intensity exercise prescription was adequate for improved oxygen consumption, but not for other measures in a group of elderly women.

Nursing Management of Functional and Personal Care Problems of Older Persons

Managing the functional and personal care problems experienced by elderly care recipients is an essential part of nursing practice in long-term care, and is the most time-consuming. Despite the rapid expansion of nursing research, the development of a research base that addresses deliberative nursing interventions that promote and sustain function and minimize behavioral aberrations has been slow to develop. Now, however, a small but growing body of nursing research exists that specifically focuses on these problems. The majority of this research focuses on institutionalized elders but there is potential for transferring findings to other care settings. Much of this research has been conducted outside of the United States.

Although a variety of medical conditions can produce functional and personal care problems, most nursing research has focused on elders with dementing disorders. The problems of elders with strokes, Parkinson's disease, and psychogeriatric diagnoses also have been considered. In most instances, research projects have been confined to the investigation of one circumscribed problem within a specific medical diagnostic category (e.g., feeding problems, communicating problems, dressing problems, agitation). This review considers research focused on functional and personal care problems separate from that focused on behavioral problems. It is recognized, however, that the problems are clearly interrelated to the degree that behavioral aberrations (e.g., wandering, hitting, agitation) are often key factors in managing functional and personal care problems.



Courtesy, School of Nursing, University of Washington; photo taken at Eda Culver House, Brookhaven, Seattle, WA

Functional and Personal Care Problems. The research strategy that has been used to investigate functional and personal care problems has been descriptive analysis using observational techniques. The basic assumption underlying many investigations has been that functional and personal care tasks (e.g., feeding, dressing) are comprised of sets of interrelated, discrete actions that form a meaningful whole. These actions can be segmented and analyzed using microanalysis (analysis of the discrete parts) and macroanalysis (analysis of the relationship of the parts to the

whole). An understanding of the whole is only possible through an understanding of the sequence of and relationship among the component parts. Some research has been based on the work of Weintraub, Baratz, & Mesulam (1982) who observed that early in the course of dementing disorders, three major problems interfered with functional behavior (motivational--the ability to initiate; mnestic--the ability to remember the correct objects and the necessary steps; and constructional--the ability to manipulate the objects correctly). Research has been based also on the work of Barnard (1981) who developed a theoretical framework for analyzing and understanding the interactions between mothers and small children. Three types of studies are used here to illustrate the research currently being done in this area.

Morning care was the focus of the investigation of Sandman, Norberg, Adolfsson, Axelsson, & Hedly (1986). They defined morning care as "a procedure involving a series of actions which [are] combined into meaningful wholes (subsystems): washing, showering, combing, tooth-brushing, shaving and dressing (p. 370)." They viewed the accomplishment of morning care for a demented patient within the context of a nurse-patient interaction that was maintained through reciprocal actions and designed to foster independence while establishing compensatory mechanisms for the performance of discrete actions that the patient was unable to perform. Within this context they analyzed videotapes of patients with Alzheimer-type dementia (N=5) and generated twelve essential abilities that the patient must have to successfully accomplish morning care (e.g., recognition and understanding of body parts, recognition and understanding of care objects, and ability to logically combine actions toward a goal). The authors used their categorization system to analyze the morning care abilities of demented elders and to determine whether it was possible to identify a link between the elder's disabilities and specific nursing interventions. The results were an initial step in documenting the complexity of the morning care situation and the fragmentation of the patient's behavioral systems. Critical problems were the patient's ability to initiate activities and to use simple objects in an appropriate sequence, and nurses falsely interpreting paratonia (increasing muscle tone during passive movements of different strength, a characteristic of many Alzheimer's victims) as a conscious resistance to care. The authors also observed that although verbal instructions had no effect on task completion, nurse-initiation of behavioral sequences often resulted in the elder carrying the task through to completion.

A group of Swedish nurse-researchers (Backstrom, Norberg, & Norberg, 1987; Athlin & Norberg, 1987; Axelsson & Norberg, 1984; Axelsson, Norberg, & Asplund, 1986; Norberg, Athlin, & Winblad, 1987) conducted a series of studies to describe and analyze the feeding problems of elders with degenerative brain disease (Alzheimer-type dementia, stroke, Parkinson's Disease). These studies were designed to use video-taped observations and open-ended interviews with nursing personnel to inductively generate an integrated theoretical nursing model for use in analyzing feeding problems. This group developed a categorization system that can be used to identify the nature of the client's problems in relation to feeding (e.g., mechanical problem), the nature of the nurse's problems in relation to feeding (e.g., lack of time, disinterest), and the nature of the interaction problems between them (inability to send cues, inability to receive cues, insensitivity to cues). Deliberative nursing interventions that are problem specific can then be devised based on the observational findings.

Beck (1988) used a similar approach to study dressing problems. She performed a task analysis of dressing and found that dressing consists of 34 separate components that must be chained together to successfully complete morning dressing. She also analyzed the behavior of demented patients to determine the types of difficulties experienced and the types of assistance needed, and categorized the assistance into seven hierarchically arranged categories. The categorization scheme is being used to devise and test problem specific nursing interventions to improve functional independence among demented patients.

These investigations are examples from a very promising and newly evolving area of nursing

research. Currently, both the number of studies and the number of functional and personal care activities that have been investigated are small. The research is in the early stages of development compared to other areas of investigation and is inhibited greatly by the lack of measurement techniques and the underdevelopment of observational methods within nursing. The narrow focus on groups within medical diagnostic categories must be expanded to identify descriptors of functional and personal care disabilities that are common across diagnostic categories and across problem areas.

Behavioral Problems. Several studies have sought to identify the various behavior problems that elders display in long-term care settings. Zimmer, Watson, & Treat (1984), for example, found that 23 percent of patients in the study exhibited severe behavior problems including physically dangerous behavior, abusive language, and inappropriate behaviors. Armstrong-Ester and Brown (1986) noted behavior problems such as repetitive behavior, attention-seeking, and acting out among long-term care residents. Similarly, behavior problems associated with dementing disorders have been reported to include memory disturbances, catastrophic reactions, demanding/critical behavior, night-waking, hiding things, communication difficulties, suspiciousness, making accusations, meal and bathing problems, daytime wandering, physical violence, and incontinence (Rabins, Mace & Lucas, 1982). Although these data were based on reports of family caregivers, the behavior problems described are also generalizable to institutional settings.

In contrast to studies designed to identify the range of behavior problems displayed by long-term care clients, other studies have been designed to produce in-depth descriptions of particular behavior problems. For example, wandering has been described by several investigations (e.g., Dawson & Reid, 1987; Synder, Rupperecht, Pyrek, & Moss, 1978; Monsour & Robb, 1982). Similarly, some investigations have sought to describe sundown syndrome (Evans, 1987). Also, aggressive behavior has been described (Petrie, Lawson, & Hollender, 1982; Jones, 1985; Winger, Schirm, & Steward, 1987).

Although the literature documents the existence of behavior problems among elders in long-term care, critical questions remain. The number of specific behavioral problems that have been described is extremely limited. Replications of studies of any particular problem are virtually nonexistent. In addition, there is little research, either about the relationship between behavior problems and functional and personal care problems, or about the effect of staff reactions to behavior problems on the prevention of functional decline.

Nursing Interventions Related to Functional and Personal Care Problems of Older Persons

Although the core of nursing in long-term care is composed of those therapies that nurses independently design and perform to treat the functional, personal care, and behavioral problems of their client, only a few studies have been conducted to describe or systematically test the current therapies being used. Even though there is every reason to believe, based on the current state of the science, that nursing therapies in long-term care are based largely on intuition and experience, clearly some portion of what is currently being done is effective. Therefore, careful descriptions of these therapies would seem to be essential before clinical trials to determine efficacy can be conducted. There are few studies that test nursing interventions for specific functional, personal care, and behavioral problems of long-term care clients.

In a descriptive study, Athlin and Norberg (1987) observed the development of a therapeutic relationship between six demented individuals and their assigned staff caregivers. Of special interest were the types of deliberative nursing management strategies used by the nurse during feeding episodes and the relationship of these to the caregiver's frustration with feeding difficulties. Their analysis suggested that as the therapeutic relationship developed over a four-week period, frustration with feeding episodes was greatly decreased and feeding became less

difficult. The authors suggested that their findings demonstrated the development of non-verbal mutual understanding between the caregiver and patient. They further suggested that although severely demented patients lose much of their ability to communicate symbolically, they retain fragmented communication abilities that are subtle but identifiable. Over time, the nursing staff member assigned to the patient systematically learned to impute meaning to vague, subtle cues and to respond appropriately. This "fine-tuning" of their assessment abilities permitted the caregivers to pace a meal based on the client's desire rather than their own conception of appropriate timing, and thus reduce feeding difficulties.

In an exploratory/descriptive study Michaelsson, Norberg, and Samuelsson (1987) investigated the assessment criteria that nursing personnel use to determine the presence or absence of thirst among severely demented clients in terminal disease states. They found six methods used by nurses (e.g., patient's behavior/reaction, intuition), none of which satisfactorily managed the problems of preventing dehydration.

In a series of investigations, Sandman and colleagues (1986) observed various prompting activities that were more or less successful for eliciting completion of morning care, including the use of tactile stimulation and the initiation of activities. VanOrt and Phillips (1990) are currently observing feeding interactions between nursing staff and demented clients to identify nursing behaviors that elicit, sustain, and extinguish feeding (e.g., en face position, modeling of eating behavior, creation of a feeding context, sensitivity to feeding cues) and nursing behaviors that elicit, sustain, and extinguish aberrant behavior during feeding encounters (ignoring feeding cues, ignoring socialization cues, chastising). Beck's (1988) seven categories of assistance given during dressing (including complete physical guidance, occasional physical guidance, gesturing or modeling, repeated verbal prompts) also are a beginning effort to describe nursing interventions.

Sporadic studies designed to test the efficacy of nursing interventions also exist in the literature. Baltes & Zerbe (1976), for example, showed that feeding behaviors and improved eating habits can be elicited through the use of social reinforcement and the manipulation of reinforcement contingencies and discriminative stimuli. Beck currently is conducting clinical trials to identify the efficacy of deliberative intervention on dressing behavior. Except for a few scattered examples, however, the knowledge base underlying nursing intervention for these problems is based largely on anecdotal reports and supposition.

Assessment Issues

Availability of valid and reliable assessment tools and techniques is critical in the study of both impaired mobility and management of functional and personal care problems of older persons. Because mobility has a major impact on the well-being of elders, the use of instruments and measures of mobility and physical function is necessary in clinical practice (Kane & Kane, 1981; Katz & Stroud, 1989). Moreover, information about function has been shown to be essential for the diagnosis, prognosis, and treatment of elderly persons (Katz & Stroud, 1989). Although functional assessment scales have been in existence for a number of years, problems exist that dictate further research in this area. Feinstein and colleagues (1986) discussed six main issues that are generic problems for all indices that measure function. These issues are summarized below.

Omission of attention to personal collaboration. Few indices of physical function take into account the amount of personal effort and social support that an individual requires in performing a physical function. Instead, the physical function is assessed only in terms of the magnitude of the task. Ignoring the time and effort, and the support that the person has in accomplishing tasks, overlooks crucial concomitant factors affecting outcome.

- ***Role of personal preferences.*** The importance of different components of physical function

is decided according to the beliefs of the health care providers unless the patient's preferences are sought. Feinstein and colleagues (1986) list three benefits in using the patient's preference when rating function. First, the patient is brought into central focus; second, clinicians can focus on the specific areas that are most gratifying to the patient; and third, by selecting primary targets for interventions, one is not lost in the myriad disabilities that often occur.

- **Measurement of change.** Almost all indices measure a patient's condition at a certain time. Comparison of the values at another time may show no change if the measure lacks sensitivity.
- **Selection and aggregation of components.** Most measurements of physical function combine or aggregate the individual components into a single result. These are done either as a simple summation or as a hierarchical arrangement. Although a hierarchical arrangement is superior to a simple summation for interpretation, it is difficult to achieve for disability indices. For example, is it worse to lose use of an arm or a leg? This question would get different responses from different people. Feinstein and colleagues (1986) suggested that the importance of individual variables can be determined by examining patient preferences, use of clinical judgements, or by variable correlation with selected outcomes such as cost of service or number of hours needed for daily care.
- **Process of justification.** Keith (1984) reviewed functional assessment measures and found that insufficient attention has been devoted to the justification of conceptual schemes and to psychometric properties of the instrument.
- **Unsatisfactory applications.** Three types of applications of established indices may be unsuitable: 1) the indices are too complex to analyze the data; 2) the particular entity under investigation may be obscured; or 3) the particular entity may not even be included in the index.

Other difficulties with the assessment of physical function have been cited. One problem was the lack of fit of observational data with observer-rated instruments (Kaufert et al., 1979; Travis, 1988). Another common problem was the lack of agreement among raters (Hutchinson, Boyd, & Feinstein, 1979; Malzer, 1988; Sheikh, 1986). Kane and Kane (1981) cover many of these concerns in their book on assessing older persons.

Research Needs and Opportunities

Consequences of Impaired Mobility

Falls. Several problem areas have been highlighted in the review of research studies on falls. Many studies were retrospective in design. A person's recall of a fall event may not be accurate in terms of its occurrence, causes, and/or consequences. In addition, the definition of a fall varied among studies; this variation in definition influences the identification of risk factors, subsequently influencing the planning and effectiveness of preventive programs. Also, sampling of subjects may lead to a selection bias, making it difficult to extrapolate either results on incidence or the association of risk factors and outcome to the general population (Fletcher, Fletcher, & Wagner, 1982). And last, the data gathered were not always equivalent across studies.

Future studies need to be carefully designed and described to allow for comparisons and generalizations across settings. A cross-sectional study may miss processes that are important contributors to falls. Retrospective designs, however, depend upon the subject's ability to recall, and even prospective designs must rely heavily on recall as the majority of falls are unwitnessed. Controlled trials of specific interventions, such as physical activity and medication, need to be implemented to determine their effectiveness in preventing falls. Physical activity has been shown to improve balance in elderly subjects residing in the community (Roberts, 1989). Isaacs (1985) and Overstall et al. (1977) emphasized the importance of exercise in maintaining strength and

reaction time to prevent falls. Such studies are needed to determine the effectiveness of various exercise interventions in preventing falls in unimpaired as well as impaired elderly. Because medications have been implicated as a potential contributor to falls, further studies are needed to determine which specific drugs are most likely to contribute to falls. Education and counseling of elderly persons on medications are important given the high rate of drug misuse and abuse and adverse reactions in this population (Barone & Holland, 1987). Evaluation of the effectiveness of such educational programs in terms of reducing falls is necessary. Although there have been clinical reports of a postfall syndrome characterized by anxiety, fear, and depression, very few studies have addressed the psychological consequences of a fall. Further studies are needed to understand this phenomenon and its consequences, and to develop strategies that can reduce the distress. Specific studies on environmental hazards are needed in the institutional setting, and in the home. Isaacs (1985) and Craven and Bruno (1986) reported that older persons may be aware of environmental hazards yet either do not attempt to reduce them, or deny that the hazards exist.

Rehabilitation. Comprehensive inter-disciplinary rehabilitation services are costly. If the effectiveness of such programs is limited to certain subgroups, certain issues should be raised. First, there is the need for accurate and adequate measurements and assessments to better select specific interventions and to better predict who would benefit from such services. Second, there is a need to examine alternative settings and strategies in providing comprehensive rehabilitation services to maximize the cost-effectiveness of such programs (Tucker, Davison, & Ogle, 1984).

Exercise. In general, there is evidence that exercise has a positive effect on the well-being of elderly persons. Little is known about the type, frequency, intensity, or duration of exercise that would optimize benefits while minimizing risks in this population. Given these gaps in the knowledge of exercise and its effects on elder clients, further studies are needed to examine physical and psychological health variables in relation to exercise, types of exercise programs, and uses of exercise programs among a variety of elderly subgroups. How to teach staff to conduct exercise programs in a systematic way has not been studied in detail. Overall, staff training in skills to improve functional ability of elder clients is of utmost urgency when considering the costly effects of immobility. In summary, nursing research is needed to describe longitudinally the physical and social psychological sequelae of altered mobility among older adults. Testing of treatment models to maintain elders' independence and prevent decline must be given high priority on the nursing research agenda.

Nursing Management of Functional and Personal Care Problems

Although nursing staff are more involved in managing the day-to-day functional, personal care, and behavioral problems of elders in long-term care than other health professionals, the research base underlying the strategies currently used is scant. The initial research suggests that deliberative nursing intervention can increase functional behavior, decrease nonfunctional behavior, and prevent functional decline among demented patients even late in the disease course. The effectiveness of nursing interventions in these areas for other long-term care clients is not as clear. Overall, however, the need for research in this area is extremely critical.

Currently, research efforts are complicated by a number of factors. First, few measurement techniques exist for studying the problems involved, and observation as a research methodology is poorly developed within nursing. Second, efforts at designing clinical trials are hampered by lack of descriptive research about possible effective interventions. Although a variety of interventions have been studied (including behavioral, interactional, environmental, and organizational interventions), much needs to be explored. Third, efforts at designing clinical trials are hampered by a lack of measurement instruments that are sensitive, specific, and appropriate outcome indicators. Fourth, in no other area of long-term care research is consideration of the issue of research utilization more critical than during initial clinical trials. Although professional nurses

may supervise the care being administered to elders in long-term care settings, the bulk of the care is provided by someone other than a professional nurse. Therefore, as studies in this area evolve, it is essential that investigators consider tests of nurse-administered nursing therapies and the degree to which these therapies are appropriately taught to other providers. Consideration must also be given to testing the most efficacious ways of doing that teaching.

Assessment Issues

There is consensus among professional healthcare workers that the development of valid and reliable assessment techniques is essential to further research efforts on the consequences of impaired mobility and on functional status in late life. In fact, Kane and Kane (1981) state that the importance of precise and accurate measurement in gaining an effective understanding of functional problems and their solutions may be the cornerstone of the science of geriatrics.

Recommendations

Based on the foregoing assessment of research needs and opportunities in "Mobility, Functional Status, and Personal Care in Late Life, the Panel has made the following recommendations concerning research over the next five years.

Impaired Mobility

- Identify the predisposing factors and components of falling in older persons; for example, drugs most likely to contribute to falls, and environmental hazards, both in the institutional setting and in the home.
- Implement and evaluate intervention programs aimed at prevention of falls in both the unimpaired and impaired older persons.
- Examine physical and psychological health variables in relation to types and uses of exercise programs in elderly subgroups; test treatment models to maintain the elders' independence and prevent decline.
- Evaluate the effectiveness of rehabilitation intervention programs on the outcomes of patient care in the institutional setting.

Nursing Management of Functional and Personal Care Problems

- Identify descriptors of functional and personal care disabilities that are common across medical diagnostic categories and problem areas. "Describe and systematically test the current nursing therapies used to treat functional, personal care, and behavioral problems of older persons across medical diagnostic categories.
- Determine the degree to which nursing therapies are appropriately taught to care providers other than professional nurses.

Assessment Issues

- Develop valid, reliable instruments and techniques for the study of functional, personal care, and behavioral problems that are sensitive, specific, and appropriate outcome indicators.

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