

Letter to the Editor



Virtual reality: a promising non-pharmacological modality for chronic low back pain management in elderly

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TO THE EDITOR

Chronic low back pain (CLBP), as a major and potentially disabling musculoskeletal conditions, is highly prevalent among older adults [1]. Previous studies revealed that in different parts of the world approximately 30% of older adults experience CLBP that lasts for at least 3 months [2,3]. CLBP among older adults can lead to functional disability, increased risk of fall, depression, sleep disturbance, cognitive deficits and poor quality of life. CLBP-related consequences can also impose substantial financial burden on caregivers and society [4,5]. Considering the multifactorial etiology of CLBP in older adults, it is a therapeutically challenging pain condition. Notwithstanding pharmacological and technological advancement in chronic pain management, CLBP management in older adults has only limited success. It has been previously shown that, despite its high prevalence and numerous negative consequences, CLBP in older adults remains untreated. Therefore, identifying a safe and cost-effective adjunctive treatment modality for CLBP management is crucial [1,6,7].

Recently, virtual reality (VR) has been proposed as

a highly promising non-pharmacological modality for chronic pain management [8]. VR is a computer-generated environment which can generate simulations of real or imagined environments and allows users to be immersed in an interactive virtual world [8,9]. Although the exact mechanism of the pain-relieving effect of VR is not well elucidated, distraction hypothesis is likely a prominent mechanism to explain the analgesic effects of VR. However, graded exposure therapy and neuromodulation are other suggested mechanisms [8,10]. Although some published reviews and meta-analysis found good evidence of the potential efficacy of VR for managing CLBP in adults [11,12], only one recently published study has evaluated the efficacy of four-week VR therapy in 22 older adults with CLBP. In this randomized controlled pilot study, although the patients' pain intensity decreased in both groups of older adults who received multimodal pain therapy in VR (n = 11) or conventional multimodal pain therapy (n = 11), the difference was not statistically significant. In addition, patients in the VR group had a significant improvement in subjective functional capacity compared to the control group [13]. The results of a requirements analysis

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indicated that for a successful usage of VR in CLBP management of older adults, obligatory requirements for the overall system, software, hardware and gamification elements should be set and applied [14]. Therefore, these requirements should be taken into account and met. Also, the results of a study have confirmed the efficacy of VR in reducing procedure-related pain and anxiety during fluoroscopic pain intervention in patients with chronic pain [15].

In terms of safety, the available evidence has indicated that VR interventions are generally safe, and tolerable. Despite its advantages, the high cost of VR devices and programs, potential risks of cyber sickness, eye strain, and addiction, especially if used for an extended period, are some potential challenges or limitations in employing VR. However further studies for evaluating the safety of VR and its potential side effects are necessary [16-18].

In sum, it seems that using VR has great the potential to be used as a feasible, useful, and safe adjunctive modality for managing CLBP in older adults. However further well designed and adequately powered randomized clinical trials are needed to fully evaluate and confirm the potential efficacy and safety of this modality in older adults.

DATA AVAILABILITY

Data sharing is not applicable to this article as no datasets were generated or analyzed for this paper.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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REFERENCES

1. Sakai Y, Wakao N, Matsui H, Watanabe T, Iida H, Watanabe K. Clinical characteristics of geriatric patients with non-specific chronic low back pain. *Sci Rep* 2022; 12: 1286.
2. Wong AYL, Forss KS, Jakobsson J, Schoeb V, Kumlien C, Borglin G. Older adult's experience of chronic low back pain and its implications on their daily life: study protocol of a systematic review of qualitative research. *Syst Rev* 2018; 7: 81.
3. Patel KV, Guralnik JM, Dansie EJ, Turk DC. Prevalence and impact of pain among older adults in the United States: findings from the 2011 National Health and Aging Trends Study. *Pain* 2013; 154: 2649-57.
4. de Souza IMB, Sakaguchi TF, Yuan SLK, Matsutani LA, do Espírito-Santo AS, Pereira CAB, et al. Prevalence of low back pain in the elderly population: a systematic review. *Clinics (Sao Paulo)* 2019; 74: e789.
5. Knauer SR, Freburger JK, Carey TS. Chronic low back pain among older adults: a population-based perspective. *J Aging Health* 2010; 22: 1213-34.
6. Wong AYL, Karppinen J, Samartzis D. Low back pain in older adults: risk factors, management options and future directions. *Scoliosis Spinal Disord* 2017; 12: 14.
7. Ali A, Arif AW, Bhan C, Kumar D, Malik MB, Sayyed Z, et al. Managing chronic pain in the elderly: an overview of the recent therapeutic advancements. *Cureus* 2018; 10: e3293.
8. Chuan A, Zhou JJ, Hou RM, Stevens CJ, Bogdanovych A. Virtual reality for acute and chronic pain management in adult patients: a narrative review. *Anaesthesia* 2021; 76: 695-704.
9. Li L, Yu F, Shi D, Shi J, Tian Z, Yang J, et al. Application of virtual reality technology in clinical medicine. *Am J Transl Res* 2017; 9: 3867-80.
10. Tack C. Virtual reality and chronic low back pain. *Disabil Rehabil Assist Technol* 2021; 16: 637-45.
11. Brea-Gómez B, Torres-Sánchez I, Ortiz-Rubio A, Calvache-Mateo A, Cabrera-Martos I, López-López L, et al. Virtual reality in the treatment of adults with chronic low back pain: a systematic review and meta-analysis of randomized clinical trials. *Int J Environ Res Public Health* 2021; 18: 11806.
12. Nagpal AS, Raghunandan A, Tata F, Kibler D, McGeary D. Virtual reality in the management of chronic low back pain: a scoping review. *Front Pain Res (Lausanne)* 2022; 3: 856935.
13. Stamm O, Dahms R, Reithinger N, Ruß A, Müller-Werdan U. Virtual reality exergame for supplementing multimodal pain therapy in older adults with chronic back pain: a randomized controlled pilot study. *Virtual Real* 2022. doi: 10.1007/s10055-022-00629-3.
14. Stamm O, Dahms R, Müller-Werdan U. Virtual reality in pain therapy: a requirements analysis for older adults with chronic back pain. *J Neuroeng Rehabil* 2020; 17: 129.
15. Joo Y, Kim EK, Song HG, Jung H, Park H, Moon JY. Effectiveness of virtual reality immersion on procedure-related pain and anxiety in outpatient pain clinic: an exploratory randomized controlled trial. *Korean J Pain* 2021; 34: 304-14.
16. Kim S, Kim E. The use of virtual reality in psychiatry: a review. *Soa Chongsonyon Chongsin Uihak* 2020; 31: 26-32.
17. Peterson BN, Hitching R, Howard L, Zhu K, Fontenot MR,

Alhalabi W, et al. Immersive virtual reality: a safe, scalable, non-opioid analgesic for military and veteran patients. *Front Virtual Real* 2021; 2: 742290.

18. Seifert A, Schlomann A. The use of virtual and augmented reality by older adults: potentials and challenges. *Front Virtual Real* 2021; 2: 639718.