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Older Adults' Needs for Home Health Care and the Potential for Human Factors Interventions

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Abstract

Demand for home health care is expected to increase as more people are living longer and because older adults rely on home health services to a greater extent than any other population (CDC, 2000). This paper provides an overview of older adults' home health care needs as well as guidance for potential human factors interventions to reduce medical errors and improve quality of care and independence for older patients. Factors discussed include reducing transition and handoff errors, ensuring proper use of medical devices, managing medication, and optimizing home health settings. The importance of considering the role of normal age-related changes in abilities when evaluating patients' needs is highlighted. The goal of this analysis is to provide guidance for human factors interventions in home health care.

Introduction

Older adults are the fastest growing segment of the population (Administration on Aging, 2006). Data from the National Center for Health Statistics (2005) demonstrate that from 1950 to 2004 the population 65 years of age and over grew twice as rapidly as the total resident population of the U.S., an increase from 12 to 36 million persons. The population 75 years of age and over grew almost 3 times as quickly as the total population, increasing from 4 to 18 million persons. Projections indicate that the rate of population growth for older age groups from now to 2050 will continue to grow more than twice as rapidly as the total population.

Future growth of the older adult population will partly result from the baby boomer generation aging. However, this growth is also the result of an increase in life expectancy for people living in developed countries. Over the past 100 years, life expectancy at birth increased in the U.S. from 48 to 75 years for men and from 51 to 80 years for women (National Center for Health Statistics, 2005). With this increased life expectancy comes an increased period of time that people are at risk for experiencing age-related health declines.

The consequences of the growing older adult population for the health care system are substantial. More services will be required for the treatment and management of chronic and acute health conditions, especially those most prevalent with aging (CDC, 2004): hypertension, arthritis, heart disease, cancer, diabetes, and stroke. Home health care has the potential to play an integral role in managing and treating many symptoms of these age-related health conditions. In fact, the majority (70%) of home health care patients are 65 years of age and older (U.S. Dept. of Health and Human Services, 2000).

Home health care offers several advantages over hospital-based health care. Health care in a home setting may be more cost effective than that provided in a hospital (Naylor, et al., 1999) and it may reduce exposure to nosocomial infections or healthcare-associated infections (HAI) (Leff, et al., 2005), which older adults are particularly susceptible (Smith, 1989). Moreover, home health care supports aging in place and independence, important factors in maintaining a high quality of life for older adults. In fact, an American Association of Retired People survey found that the majority of older adults prefer to remain in their own homes as long as possible (AARP, 2000).

The purpose of this article is to provide an analysis of home health care patients' needs and guidance for potential human factors interventions related to issues that older adults might experience in receiving home health care.

Review

Home Healthcare Patients & Their Needs

An understanding of the characteristics and needs of home health care patients is necessary to optimize the health care support services that providers offer. The results of the National Home and Hospice Care Survey (U.S. Dept. of Health and Human Services, 2000) provide detailed information about the characteristics of the home health care patient population. Home health care agency survey respondents indicated that patients were predominantly women (65%), 65 years and older (71%), unmarried (58%), living in private or semi-private residences (94%), and living with their family members (63%). The most frequent service used by patients was medical/skilled nursing services (75%), followed by personal care (44%) and therapeutic (37%) services. Other services, such as continuous home care, counseling, administering medications, occupational therapy, and social services were less frequently used.

Chronic Health Condition Treatment & Management

Medical/skilled nursing services are primarily needed for treating and managing chronic health conditions. Given that the population 65 years of age and older comprises the majority of home health care patients, it is not surprising that health conditions prevalent in the aging population are some of the most frequent conditions in need of management assistance. Specifically, heart disease (11%), diabetes (8%), cerebral vascular disease (7 %), chronic obstructive pulmonary disease (COPD) (5%), malignant neoplasms (5%), congestive heart failure (4%), osteoarthritis and allied disorders (4%), fractures (4%), and hypertension (3%) are the most common admission diagnoses for home health care patients (U.S. Dept. of Health and Human Services, 2000).

Not only do skilled nurses provide chronic condition treatment and management, they also provide education and training to help older adults better manage their conditions themselves. For instance, a skilled nurse might provide training for using a blood pressure monitor (BPM) to a patient with hypertension or for using a blood glucose meter (BGM) to a patient with diabetes.

Personal Care Assistance

Needs for assistance with personal care, also known as activities of daily living (ADLs), increase with age. ADLs include eating, bathing, dressing, and getting around inside the home. The percentage of noninstitutionalized adults 65 years of age and over who report needing help with ADLs increased with age from 3% of persons 65-74 years to 10% of persons 75 years and over (National Center for Health Statistics, 2005). Not surprisingly then, the 2000 National Home and Hospice Care Survey (U.S. Dept. of Health and Human Services, 2000) found that over half of home care patients received help for at least one ADL (51%). The most frequent ADLs requiring assistance were bathing or showering (83%), followed by dressing (39%), transferring to or from a bed or chair (30%), and using the toilet room (22%). Though not considered an ADL, patients required assistance walking as well (28%).

Home care patients typically require assistance with instrumental activities of daily living (IADL) as well. IADLs include tasks such as driving, preparing meals, doing housework, shopping, managing finances, managing medication, and using the telephone (Lawton & Brody, 1969). Almost half (43%) of the National Home and Hospice Care Survey respondents 65 years of age and over reported needing help with at least one IADL. The most common IADLs for which assistance was received were doing light housework (31%), preparing meals (20%), taking medications (20%), and shopping (11%). Not only do home health care providers assist directly with ADLs and IADLs, they provide training to enable home health patients to increase their ability to perform ADLs and IADLs independently.

Potential for Human Factors Interventions

Given the growing need for and importance of home health services, we need to learn more about how to ensure that problems and errors in receiving home health care are minimized or avoided. An alarming statistic is that between 44,000-98,000 people are estimated to die each year from medical errors in the U.S. (Kohn, Corrigan, & Donaldson, 2000). Although these estimates are based on studies of hospital settings, it is likely that a substantial number of people die from errors made in home health care settings as well. Human factors interventions have the potential to reduce these errors and save lives.

Reducing Transition and Handoff Errors

Transition and handoff errors can occur when patients move from hospital care to home care or within the home health setting as several providers may be managing different aspects of the same patient's care. Transition and handoff errors can greatly impact the nature of care received in the home. For example, an error in diagnosis, prescribed therapy, treatment, and/or medications could result in mistreatment or an adverse drug event (ADE). Communication breakdowns during such transfers are estimated to be one of the largest sources of medical error. For example, in one study, 68% of specialists reported not receiving any information from the primary care physician before the referral visit, and 25% of primary care physicians reported that they had not received any information from specialists 4 weeks after referral visits (Gandhi, Sittig, Franklin, Sussman, Fairchild, & Bates, 2000).

Transition and handoff errors may occur more often with older adults given that they are more likely to experience medical errors overall (Kanjanarat, Winterstein, Johns, Hatton, Gonzalez-Rothi, & Segal, 2003; Tsilimingras, Rosen, & Berlowitz, 2003). In addition, age-related declines in working memory (see Zacks, Hasher, & Li, 2000, for a review) may make older adults less able to contribute to preventing transition and handoff errors. Working memory is the system responsible for manipulating and storing information for later recall. Many factors could exacerbate age-associated memory declines including stress related to a medical condition, medication side effects, or unfamiliar terminology. Hence, older patients may be less likely to remember personal medical or health information that would allow them to circumvent a transition or handoff error.

Despite the importance of comprehensive transition systems, one survey found that few internal medicine residency programs had them in place (Horwitz, Krumholz, Green, & Huot, 2006). However, in 2007 the Joint Commission on Accreditation of Health Care Organizations issued a requirement for hospitals to establish standards for handoff communications. Methods for improving communication include strategies borrowed from aviation and military domains (e.g., Mann, Marcus, & Sachs, 2006; and see Oriol, 2006, for a review), areas in which human factors research has significantly contributed.

Another method for minimizing these types of errors is the implementation of technology (Singh, Naik, Rao, & Peterson, 2008), such as electronic systems for prescribing and documenting home health care. For instance, electronic medical records could improve communication and reduce transition and handoff errors (e.g., Scott-Cawiezell, Madsen, Pepper, Vogelsmeier, Petroski, & Zellmer, 2009), although to date few hospitals have implemented them. For home health care, human factors research related to improving communication could have a significant impact on reducing errors when transitioning patients from the hospital to the home as well as between different providers coming into the home.

Ensuring Proper Use of Medical Devices

As discussed above, home health needs can be categorized as chronic health condition treatment and management or personal care (ADL/IADL) assistance. Human factors interventions can be particularly beneficial for training and ensuring proper use of medical devices that are used to manage chronic health conditions by health care providers and by patients themselves. Research has demonstrated the importance of training, even for “walk-up-and-use” medical devices (Mitchell, Gugerty, & Muth, 2008). Moreover, home-based intervention training on personal care devices can improve not only patients' ability to use that device but also their overall functioning, rate of use, and satisfaction (Chiu & Man, 2004).

Though training is a central component to reducing usage difficulties and errors, it has been demonstrated that the type of training matters particularly for older adults who may be more sensitive to training quality. For example, in learning to use a BGM older adults performed better after having video training based on instructional principles than after text-based instruction or viewing the manufacturer's instructional video (Mykityshyn, Fisk, & Rogers, 2002). Younger adults' performance was less influenced by type of instruction. Hence, the

implementation of training programs particularly suited for older users is an important component to reducing errors in home health care.

Medication Management

Medication management is an aspect of home health care that deserves special attention. Modern pharmaceutical treatments are one of the most significant factors contributing to the advanced state of healthcare today and are likely significant contributors to lengthened life spans. Currently, medications exist that are effective in treating the most common age-related health conditions: high blood pressure and cholesterol, diabetes, heart disease, cancer, and stroke. As a result, five out of six persons 65 and older are taking at least one medication and almost half take three or more medications (CDC, 2004).

However, if medications are not prescribed or taken correctly the ramifications can be life threatening. One study found that out of a sample of 1879 prescriptions, 7.6% contained a prescribing error (Gandhi, et al., 2005). Moreover, nearly 1 in 20 hospital admissions can be traced to problems with medications, many of them preventable (Winterstein, Sauer, Hepler, & Poole, 2002). One study found that about 1 in 4 patients suffered an adverse drug effect (ADE), many of a serious nature, after being released from the hospital (Gandhi, et al., 2003).

Unfortunately, many older adults have multiple health conditions and therefore have complex medication regimens involving multiple medications, with multiple side effects, and multiple schedules. Complex medication regimens are difficult to prescribe and administer. In fact, research has shown that patients on multiple medications, risky medications, and older patients are more likely to be harmed by a medical error in a hospital (Kanjanarat, Winterstein, Johns, Hatton, Gonzalez-Rothi, & Segal, 2003; Tsilimingras, Rosen, & Berlowitz, 2003); a similar finding would be expected for home health settings (Coleman, Smith, Raha, & Min, 2005).

In addition to complex medication regimens, age-related changes in cognition may make medication management especially challenging for older adults. For example, evidence suggests that older adults have difficulty with prospective memory tasks even when the tasks have become habitual (Boron, Rogers, & Fisk, 2006; Einstein, McDaniel, Smith, & Shaw, 1998). Prospective memory is memory for an activity to take place in the future, such as remembering to take medication. In addition, age-related declines in vision may make it difficult to read medication instructions accurately, particularly if the lighting is dim (Kosnik, Winslow, Kline, Rasinski, & Sekuler, 1988) or if the text to background contrast is poor (Mitzner & Rogers, 2006). Unfortunately, research has found that homes often have suboptimal lighting (Charness & Dijkstra, 1999).

Given the difficulties older adults may experience in trying to manage their own medications, it seems that medication management would be a critical service that home health care could provide. However, home health care providers are limited in the amount of assistance they can provide, as they are regulated as to the degree of involvement they can have in managing and administering medications. Typically, only a skilled nurse can manage medications or help a patient manage their own medications (i.e., make a decision

about which medication to administer and when to administer it, based on a physician's prescription). Non-skilled home health providers may only be permitted to transfer a medication from a container to the patient.

Given that regulations constrain the amount of assistance a patient can receive from a home health care provider for managing their medications, assistive devices may be particularly useful in this domain. Technologies such as electronic medical records, electronic prescription and administration of medication, bar coding and radiofrequency identification systems can be implemented to better assist home health care patients in managing their medications (Wachter, 2008). More research is needed to compare different devices with respect to characteristics such as ease of use and error reduction. Given the potential for errors in medication management and the serious repercussions of making errors, this is an area ripe for additional human factors research.

Optimizing home health settings

For many of the ADLs and IADLS for which older adults need assistance the source of the problem is reduced mobility (i.e., bathing, dressing, moving from place to place, shopping, housework, and meal preparation). Reduced mobility may be the result of an acute or chronic condition but can be exacerbated by normal age-related changes in sensation and perception. For example, with age anatomic and physiologic changes in the eye occur, impacting the quality of the retinal image and making it more difficult to perceive the environment. Visual difficulties are made worse in low illumination and with low-contrast objects (Sturr, Kline, & Taub, 1990), which can make moving around especially problematic in poorly lit environments. The acuity of peripheral vision is also reduced with age (Kline & Scialfa, 1996), which makes it more difficult to navigate through narrow or cluttered spaces. Together, these characteristics can make older adults susceptible to falling in their homes.

Unfortunately, a single fall can put an older adult's health on a downward spiral. Older adults who experience a fall are more likely to sustain greater long-term health costs and higher rates of morbidity (Fuller, 2000). Given that homes are not designed as health care settings, modifications may be necessary to accommodate a decline in mobility or physical disability. Durable medical equipment such as hospital beds and railings can be installed to minimize falls and movement sensing devices can be employed to allow for remote monitoring.

Home modification and training have been shown to be successful for addressing limitations in IADLs and ADLs, with the most benefits evident for bathing and toileting (Gitlin, Winter, Dennis, Corcoran, Schinfeld, & Hauck, 2006). The research of Gitlin and colleagues also demonstrated that patients who received home modification and training interventions had increased self-efficacy, less fear of falling, fewer home hazards, and greater use of adaptive strategies. Additional research has also shown the effectiveness of training related to fall prevention (Hofmeyer, Alexander, Nyquist, Medell, & Koreishi, 2002).

Lastly, an important research finding to take into consideration is that those receiving personal care services report a preference for having their personal autonomy facilitated (Meyer, Donelly, & Weerakoon, 2007). These findings reflect older adults' preference for

remaining independent and highlight the importance of helping older adults to help themselves. The implementation of training programs and assistive devices can do just that as well as reduce the future needs for home health care services.

Discussion

It is important to understand the unique needs of older adults in evaluating home health care as they are the majority of consumers of such care. Human factors interventions have the potential to improve quality of care and reduce medical errors; however, age-related changes in abilities such as cognition need to be considered as well.

We conducted an analysis of the home health care needs specific to older adults. This assessment is a necessary first step for identifying requirements for human factors solutions. Our assessment indicated that older adults' needs may be categorized into the following categories: chronic health care treatments and management and personal care assistance. We furthermore identified how age-related changes in perception and memory may contribute to the complexity of the problem space. Lastly, we provide guidance for the development of human factors interventions.

We highlight the need for training programs and assistive devices that are designed to take into account declines in vision and memory that are associated with aging. It is important to note that assistive devices and training programs may have a benefit for older adults compared to receiving assistance from a health care provider in that they foster independence and reduce caregiver burden. However, home health technologies are under utilized by older adults (Mann, Belchoir, Tomita, & Kemp, 2007), as are technologies as a whole (Czaja et al., 2006). Future research is needed to better understand the factors that contribute to health care technology acceptance for older users as well as to investigate in greater detail other types of human factors interventions that can facilitate home health care.

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