TECHNOLOGIES FOR LONG-TERM CARE

The number of older adults is rapidly growing. Many have chronic illness states and multiple co-morbidities as stated in the European Silver Paper[1]. Informal caregiving by family and friends has helped to meet some of their care needs; however, extended families have become less common. Many older adults may live alone with limited social networks[2] and as their health declines may require residential long-term care (LTC) services. Technology can improve efficiency and quality of LTC services and enhance older adults' quality of life[3]. Existing and emerging technologies in residential LTC may include management systems for wandering, fall prevention, incontinence, assistance call, medication, and delivery products.

Wander management. For patients with Alzheimer disease, to promote safety and address wandering behaviors such as pacing, restlessness, turning doorknobs, and exit seeking[4], video monitoring and electronic tagging are available. Other options include infrared and radio frequency identification, elopement management systems and tracking devices to locate residents who have left the facility[3].

Fall prevention. In the US, nearly 13 million falls per year occur in adults 65+, nearly 10% resulting in serious injuries[5]. Impaired mobility and increased dependence may result. LTC residents have fall rates three times those of older adults living in the community. A prototype 'safe floor' provides a stable surface during ambulation and deforms elastically under higher load stress such as falls. To minimize pharmacological and physical restraints, fall prevention technologies such as bed alarms and identification bracelets are available as well as motion alarm devices which allow for early intervention and injury reduction[5]. User activated alarms and pendants, automatic wearable fall detectors, video monitoring and floor-vibration sensors add to the array of technologies.[7]

Incontinence. This common health problem for older adults is associated with embarrassment, high cost, and increased caregiver burden. Technologies include enuresis alarms, bladder scanning to detect bladder volume, biofeedback which assists in the strengthening of pelvic floor muscles[3], and urethral occlusion devices for urinary stress incontinence in women[8].

Assistance call systems. These allow staff members to determine the needs of LTC residents before entering rooms, thus increasing efficiency. Passive call systems can alert caregivers when residents exceed preset parameters such as time spent in the bathroom without exiting, through the use of motion detectors and software[3].

Medication management and monitoring. Older adults use a high number of medications. In the US, the average nursing home resident takes six different medications and 20% require at least 10 medications[9]. Adverse drug events are common and may lead to injury, hospitalization, or even death. Electronic prescribing and automated dispensing systems are targeted at reducing errors, some of these incorporating bar code bracelets for the safe identification of patients. The US Food and Drug Administration[10] estimates that a new regulation which incorporates drug identification coding could reduce the number of adverse drug events by over 500,000 over the next 20 years. Software which can provide alerts for ongoing medication monitoring is also available[9].

Conclusion. Technology offers novel ways to extend our society's ability to provide services to older adults requiring long-term residential care. We must consider technological innovations in our planning and implementation in order to provide the highest quality of care to older adults. Additional research is needed regarding evaluation of outcomes and effectiveness of these resources.

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