Voice-controlled virtual assistants for the older people with visual impairment

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Compared with the other age groups, the elderly population in England and Wales suffer from the highest incidence of visual impairment, with almost 18 000 Certificates of Vision Impairment (CVI) registrations, which was 75% of the total figure in the over-65 age group between 2012–2013.¹ Age-related macular degeneration (AMD) is the leading cause of visual impairment, with estimations suggesting a 2.4% prevalence of late AMD in the over-50 age group, equivalent to 513 000 cases in the UK. The proportion of late AMD increases with advancing age, rising to 4.8 and 12.2% at over-65 and over-80 age groups respectively.² Older people with visual impairment suffer from more physical and mental health co-morbidities compared to those with normal vision.³ This vulnerable group of population is also associated with higher rates of hospital admissions with falls.⁴ Psychologically, visually impaired elderly display higher prevalence of anxiety, depression, and have poorer quality of life.^{5,6}

It has been shown that introducing the Internet to the elderly can help to promote psychological well-being, contributing to their sense of empowerment and independence, through accessing news, weather and entertainment, obtaining information on interests and health problems, or shopping online.^{7,8} While high proportions of the working-age adults regularly surf the Internet, the older generation are less likely to do so. A recent survey in US found that Internet use among the elderly has steadily climbed over the past decade, with the ‘younger seniors’ (65–69-year-olds) almost twice as likely to use the Internet than the over-80s, at 82 and 44% respectively. Not surprisingly, however, Internet use is also positively correlated to higher household income and educational attainment.⁹

‘Virtual Assistants’ are software agents powered by artificial intelligence, the first one popularised and used globally being Apple Inc.’s Siri.¹⁰ It was integrated into the iOS (iPhone operating system) and was first released in 2011. To date other notable Virtual Assistants, backed by competing tech giants, include Amazon Inc.’s Alexa, Google Inc.’s Assistant, and Microsoft Corp’s Cortana.

‘Traditional’ devices such as computers, smartphones, and tablets rely on display screens to present information and keyboards or touch-screens to input data or commands. These require reasonable levels of vision and manual dexterity, both of which can be demanding for older persons with degenerative eye and joint diseases. In contrast, voice-driven ‘smart speakers’ powered by Virtual Assistants are able to bypass these constraints, relying on the users’ speech and hearing functions instead.

Amazon Echo, publicly launched in 2016, is the first always-on voice-controlled smart speaker powered by ‘Alexa’. The use of such a gadget can assist the day-to-day living of an elderly person with visual impairment. With Internet connection, its users can listen to the news, music, radio channels and audio books. They can also check the time, set timers and alarms, organise personal calendars, search for facts and shop online, all via voice commands alone. With other ‘smart’ home devices installed, one can control the thermostat and lights, all without the need of physical contact.¹¹ For the first time, a person with reduced vision and no prior experience with computers can utilise such hi-tech gadgets simply by talking to them.

These valuable tools do face significant barriers to gaining traction in this elderly cohort; it is important to note that the very elderly and socially deprived suffer from a higher risk of vision-related quality of life impairment¹²—incidentally the very group of older people least likely to surf the Internet and possibly least able to afford such devices and home broadband

connections. Furthermore, elderly with co-existing hearing or speech impairment, such as from cerebrovascular accidents, may not benefit from such devices. At the moment certain simple functions, for example deleting items off a shopping list on the Alexa, cannot be voice-controlled and is still display screen-dependent. There are also concerns regarding possible intrusion to privacy with these always-on microphone-enabled products that are connected to the Internet.¹³

Undoubtedly, we as healthcare professionals will encounter more and more tech-savvy elderly patients in the years to come. Will these voice-controlled smart speakers assist the daily living of older people with visual impairment and enrich their psychological well-being? Perhaps; more real-world studies will certainly be needed to evaluate their efficacies. Optimising costs and functionality to make them more accessible and user-friendly to this population will be a necessary consideration for technology firms, healthcare services and patient support groups alike, in order to reap the full benefit this technology can bring.

Conflict of interest

The author declares no conflict of interest.

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