Consumer Managed Home E-Health For The Next Decade

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ABSTRACT

Connectivity allows access to health information services at home for self-care, on-line or automated consultations, links with home telecare devices for safety, independent living and social links.

The trends for access to healthcare from the consumers' own homes through intelligent assistive technology offers significant sustainability advantages including reduced admissions, readmissions, length of stay when people are admitted, reduced carer and patient travel, and other clinical, social and economic benefits.

This paper will discuss the opportunities for better delivery of care to the elderly in their own homes, the availability of innovative technology, evidence of benefits and pathways for greater adoption.

Keywords: e-Health, telecare, telehealth, assistive technology, consumer

INTRODUCTION

The needs and opportunities for better delivery of healthcare is indicated by the high level of poorly-managed illness, adverse events and conditions amongst the elderly in the community and in residential aged care. These include falls, polypharmacy, medication events, the incidence of aspects of frailty such as incontinence, cognitive decline and social isolation. Telecare in the form of the personal emergency alarm is readily available in many countries and there are many projects that are deploying home telehealth but not yet a sustainable market.

There are many chronic illnesses that could be better managed with innovative intelligent assistive technology technologies that are available, yet rarely found in the homes of people who might benefit most from their use. Intuitively, supporting people at home would incur a lower cost than hospital care. Whilst there are successful pilots and projects that have shown compelling evidence of benefits, there are other pilots that have been abandoned and the systematic reviews of the literature have been inconclusive.

There is much to be done in research to improve access to intelligent assistive technologies for people who could benefit including frail aged consumers, their families, carers, care provider organizations and care funders. There is a need for more compelling evidence of the benefits through large-scale randomized controlled trials to be able to influence policy relating to resource allocation. There is a need for greater awareness of the technology and how to acquire and operate it successfully.

NEEDS AND OPPORTUNITIES

Age-related demographic changes in Australia and the rest of the world are well-documented [9]. Associated with ageing is an anticipated increase in demands for support and increasing incidence of chronic illnesses such as chronic obstructive pulmonary disease and heart failure [1]. Ageing increases the likelihood of such conditions and can expose consumers, their families and carers to well-known challenges of social isolation [5], depression, polypharmacy [6], medication errors [Runciman et al], reduced mobility and risk of falls [2]. Consumers and their families are ill-prepared to deal with issues that confront them suddenly following a serious fall. The experience of navigating the complexity of services to meet the needs of a family member can be daunting [3]. To date care delivered in the home has remained largely labour-intensive and poorly supported by modern technologies to help consumers or their families in accessing and sharing information, better managing conditions, restoring function and providing the best-possible quality of life.

Almost all areas of healthcare provision experience demands that exceed capacity. Assistive technology will assist in the better adoption of assistive technologies that will enable consumers to better manage their own care, access information and consultations from their own homes, reduce the need to travel, enhance safety, provide connections to others and provide many other benefits.

To date the consumer experience of assistive technology has not been fully understood as evidenced by the low level of adoption and the high level of abandonment. In Australia the Independent Living Centres provide a valuable service to consumers, families and carers through awareness-raising and promoting adoption. There is however little follow-up research on the

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experiences of consumers who have received a consultation on assistive technologies or who may have acquired these. There is a need to understand their experiences, attitudes, perceptions, benefits and barriers. This would help to better deploy assistive technologies to reduce the pressures on the healthcare workforce and many other benefits.

Falls

Falls amongst the elderly can have catastrophic consequences with only fifty per cent of people who suffer hip fractures ever regaining the ability to walk without the use of mobility aids. Falls are defined as "an unintentional descent to the floor or ground in a conscious patient" [4]. Falls account for the largest proportion of all injury related deaths and hospitalisations in individuals over 65 years [10] and one third of older Australians will fall each year with the risk increasing with age. For individuals over the age of 80 the risk of falls is double due to the prevalence of multiple risk factors associated with age [11]. In residential aged care up to 50% of older people fall once or more in a year. There is an abundance of literature on risk factors associated with falls. Falling is not a diagnosis but a symptom of multiple underlying diseases, the effects of medications, and/or environmental hazards or obstacles. Strategies for falls minimisation include screening, use of assistive devices, education, exercise and addressing environmental hazards. Falls in older people are preventable, complex events that involve a number of interactive risk factors, and the more risk factors the greater the chance of falling.

Early identification of falls risk or falls related injury risk and development of a targeted management plan reduces the likelihood of development of secondary problems such as fear of falling and reduced activity level, and increases the likelihood that interventions will be successful. Falling is a health condition meeting all criteria for prevention: high frequency, evidence of preventability, and high burden of morbidity. The multifactorial nature of falls requires a coordinated approach involving care professionals such as the patient's family doctor, community care nurses, allied health, medical specialists and others. This requires an integrated approach to care supported by communications and information management infrastructure.

There are movement detectors that can be installed in a home and which will alert for lack of movement that might indicate that a fall has happened. Other wearable technologies will detect that a fall has happened and that a carer needs to be alerted. Anecdotal evidence is that the elderly are reluctant to wear devices. There is work on intelligent assistive technologies are available that can monitor movement and gait in order to predict the likelihood of a fall. These assess gait and balance and attempt to infer future risk. There is early work on devices that will record events surrounding a fall in order to identify factors leading to falls. In addition there are technologies that will automatically alert a carer in the event of a fall.

Cardiovascular disease

Cardiovascular disease including Heart Failure is Australia's most costly disease and second only to cancer in terms of disability and premature death [1]. Heart disease is a major cause of hospital admission with readmission rates from an exacerbation of heart failure of 30% and 60% at 30-day and 12 months respectively following discharge. It is associated with high levels of health-service utilisation across all settings of care as the disease progresses. Risk factors such as smoking, lack of exercise, being overweight, excessive alcohol use and poor diet can be minimized, and thereby can greatly reduce the impact of heart disease [2]. There is evidence that cardiac rehabilitation can decrease these risk factors. This is the goal of the Heart Failure Service at the Royal Brisbane and Women's Hospital, where objective evaluation of our model will be conducted.

Home-based healthcare support can assist with early intervention and help patients to proactively manage their conditions through self-monitoring, thereby reducing the need for patients to leave their homes to seek advice and care. Through on-line transmission of patient vital signs and other indicators, the technology can help prioritise home visits and decrease clinician visits for only routine check-ups. Having a personalised care plan with specific targets, supported by timely access to quality information sources and to healthcare professionals when required from within their homes, would enable many people with chronic health to take charge of their own care.

Home heart failure services are multi-disciplinary and depend on effective working relationships with members of many health disciplines, for example, General Practitioners, Allied Health Practitioners, Nurses, and Internal Medicine Specialists, with particular expertise in cardiac care and community and restorative care. There are few means of electronically sharing patient information across sectors and across the many carers that a patient interacts with. HF carers work in a field where there is a high level of adverse events, conditions and unmet needs. Many of their patients have multiple and complex co-morbidities. HF clinicians are often

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isolated in their work and usually limited for time, information and resources. There is interest in but not as yet a favourable expectation of ICT (Information & Communications Technology) such as intelligent assistive technology for efficiency, effectiveness and productivity. The technology is expected to provide efficiencies which will help with the shortage of staff to work in this area.

INTELLIGENT ASSISTIVE TECHNOLOGIES

There is a need for more knowledge to assist in improving the processes of client consultation around assistive technologies and providing advice to clients and their families. The knowledge would assist in training of Allied Health professionals and relevant clinical schools. It would also be of interest to developers of assistive technologies, telecare and telehealth to assist them in product design, development and marketing.

Assistive technology deployment would support the healthcare reform agenda in Australian and in other countries which advocates for more care in primary and community settings, health literacy, consumer health education, self-care and greater use of technology. It will help shift the focus more to prevention and management of care in the community and better equipping consumers and their families to proactively manage conditions. It will identify a major knowledge gap which is the experience of consumers of assistive technology services. There is a need for more large-scale randomised survey of consumers of intelligent assistive technology services. The benefits of the intelligent assistive technology will help intelligent assistive technology providers improve their services to achieve a higher level of consumer adoption and realisation of the benefits for consumers and their families. A better understanding of the consumer experience and resulting strategies for adoption will give care providers greater comfort for investing in these innovations.

Such research will examine how AT can help people get access to health care, their perceptions of costs and benefits, what happens to patients as a result of receiving intelligent assistive technology consultations and their experiences with AT. It will assist the intelligent assistive technologies and other health services to identify the most effective ways to organize, manage, finance, and deliver high quality care; reduce errors; and improve patient safety through innovative home health technologies.

BARRIERS AND PATHWAYs TO ADOPTION

Intelligent assistive technologies such as telehealth have not been widely adopted despite the expected value in timely and cost-effective management [Hebert et al 2006]. Barriers to adoption include a low level of awareness, a lack of business models for providing and supporting the technologies, user resistance on the part of both consumers and carer professionals, a lack of funding for the technologies, healthcare and support services funding models which tend to focus on end-stage of disease and episodic treatment rather than long-term and chronic conditions, and many other factors. Where technologies have been initially adopted there has been a high level of abandonment reported.

One of the reasons for this recalcitrance is the lack of studies that have progressed beyond pilot scale; there is also criticism of the quality of the available evidence [13].

CONCLUSION

Health services are under increasing strain in most countries; this will intensify as Babyboomers move into old age when the incidence of illness and utilisation of health services increases. Currently almost one million Australians receive some form of support at home; usually delivered in labour-intensive modes and there is little adoption of home assistive technologies and telehealth beyond pilots. Some evidence is emerging that home Assistive Technologies can reduce admissions and re-admissions, reduce hospital length of stay, improve community nursing work-force productivity, reduce patient and carer travel, allow consumers to delay or avoid moves into nursing homes, enable patient self-care and produce better clinical outcomes. There has been little feedback on patient outcomes and experiences which will help in service planning and effectiveness. The outcome will help health services in resource allocation decisions, help technology developers in design approaches to achieve greater adoption, and will assist consumers live independently and better manage their own care.

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