Review Article

Digital Health Transformed for Elderly Care Through the Metaverse

Thomas W Miller*

Professor Emeritus & Senior Research Scientist, Institute for Collaboration on Health, Intervention & Policy, University of Connecticut, Department of Gerontology, College of Public Health, & Department of Psychiatry, College Medicine, University of Kentucky, USA

*Corresponding author: Thomas W Miller PhD ABPP, Professor Emeritus & Senior Research Scientist, Institute for Collaboration on Health, Intervention & Policy, University of Connecticut, Department of Gerontology, College of Public Health, & Department of Psychiatry, College Medicine, University of Kentucky, USA

Abstract

Advances in digital health provides a new frontier for healthcare delivery. The metaverse is part of that new frontier that blends together several current smart technologies that provide a vehicle for integrating healthcare with a patient's needs. Our elder populations need for healthcare delivery can benefit from this technology and provide elder patients the opportunity to learn more about their conditions as they age and gain educational information and strategies that can improve their health care delivery through integrated medicine. Examined are current uses along with futuristic applications using advances in technology when it comes to health care delivery for our geriatric population. Anticipated challenges are also offered in the use of these digital advances with a geriatric population.

Introduction

There is an emerging literature focusing on the next generation of healthcare delivery with specific attention to the use of digital technology [1-8]. Examining the impact of the metaverse on elder healthcare has become the focus of healthcare scientists and practitioners. The metaverse is generally regarded as a network of 3-D virtual worlds where people can interact, through their virtual "avatars." A metaverse is understood to be a space where humans can participate in shared virtual universe experiences. Think about it as a virtual reality version of today's internet. The metaverse can include virtual reality which is characterized by persistent virtual worlds that continue to exist even when they are not being used. They provide an augmented reality that combines aspects of the digital and physical worlds.

From a more scientific perspective, the metaverse is defined as a combination of multiple elements of technology, including virtual reality, augmented reality and video where users live within a digital universe. Scientific supporters of the metaverse envision its users working, playing and staying connected with friends through everything from concerts and conferences to virtual trips around to the world.

Within the next decade, technological science will employ ultra-fast broadband speeds, virtual reality headsets and persistent always-on online worlds for healthcare providers and their patients. Digital health has transformed elderly care in several ways. Naturally, it has had the most impact on the healthcare component of elderly care through telehealth technology. With the use of such technology, the care the elderly need is available more readily and as need. Here are some aspects of health care for the elderly and how digital health has transformed them.

The metaverse has gained considerable attention in a variety of venues concerning its potential to revolutionize the manner in which healthcare can be delivered. There is an absence or void however, about how it could affect healthcare. In the healthcare arena, its applications and delivery are where its impact could be transformational to medical and allied healthcare professional practice.

Twenty-first Century Evolutionary Care

Telemedicine, telehealth and its variety of configurations have offered medicine a remote service of care. There is more to emerge for healthcare professionals in the delivery of healthcare. The metaverse involves the convergence of three major technological trends, which all have the potential to impact healthcare individually. Together, though, they could create entirely new channels for delivering care that have the potential to lower costs and vastly improve patient outcomes.

Metaverse is a vehicle that allows professionals and patients to be together virtually, even while being at a distance through digital twinning, and blockchain models. These models provide an ability to let us create a distributed internet or virtual reality. This represents a key technology that enables the next-level immersion that partly qualifies a platform or application as part of the metaverse and opens a new range of possibilities in delivering effective and efficient healthcare.

The application of metaverse to telemedicine consultations, using virtual reality technology will mean patients are no lon-

ger limited to being treated by particular clinicians due to their physical location. It offers the opportunity to link with the best medical and healthcare professionals globally. If you're in the United States and the best specialist to deal with your particular condition happens to be in Germany, you can effectively be in the same room simply by wearing a headset. Scans and tests can be carried out at a facility locally, and the data transferred to the specialist, wherever they are in the world. It's particularly useful in areas where there is an acute shortage of medical professionals, as well as for patients in remote regions who would ordinarily have to travel great distances to be seen by healthcare professionals.

Examining Applications Beneficial to Elder Care
Monitoring Elder Health
The elderly population has the highest risk of non-communicable diseases. Most chronic diseases require regular health checks. These doctor appointments are challenging for the elderly due to mobility issues and the cross-infection risks during these appointments. Digital health helps to bridge this divide. Healthcare providers are able schedule an appointment with elderly patients using telemedicine platforms. This spares the elderly the trouble of leaving home for health checks, except if it is essential.

Digital Twinning
A digital twin is a virtual model, or simulation, of any object, process, or system, generated using real-world data, for the purpose of learning more about its real-world counterpart. In the case of the metaverse, the digital twin could be of the patient themselves.

Blockchain Technology
In healthcare, Blockchain technologies assures management and security of highly valuable healthcare data. At the moment, data is often shared between multiple organizations in a way that's both inefficient and opaque as far as the owners of that data (us) are concerned. The fact that health records are usually stored on centralized servers means that our data is at risk of being stolen or hacked. It also means that getting at it, even for those who have a legitimate need to access it such as a health care provider who is treating a given patient in another location. Metaverse offers the technology for a patient to own their own records. This would be kept on a personal file on a blockchain. It's unhackable and with a click of a button, a patient can give consent to any clinician anywhere in the world to review such records.

Integrated Treatment
Linking all health care providers with the patient can be provided with the convergence of these core technologies in online environments. This is what the metaverse can offer healthcare professionals by delivering integrated treatment programs and packages. It will offer Swift information sharing between clinicians t6hat would mean that underlying causes of ill health could more quickly be established. Monitoring of patient activity in the metaverse means factors such as compliance could more easily be tracked, which would further assist with diagnosing and treating a variety of condition and diseases.

Specific Interventions
Another area where it can be particularly beneficial is with specific kinds of therapy. Environments can be personalized to individual patients. Virtual reality is already used by cli-

nicians and researchers with aversion therapy. This form of therapy is where patients can interact with situations that cause them stress resulting in abnormal levels of anxiety. The virtual usage provides a safe environment where every aspect of the interaction can be closely monitored and controlled.

Virtual Clinics and Medical Centers
The virtual clinic or medical center which comprises of a virtual reality hospital environment, accessed through medical augmented reality with surgeons are able to perform complex procedures, knowing precisely where their needle, scalpel, or drill will need to be placed for precise intervention in correcting mistakes of nature and removing unwanted tumors. This is where the intersection of digital and physical worlds has real value. Allied health professionals will utilize similar strategies in selecting needed treatments that will at first be focused around counseling and therapeutic services.

Digital Healthcare & Resource Center
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Wellness and Health Promotion
Health promotion is central to ensuring the health of any population, including the provisions of services to those receiving elder care. It provides education, skills, and an environment to help people live a healthier lifestyle. Digital health has been a helpful tool in disseminating health information in the elderly population through health literacy apps and websites for the elderly.

APP Related Health Care Models
There are numerous Apps designed to address Health Promotion and disease prevention. These apps provide information concerning diet plans, fitness, and exercise, tracking vital signs, medical emergency guides, and more. This has empowered senior citizens to make healthier choices and prevent many disease conditions.

Remote Healthcare Monitoring
Older adults often require long-term care for chronic diseases. Many of them forget to take their medication. There are digital solutions in the form of apps that can provide a reminder and monitor seniors' compliance with their medications. If the app is linked to a provider, it also helps the provider generate health data that can be used to deliver personalized patient care.

Some artificial intelligence-aided devices have also been created to help seniors live healthier lives. Some of these devices include biometric trackers, smartwatches, AI-aided hearing aids, and fall detectors, which protect the elderly against hazards that would otherwise have occurred. Some companies like Medical Guardian offer a complete range of devices to protect the elderly living alone.

Safeguarding Social Networking and Care
One major challenge faced by the elderly is social isolation. Online community and digital platforms can reduce the mental and physical health risks associated with this population through interaction with peers and making new friends. Virtual

companions are also helping to meet the needs of seniors for necessary care, companionship and monitoring through metaverse technology.

Caregivers Support

Caregivers' needs must be integrated with the needs of the individuals being cared for and their health care professional staff treating the geriatric person. The metaverse can provide needed immediate guidance and support with digital solutions that can aid informal caregivers get the training they need to render appropriate care to their relatives and keep them out of institutional homes as long as possible.

Challenges for Digital Health in Elderly Care

As with advancing age, there are some challenges associated with implementing digital solutions for care among the elderly. Among some of the anticipated challenges ahead are the following considerations.

1. Digital Exclusion: In some parts of the world and most likely in developing world, the geriatric population is yet to be mainstreamed with digital health technologies. These individuals stand the risk of being completely ignored in the digital health revolution focusing on elderly care.

2. Digital Illiteracy: Globally our aging population possess poor or limited digital skills and ready exposure to the advances in technology. This limitation must be addressed as current technological trends will make it difficult for them to use digital technologies to enhance their health.

3. Education and training along with financial assistance for our geriatric population in the use of digital technologies is critical. Research and development in the provision of digital technology for all socio-economic groups is critical. Digital technologies and their applications through the metaverse are quite expensive and may not be affordable for some individuals and at-risk groups.

Concluding Thoughts

It's clear that many aspects of healthcare delivery will be affected by the opportunities offered through the advancing metaverse. Efforts must be generated to educate and share the value and benefits of health care for all individuals and including the geriatric population globally through metaverse science. This must begin with a shift in people's attitudes toward receiving healthcare and treatment online or remotely. There need to be evidence-based answers to issues and questions around equality of access to such technology for all including are elder citizens. These are issues that are likely to be addressed given time if the new generation of digital-first healthcare providers can successfully demonstrate that their innovation will lead to reduced cost and improved outcomes for patients and for caregivers.

Over the past decade, digital health has transformed care for the elderly. It is expected that with increasing life expectancy, this revolution will continue with subsequent generations and completely change the way care is delivered to the elderly and improve their quality of life. The challenges of providing digital health solutions for elderly care can easily be overcome by increased investments in health education and development. As the world's elderly population continues to grow, its investment in digital health technologies must continue to grow with it. Digital health technologies are the world's best bet for improved health and quality of life for the elderly. Healthcare organizations that focus on elderly care need to adopt these technologies early and identify other areas where digital health can make a difference in maintaining a favorable health environment for our geriatric population.

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