What Kinds of Electronic Devices do People with Spinal Cord Injury Use?

A spinal cord injury (SCI) is damage anywhere along the spinal cord from an accident or other trauma. Depending on the injury’s location, people with SCI may lose movement in their legs (paraplegia) or in their legs and arms (tetraplegia) in varying degrees. High-level tetraplegia is caused by an injury between the first four vertebrae of the spine and is the most severe form of injury. It can cause severe limitation or total loss of a person’s ability to use his/her legs and arms, including loss of dexterity in their hands. Recently, many programs and apps have been developed for smartphones, tablets, and computers, and they could help people with SCI manage their health. However, some people with SCI may have trouble accessing these common electronic devices. In a recent NIDILRR-funded study, researchers looked at electronic device use among people with SCI. They wanted to see what devices most people with SCI use, and whether a person’s age or level of paralysis had any impact on their use of these common devices.

Researchers at the project on Addressing Self-Management Skills Through Electronic Gaming: Meeting the Needs of Underserved Individuals with SCI surveyed about 450 people with SCI in 2013. The participants ranged in age from 7 to 96 and had either tetraplegia or paraplegia. All participants were or had been patients at the University of Michigan within the past 10 years. On the surveys, the participants were asked whether or not they owned or used a computer, tablet, or handheld device such as a smartphone. The participants also answered questions about their background, including whether they had high tetraplegia, low tetraplegia, or paraplegia, and whether that paralysis made it difficult to use electronic devices.

The researchers looked at which devices were used across all levels of paralysis and age groups. The researchers found that almost all of the participants reported using a desktop or laptop computer, regardless of injury severity or age. However, only about a third of the participants with high tetraplegia used a tablet or handheld device, compared to about half of the participants with less severe paralysis. Also, the participants who were 65 years old or older were less likely to use tablets or handheld devices than the younger participants. Even though electronic device use was common among all adults over 18 with SCI in this study, it was not as common as it may be for American adults in general. When the researchers compared their findings to a Pew Research survey of device use among a nationwide sample of American adults, they found that a smaller percentage of participants in this study used computers, tablets, or handheld devices compared to the general population sample of American adults. For example: about 65% of the participants in this study reported using a computer, while about 80% of adults in Pew’s nationwide study sample reported using a computer.
Some of the participants in this study said that they were unable to use a handheld device because of their SCI. About 25% of respondents with high-level tetraplegia and complete paralysis said they could not use a smartphone and about 22% said they could not use a tablet. The participants with low-level tetraplegia (injuries between the fifth and eighth vertebrae of the spine) or paraplegia were less likely to report difficulty in using these devices.

The authors noted that people with high-level tetraplegia, who may have very limited use of their hands, may have difficulty performing the hand and finger gestures needed to access many tablets and handheld devices, like swiping or tapping. On the other hand, desktop and laptop computers, which were commonly used by the participants from all injury levels and age groups, may be easier to use because they can be paired with peripherals like voice controls or eyegaze trackers to make navigation and typing more accessible. In addition, a household may jointly own a single computer, making it less costly than purchasing an individual tablet or mobile device for each member of the household.

The authors suggested that mobile health application developers may want to consider developing web-based applications that are also easy to use with a computer, increasing the accessibility of these programs to people of all age groups and abilities. It may also be helpful for tablet and handheld device developers to consider the unique accessibility needs of individuals with limited hand function due to SCI. Software enhancements such as voice recognition or head-operated controls may improve accessibility for people with high tetraplegia. It may be important to note that this survey was conducted in 2013, as tablet use was beginning to grow. As prices drop and handheld technology becomes more popular, researchers may want to explore how attitudes toward tablets and smartphones and their adoption change in the coming years. Finally, researchers and program developers may want to consider the interaction between age and electronic device use and appropriate tailor their approach with consideration for preferred methods of interactions. Future research will be useful in identifying the reasons that people with SCI use electronic devices as well as what they perceive as barriers to electronic device use.

To Learn More

AbleData, the largest database of assistive technology products and manufacturers, lists many options for assistive devices, peripherals, apps, and programs for computers and hand-held devices. Read through their guide to accessibility and mobile assistive technology apps at http://abledata.com/publications/accessibility-and-mobile-apps-story and browse through the listings at http://abledata.com/products/cat/computers

The Technology Increasing Knowledge/Technology Optimizing Choice (TIKTOC) Rehabilitation Engineering Research Center is currently beta testing a health-management game app, SCI-HARD, for tablets and phones. Find out more about the app and joining the beta test at http://cthi.medicine.umich.edu/sci-hard
To Learn More About this Study:


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