

## THE IMPACT OF VIRTUAL REALITY ON IMPROVING HEALTH CARE SERVICES

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**Annotation.** This paper aims to showcase the latest advancements of virtual reality in medicine, highlighting its extensive applications across various healthcare domains. The information presented is derived from the analysis of recent scientific publications and articles pertaining to the role of virtual reality in modern healthcare.

**Keywords:** Virtual Reality (VR), VR Exposure Therapy (VRET), in-person therapy.

**Introduction.** The essence of virtual reality is the experience of being in computer-generated interactive worlds. This makes it possible to evoke physiological and psychological reactions similar to real ones. VR puts you in a 3D, computer-generated environment. It usually involves wearing a headset or goggles that show video. You move your head to look around the simulated setting. You might also have the option to control movement or interact with virtual objects by using a controller or other device.

When you think of virtual reality, video games and other types of entertainment might come to mind. But VR could have benefits in other aspects of life. 171 million people worldwide use VR in some form. Companies and individuals are leaning toward virtual reality now more than ever. While the gaming industry has contributed to VR technology's popularity, its scope is not limited to entertainment.

According to a recent report, the healthcare sector is emerging as one of the leading industries embracing VR technology. It might seem odd to pair virtual reality and healthcare, but there are avenues such as mental health care where the ability to safely explore and experience could be beneficial to treatment and recovery.

**Main part.** In healthcare, Virtual Reality involves the application of immersive, computer-generated environments to replicate real-world medical situations or design innovative therapeutic experiences. Through VR headsets paired with sensory devices, users experience a deeply engaging simulation that integrates visual, auditory, and, at times, tactile elements. The integration of VR in healthcare has been transformative, offering unexplored solutions for training, treatment, and patient engagement, so much so that about 62% of patients would lean towards virtual reality as an alternative to traditional healthcare [1].

One of VR's greatest contributions to healthcare is improving medical training and education. Gone are the days when senior healthcare professionals shadowed their juniors to train and educate them. A landmark moment in this evolution was when Dr. Shafi Ahmed conducted the first VR surgery in 2016, the world's first operation to be streamed live in a 360-degree video [2].

This VR surgery provided medical students and professionals with the opportunity to engage in a lifelike simulation of the actual procedure. With VR technology, medical professionals can receive training, practice procedures, and hone their skills without harming patients. Furthermore, these simulations offer detailed anatomical visualization and interactive scenarios that improve understanding and retention of medical knowledge.

Virtual reality training for healthcare professionals is a huge area that can benefit modern healthcare provision. VR's engagement factor makes training much quicker, which in turn allows on-the-job training. This is very flexible when trying to fit in education and development around the day-to-day duties of a clinician, and ultimately the combination makes personal development more effective. One of the big benefits though is the honing of soft skills – bedside manner, empathy, emotional engagement. These skills take years to perfect, and younger clinicians historically struggle due to their lack of exposure to the variety of patient cases. With a virtual reality healthcare

simulation, this emotional engagement is activated straight away, and so soft skills can be built up at an accelerated rate.

Perhaps the biggest area that could benefit from VR in healthcare is mental health care. Virtual reality headsets can put a patient in a new environment, and it is that immersion that has been missing from past treatment approaches. Mental health care is an aspect of modern healthcare that is becoming an ever-greater priority. Virtual reality therapy offers a much richer setting within which psychiatrists, counsellors, and therapists can better engage patients and safely interact with the root problems they are experiencing. VR is being increasingly used in mental health therapy, offering new approaches to treat conditions such as anxiety, PTSD, and phobias. A notable application is VR Exposure Therapy (VRET), where patients are gradually exposed to anxiety-provoking stimuli in a controlled virtual environment.

This approach enables patients to face and overcome their fears in a safe and controlled environment. Research indicates that VR could alleviate symptoms of posttraumatic stress disorder by recreating traumatic experiences, such as combat, natural disasters, or car accidents, in a virtual setting. VRET has a reported success rate of between 66% and 90% for those with PTSD and has shown promising results in treating various anxiety disorders, providing an effective and innovative alternative to traditional therapy methods [3].

Studies indicate that VR therapy could serve as a substitute for in-person therapy, helping individuals diagnosed with social anxiety gradually transition into treatment within a virtual environment. 41% of Gen Z and 33% of millennials prefer virtual medical experiences to traditional, in-person hospital visits. One of the greatest advantages of VR technology is its ability to enhance access to high-quality healthcare, particularly in remote or underdeveloped areas.

A recent study examined the financial advantages of introducing VR programs in hospitals. The results revealed that the cost savings per patient for the VR program versus usual care was \$5.39. The study also showed that, on average, the hospital saved \$98.49 per patient among those willing to try VR programs. For patients who were unwilling to or did not accept VR therapy, the hospital lost \$16.90 per patient [4].

The adoption of VR in healthcare can lead to significant cost savings. VR training programs reduce the need for physical equipment traditionally used in medical training, lowering costs and allowing for repeated practice without additional expenses. In surgical planning, VR can reduce operation times and improve precision, leading to fewer complications and shorter hospital stays. Additionally, VR-enabled rehabilitation programs can be carried out remotely, minimizing the necessity for frequent hospital trips and the expenses tied to them.

The implementation of virtual reality in healthcare comes with its own set of challenges, including physical limitations, ethical concerns, and the undeniable reality that VR is not a universal solution for all healthcare needs. The most obvious of these challenges is the physical impact of the virtual reality device. Some users have reported initial problems with unease, disorientation, and even nausea in VR. The nausea (as well as other symptoms such as dizziness and a loss of balance) are a form of virtual reality «sickness». This is primarily caused by latency – a lag in the data transfer that means your actions do not tally with the virtual response. Moreover, the blue light output from the headsets can disrupt natural biological.

**Conclusion.** As VR technology continues to evolve, its integration into healthcare promises to enhance patient care, improve health outcomes and transform medical education. The immersive nature of VR, combined with increasing personalization and interactivity, holds the potential to address a wide range of healthcare challenges.

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