The Use of Virtual Reality in Physiotherapy Practice: A Review Article

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DOI: https://doi.org/10.51584/IJRIAS.2026.11100052

Received: 18 July 2026; Accepted: 23 July 2026; Published: 05 November 2026

ABSTRACT

Aim– To explore how virtual reality is being used in physiotherapy practice and what benefits it offers in terms of clinical outcomes.

Background - Virtual reality (VR) has emerged as a promising tool in physiotherapy, offering immersive, engaging, and patient-centered rehabilitation experiences. It has shown positive outcomes across various conditions including stroke, musculoskeletal disorders, and neurological impairments, enhancing motivation and functional recovery.

Method – A literature search was conducted on google scholar, and researchGate, Out of approximately 50 articles, 16 were selected based on inclusion and exclusion criteria and were reviewed to understand the clinical role of VR in physiotherapy.

Result - The review revealed that virtual reality interventions significantly improved patient outcomes such as balance, mobility, pain reduction, and engagement compared to conventional physiotherapy. Most studies reported enhanced adherence and functional recovery, especially in stroke, orthopedic, and neurological rehabilitation settings.

Conclusion – VR shows strong potential as a supportive tool in physiotherapy. It makes rehabilitation more interactive and effective although more research is needed to fully understand its long-term impact and best practices for use.

Keywords – Balance, Motor Function, Physiotherapy, Rehabilitation, Virtual Reality

INTRODUCTION

Rehabilitation plays a crucial role in healthcare. It mainly focuses on functional independence & quality of life. Physiotherapy is one of the important profession involved in rehabilitation. Physiotherapy rehabilitation can be required following injury, disability, ageing, disease etc. Physiotherapist address physical functioning, movement & participation.

Healthcare is evolving with advance technology. Modern physiotherapy requires modern technology, innovation that can complement conventional rehabilitation are gaining attention.[1,2]

VR is a technology that can create interactive environment. VR can immerse the patient in virtual environment. It can be used in rehabilitation with conventional physiotherapy to perform exercises &

therapeutic activities. It can make the rehabilitation more engaging & interactive. VR can be used for motivation, feedback & task oriented activities which can make rehabilitation more engaging.[3]

VR based rehabilitation is used in physiotherapy in conditions like Parkinson's for balance & gait, Down syndrome for motor proficiency, in older women for balance. These demonstrates that VR has been used for different functional problems.VR provides interactive environment, game like activities, immediate auditory & visual feedback. It complements conventional physiotherapy by adjusting the activity by patient's abilities, & repeated practice & encourage participation through game like activities & enhance patient's engagement & motivation.[4,5,6]

Research has shown the effectiveness of VR based rehabilitation across multiple outcomes, including motor function, pain, balance, gait. The integration of VR into rehabilitation depends on its clinical effectiveness. Physiotherapist can decide when to use it, how to integrate it with conventional physiotherapy, how to monitor the patient, how to modify the treatment.[7] VR-based training has also demonstrated improvements in balance and gait among older adults with Parkinson's disease when compared with conventional physiotherapy.[8]

Despite the effectiveness of VR only 2.7% of physiotherapist reported using VR during the previous year, only 7% uses VR for chronic pain. Its clinical use has been limited due to insufficient familiarity with VR, its availability & accessibility, technical knowledge, Its cost & maintenance can be a physical barrier. VR can be effective but still not be integrated despite its potential benefits.[9,10,17]

Existing research has shown growing interest in the use of VR in rehabilitation. It has focused on the outcome in specific patient population. However, evidence regarding the effectiveness & clinical adoption is still limited. Understanding these factor can help determine the integration of VR in physiotherapy & rehabilitation.

This study aims to assess the perception, knowledge, attitude & practice regarding the use of VR in physiotherapy among physiotherapists. It aims to explore the factors that influence the adoption & implementation of VR in physiotherapy practice. The study intends to provide the understanding of barriers of current status of VR that influence its integration, training & further education. The gap between technology & practical implementation emphasize on the importance of how it is perceived & utilized by physiotherapist.

METHODOLOGY

Study Design: Systematic Review

Inclusion Criteria:

• Articles published in English between 2020 and 2025.

• All age group or diagnosis relevant to physiotherapy (e.g., neurological, orthopedic, pediatric).

• Used virtual reality (VR) as a part of the intervention or assessment.

• Involved human participants undergoing physiotherapy treatment.

• Available in full-text format for review and analysis.

Exclusion Criteria:

• Studies published before 2020.

• Articles not published in English.

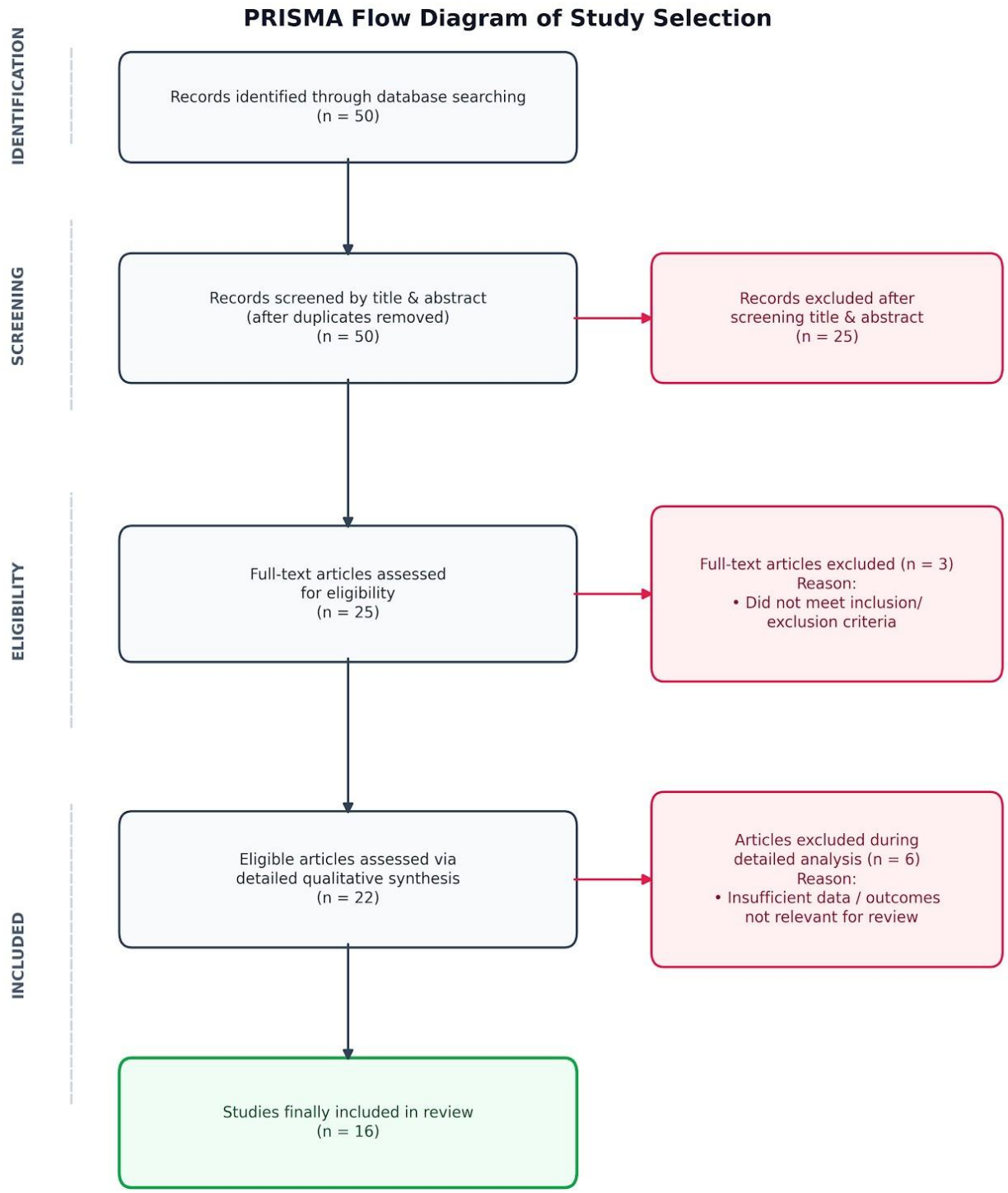
• Presence of uncontrolled medical conditions (e.g., hypertension, diabetes, cardiac issues).

• Participants with any bone fractures within the past 3 months.

• Individuals with cognitive impairments or severe psychiatric disorders.

Procedure: A systematic literature search was conducted exclusively through google scholar and ResearchGate to identify relevant studies on the use of virtual reality in physiotherapy practice. The search was performed using specific keywords such as “Virtual Reality”, “VR in Physiotherapy”, “Rehabilitation”, “Balance Training”, and “Pain Management”. Filters were applied to include only studies published between 2020 and 2025 and written in English.

Initially, 50 articles were found. After removing duplicates and screening by title and abstract, 25 articles were shortlisted for full-text review. Out of these, 22 articles were considered eligible based on the inclusion and exclusion criteria. However, only 16 studies were finally selected and included in the review after a detailed analysis.



S.No.	Title of Paper	Author(s)	Year	Methodology	Sample Size	Results	Conclusion	Outcome Measures
1	VirtualPT: Virtual Reality based Home Care Physiotherapy Rehabilitation for Elderly	Thamindu A. Heiyanthuduwa et al.	2020	Developed a VR system for home-based physiotherapy using sensors and a virtual guide. Tested in older adults.	150 elderly participants	Most users completed sessions, felt motivated and guided. Physiotherapists found it helpful.	Effective, affordable, and improves elderly participation in home rehab.	Custom feedback questionnaire and real-time motion sensors.
2	Immersive Virtual Reality: A New Dimension in Physiotherapy	Siok Yee Tan et al.	2023	Developed 'FisioVR' Android app with physiotherapist input. Tested on patients using online forms.	8 patients	Patients said the app was useful and easy. They felt more motivated to complete sessions.	FisioVR is a good and easy tool for home physiotherapy.	Likert-scale based feedback on use, functionality and motivation.
3	Exploring the Efficacy of Physiotherapy in Guillain-Barré Syndrome Through Virtual Reality-Based Rehabilitation	Neha P. Arya et al.	2024	Case report of a 29-year-old male with AMAN variant of GBS. Used VR-based balance and mobility training.	Single case study	VR helped improve strength, balance, and function over 8 weeks.	VR therapy added to regular rehab shows promising results for GBS.	Motor function outcomes, dynamic balance tests.
4	Post-Stroke Rehabilitation Using Virtual Reality-Based Physiotherapy: A Case Report	Nafeesa Ishfaq et al.	2025	Case study on a 58-year-old male post-stroke. Used VR for balance and mobility rehab.	Single patient	Showed improvements in walking, coordination, and daily activity independence.	VR therapy is helpful for motor recovery in stroke rehab.	Motor strength, dexterity, gait, coordination (qualitative report).
5	The Effect of Adding Virtual Reality-Based Rehabilitation to Conventional Physiotherapy on Pain, Function, and Balance in Knee Arthroplasty	Ghazal Hashemi Zenooz et al.	2025	RCT with 52 TKA patients (VR + physio vs. physio only). Measured pain, function, and balance.	52 patients (24 control, 28 intervention)	VR group had better improvements in pain, function, and balance than control.	VR enhances early rehab outcomes in knee surgery recovery.	WOMAC, NRS, Wii Balance Board COP metrics.
6	The Effects of Physiotherapy Programmes Aided by Virtual Reality Solutions on Balance in Older Women	Marek Zak et al.	2024	RCT comparing VR + dual-task training vs. OTAGO exercises in elderly women over 6 weeks.	80 women	Both groups improved, but VR group showed more improvement in balance during harder tasks.	VR is useful and safe for improving balance in elderly.	Single-leg stance, gait, Berg Balance Scale, TUG.
7	Limited Use of Virtual Reality in Primary Care Physiotherapy for Patients with Chronic Pain	Syl Slatman et al.	2024	Online survey of 265 physiotherapists in the Netherlands on VR use for chronic pain.	265 physiotherapists surveyed	Only 7% use VR; those who do find it moderately helpful. Most not familiar with it.	VR has potential, but more awareness and training are needed.	Surveys rated on 0–10 scale for usage, satisfaction, goals.
8	VR Therapy + Physiotherapy to Improve Motor Proficiency in Down Syndrome: Systematic Review	Ghafar, Wuang, Silva, et al.	2022	Systematic review of 7 studies (RCTs, quasi-experiments, case study)	345 (148 experimental)	VR with PT improved balance, agility, and strength; results varied	VR therapy shows promising results when combined with PT, but needs more consistent research	BOT-2, Paediatric Balance Scale, TUG, 5xSTS, TGMD-2, handgrip, shuttle run

9	Implementation of a VR Intervention in Outpatient Physiotherapy for Chronic Pain: Protocol	Elser, Kopkow, Schäfer	2024	4-phase implementation study using interviews and framework-based strategy	5 clinics, qualitative only	Ongoing; early results show feasibility and barriers identified	A VR-based chronic pain intervention is practical and helpful; theory-based implementation strategy developed	Tampa Scale of Kinesiophobia, Pain Disability Index, EQ-5D-5L, Pain Catastrophizing Scale
10	Virtual Reality for Assessment of Chronic Lower Back Pain in Physiotherapy	Lundström, Björnfot, Sahlin, Herath, Berglund, Strömbäck	2024	Design research: 3 workshops, 3 VR tools tested by 6 physio students	6 participants	Found VR usable for low back pain assessment but needs task refinement	VR is promising for assessing physical function in chronic low back pain, especially with tailored task design	Custom VR applications designed in study; qualitative feedback-based outcomes
11	Immediate Effect of AR, VR & Neurofunctional PT on Parkinson's Patients	Oliveira Araújo, Souza, Silva, Terra, et al.	2022	RCT comparing VR, AR & neurofunctional PT	30 (3 groups of 10)	VR & AR showed improved postural control; neurofunctional PT also effective	VR/AR can have immediate positive effects on balance and executive function in Parkinson's disease	TUG Test, Stroop test, Mini-BESTest, MoCA
12	Contemplating or Acting? VR Immersion in Breast Cancer Physiotherapy	Buche, Michel, Piccoli, Blanc	2021	Within-subject design with 4 conditions (music, VR active/passive, standard care)	30 breast cancer patients	Participatory VR improved presence; all methods reduced anxiety	VR, especially participatory mode, is effective for emotional support during scar massage	Self-reported emotion scales, time perception, presence scale
13	Comparative Analysis of VR Training vs Conventional PT in Parkinson's	Usama, Khan, Saeed, et al.	2023	Quasi-experimental comparative study	30 older adults	VR group showed more improvement in gait & balance than traditional PT	VR training is more effective than conventional PT in Parkinson's rehabilitation	Berg Balance Scale, TUG, gait speed
14	Usage of VR in Physiotherapy in Germany: Survey Study	Elser, Ohse, Frankenstein, Leeuw, Schäfer, et al.	2024	Cross-sectional survey	296 physiotherapists	Only 2.7% used VR in practice; majority unaware or unfamiliar	Need for awareness, training, and institutional support for VR adoption	Not applicable – survey on practice trends
15	Perceived Usefulness & Ease of Using VR – Survey from Physio Perspective	Krishnan, Purushothaman, Subbarayalu, et al.	2023	Cross-sectional survey	128 physiotherapists	Positive views on usefulness and ease of VR; concerns about cost & training	Most physiotherapists believe VR can be a valuable tool if implemented well	Likert scales for ease-of-use, usefulness, intention to use
16	Effect of Physiotherapy with Immersive VR in Stroke: Protocol	Garay-Sánchez, Marcén-Román, Ferrando-Margelí, Franco-Sierra, Suarez-Serrano	2023	RCT Protocol with two groups (VR + PT vs conventional)	Not yet implemented (planned)	Not available yet – protocol only	Study aims to test if immersive VR improves stroke recovery vs traditional PT	BESTest, BBS, PASS, TUG, ECVI-38

DISCUSSION

This systematic review aimed to explore how virtual reality (VR) is being used in physiotherapy practice and what outcomes it helps to improve. After analyzing the selected studies, it became clear that VR is a promising

tool in rehabilitation across various conditions such as stroke, Parkinson's disease, post-surgical rehabilitation, Down syndrome, chronic pain, and even cancer care.

Across most studies, patients who received VR interventions along with conventional physiotherapy demonstrated better motivation, improved balance, coordination, strength, and in some cases, reduced pain. For example, in total knee arthroplasty patients, the group receiving VR showed significantly better progress in pain reduction and balance compared to those receiving only conventional therapy.[5] Similarly, stroke patients who received VR-based rehabilitation showed improvements in coordination, gait, and motor function [10,14] ,and Parkinson's patients showed enhanced postural control, balance, and gait function with VR interventions.[8]

Emotional and psychological benefits were also noted. For instance, a study involving breast cancer patients found that participatory VR reduced anxiety and increased emotional engagement during therapy sessions.[10] This shows VR's potential not only in physical rehabilitation but also in psychological well-being.

However, the review also revealed that the use of VR in day-to-day physiotherapy remains limited. Survey-based studies conducted in Germany and the Netherlands showed that a very small percentage of physiotherapists were currently using VR—2.7% and 7%, respectively—citing lack of awareness, insufficient training, or lack of access to necessary technology as major barriers.[12] These findings emphasize the need for structured training programs, awareness campaigns, and institutional support to facilitate the broader adoption of VR tools.

Although most of the reviewed studies reported positive outcomes, it is important to acknowledge the limitations. Some were case studies or small-scale RCTs [9,11] ,while others were still in protocol stages[4,14]

In summary, this review shows that VR has great potential to improve outcomes, increase patient engagement, and add value to physiotherapy especially when combined with conventional methods.

RESULT

After reviewing the articles a total of 16 studies were included in this systematic review. These studies looked at how virtual reality (VR) was used in physiotherapy for different conditions like stroke, Parkinson's disease, joint replacements, chronic pain, Down syndrome, and in elderly care and cancer rehabilitation. Most of the studies showed that using VR along with regular physiotherapy has shown better outcomes. Patients experienced improvements in: Balance and coordination, especially in stroke and Parkinson's patients. Motivation and interest during sessions increases, as the VR activities were more engaging. Pain relief and faster recovery in conditions like knee replacement were seen. Motor skills and strength increases, especially in children and people with Down syndrome. Some studies also mentioned that VR helped reduce anxiety and stress, especially in patients going through tough treatments like cancer rehab.

Also, survey-based studies showed that many physiotherapists still don't use VR in daily practice, mostly because of limited awareness, training, or access to the right equipment. Even so, most of them said they were open to learning and using VR in the future if proper support was available.In short, these results show that VR can be a helpful and motivating tool in physiotherapy when used with traditional methods, but we still need more detailed and large-scale research to fully understand its long-term benefits.

CONCLUSION

This review shows that VR is becoming a helpful addition to physiotherapy. Whether it's used for patients recovering from a stroke, or with Parkinson's, healing after surgery, or even managing cancer-related anxiety, VR seems to bring something extra. It helps improve balance, movement, and motivation, and even makes therapy more enjoyable and less stressful.

We also noticed that while the results are encouraging, VR isn't being used much in daily physiotherapy yet. Many physiotherapists aren't fully aware of how to use it or don't have the tools and training. This means

there's still a long way to go before it becomes a regular part of rehab. Even though VR can't replace hands-on therapy, it can definitely support it. With better awareness, proper training, and more research, virtual reality could become a fun, engaging, and effective way to help people recover and stay motivated during their physiotherapy journey.

Abbreviation: VR – Virtual Reality

Conflict of interest: No conflicts of interest are disclosed by the writers.

Funding details: Funding was not obtained for this study.

Acknowledgement: I extend my sincere gratitude to my guide for her invaluable guidance and support throughout this research. I gratefully acknowledge my family and friends for their unwavering encouragement.

REFERENCES

1. Stolwijk N, van Bergen A, Jetten E, Maas M, Berkhout JJ, Driessen E, et al. Preparing physiotherapists for the future: the development and evaluation of an innovative curriculum. BMC Med Educ. 2025;25:83. doi: https://doi.org/10.1186/s12909-024-06537-1
2. World Health Organization. Rehabilitation [Internet]. Geneva: World Health Organization; 2023 [cited 2025 Jul 7]. Available from: https://www.who.int/news-room/fact-sheets/detail/rehabilitation
3. Tan SY, Lam MC, Faburada J, Pavel MI. Immersive virtual reality: a new dimension in physiotherapy. Int J Adv Comput Sci Appl. 2023;14(10):735–9. doi: https://doi.org/10.14569/IJACSA.2023.0141009
4. Elser A, Kopkow C, Schäfer AG. Implementation of a virtual reality intervention in outpatient physiotherapy for chronic pain: protocol for a pilot implementation study. JMIR Res Protoc. 2024;13:e58089. doi: https://doi.org/10.2196/58089
5. Hashemi Zenooz G, Taheriazam A, Rezaeian T, Mokhtarinia H, Moosavi A, Zenooz SMS, et al. The effect of adding virtual reality-based rehabilitation to conventional physiotherapy on pain, functional ability and static balance control in patients with total knee arthroplasty [preprint]. Res Sq. 2024. doi: https://doi.org/10.21203/rs.3.rs-5806312/v1
6. Stander J, du Preez JC, Kritzinger C, Obermeyer NM, Struwig S, van Wyk N, et al. Effect of virtual reality therapy, combined with physiotherapy for improving motor proficiency in individuals with Down syndrome: a systematic review. S Afr J Physiother. 2021;77(1):a1516. doi: https://doi.org/10.4102/sajp.v77i1.1516
7. Zak M, Sikorski T, Michalska A, Sztandera P, Szczepanowska-Wolowiec B, Brola W, et al. The effects of physiotherapy programmes, aided by virtual reality solutions, on balance in older women: a randomised controlled trial. J Clin Med. 2024;13(21):6462. doi: https://doi.org/10.3390/jcm13216462
8. Usama M, Khan UA, Saeed A, Siddiqui B, Fatima SB, Azfar H. Comparative analysis of the impact of virtual reality training and conventional physiotherapy on balance and gait in older adults with Parkinson's disease. J Health Rehabil Res. 2023;3(2):526–30. doi: https://doi.org/10.61919/jhrr.v3i2.179
9. Janani RC, Natarajan S, Varadaraju N. Exploring the efficacy of physiotherapy in Guillain-Barré syndrome through virtual reality–based rehabilitation: a case report. Cureus. 2024;16(4):e59042. doi: https://doi.org/10.7759/cureus.59042
10. Ishfaq N, Khalid A, Razzaq MN, Hashmi MT, Almagharbeh WT, et al. Post-stroke rehabilitation using virtual reality–based physiotherapy: a case report. Insights J Health Rehabil. 2025;3(2):419–24. doi: https://doi.org/10.71000/6ake0t89
11. Buche H, Michel A, Piccoli C, Blanc N. Contemplating or acting? Which immersive modes should be favored in virtual reality during physiotherapy for breast cancer rehabilitation. Front Psychol. 2021;12:631186. doi: https://doi.org/10.3389/fpsyg.2021.631186
12. Elser A, Ohse M, Frankenstein C, Leeuw M, Schiebler S, Schmieder S, et al. Usage of virtual reality technology in physiotherapy in Germany: results from a survey. Bioengineering (Basel). 2025;12(2):106. doi: https://doi.org/10.3390/bioengineering12020106

13. Vasanthi RK, Chaw LJ, Purushothaman V, Kumaresan A, Chinnusamy S, Karuppaiyan R, et al. Perceived usefulness and ease of using virtual reality during physiotherapy – a cross-sectional survey from physiotherapists' perspective. Electron J Gen Med. 2023;20(6):em530. doi: https://doi.org/10.29333/ejgm/13519
14. Garay-Sánchez A, Marcén-Román Y, Ferrando-Margelí M, Franco-Sierra MÁ, Suarez-Serrano C. Effect of physiotherapy treatment with immersive virtual reality in subjects with stroke: a protocol for a randomized controlled trial. Healthcare (Basel). 2023;11(9):1335. doi: https://doi.org/10.3390/healthcare11091335
15. Heiyanthuduwa TA, Amarapala KWNU, Gunathilaka KDV, Ravindu K, Wickramarathne J, Kasthurirathna D. VirtualPT: Virtual Reality–based home-care physiotherapy rehabilitation for elderly. 2020 2nd International Conference on Advancements in Computing (ICAC). 2020 Dec 10. doi: https://doi.org/10.1109/ICAC51239.2020.9357281
16. Limited use of virtual reality in primary care physiotherapy for patients with chronic pain: a national survey among Dutch physiotherapists. BMC Musculoskelet Disord. 2024;25:168. doi: https://doi.org/10.1186/s12891-024-07285-5
17. Lundström A, Björnfot P, Sahlin W, Herath H, Berglund L, Strömbäck E. Virtual reality for assessment of chronic lower back pain in physiotherapy – task selection, design, and user experience evaluation. In: Gray C, Ciliotta Chehade E, Hekkert P, Forlano L, Ciuccarelli P, Lloyd P, editors. DRS2024: Boston; 2024 Jun 23–28; Boston, USA. Paper no. 372. doi: https://doi.org/10.21606/drs.2024.1297
18. Araújo HAGO, Souza RJ, da Silva TCO, Nascimento TS, Terra MB, Smaili SM. Immediate effect of augmented reality, virtual reality, and neurofunctional physiotherapy on postural control and executive function of individuals with Parkinson's disease. Games Health J. 2023;12(3):211–9. doi: https://doi.org/10.1089/g4h.2021.0222