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Effect of Virtual Reality Exergaming on pain, functional disability and Quality of Life in Women with Fibromyalgia Syndrome": A literature review

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Abstract
Fibromyalgia syndrome (FMS) is chronic pain disorder accompanied by high levels of fatigue, stiffness and impaired mobility that affects the ability to perform daily life activities, diminishing the quality of life (QoL) of fibromyalgia patients. The worldwide prevalence of this condition ranges from 0.2% to 6.6%, with a mean value of 2.7%. Female have 80 and 96% predominance of FMS in individuals aged above 30. Among various types of non-pharmacological and physiotherapy interventions, Virtual reality Exergaming (VRE) have emerged as a promising therapy for different populations by providing a three-dimensional (3D) environments and multisensory stimulation to users. VRE are considered as therapeutic tool to manage pain. The aim of this study was to assess the effectiveness of VRE in managing pain, poor physical fitness, physical fatigue, cardiopulmonary capacity, and quality of life (QoL) in women with FMS. The goal of this literature review was to assess and evaluate the effects of VRE on pain, functional disability and Quality of Life in Women with Fibromyalgia Syndrome. This literature review was conducted, adhering to PRISMA guidelines. A comprehensive search was performed using keywords in Google Scholar, PEDro, PubMed, and Research-Gate to identify relevant studies. Out of 195 studies, 7 quality RCT studies were included. This literature review highlighted Virtual Reality Exergaming (VRE) as an effective therapeutic approach for reducing pain, improving functional disability and quality of life in women with Fibromyalgia Syndrome (FMS). Additionally, VRE was found to have positive secondary outcomes, including increased physical activity, improved mobility, enhanced physical function, better balance, and improved cardiorespiratory fitness in women with FMS.

Keywords*: Fibromyalgia; Chronic pain; Diffuse myofascial pain syndrome; Fatigue syndrome; Quality of life; Virtual reality exergaming*

1. Introduction
Fibromyalgia syndrome is a disease that causes a widespread of chronic musculoskeletal pain (which lasts for 3 months), intense, fatigue, cognitive dysfunction, variety of somatic complaints, psychiatric disturbances (such as anxiety and depression). The associated symptoms of FMS include joint stiffness, cervical and lumbar pain, muscle weakness, depressive symptoms and balance alteration. All these symptoms affect the daily living of patients with fibromyalgia especially females [1-3]. Prevalence of this condition is higher in females when compared to males at a ratio of 2:1. Worldwide prevalence of FMS is around 0.2 to 6.6% with a mean value of 2.7%. Indian prevalence on a community-based study shows that out of 648 women, 33.4% has chronic pain and 6.17% has fibromyalgia. 1,3 Females consist of 80 to 96% of predominance of FMS in individuals aged above 30. The reason for this higher prevalence in females remains unclear, whereas certain studies shows that the level of

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testosterone helps to protect muscle fatigue but it is low in females when compared to males and other causes may include genetic origin and hormonal fluctuation but the exact reason is unclear. Fibromyalgia is a chronic pain condition in which the factors contributing to pain consist of central sensitization, nervous system dysregulation, sleep disturbance, musculoskeletal change, psychological and emotional factors. 1 The American college of Rheumatoid association shows some diagnostic criteria based on the presence of widespread of pain on at least 11 to 18 tender points for a duration of 3 months. The diagnosis of FMS has clinically been reliant on the evaluation of tender points or areas of tenderness around the joints. Women tend to report more tender points and feel pain intense pain when compared to males. The greater frequency of fibromyalgia among women has thus been largely attributed to the criterion. Identifying and treating the FMS is essential for reducing symptoms, minimizing disability and improve the quality of life. The main challenge in treating the FMS patients is low adherence to physical therapy because of pain, fatigue and fear of worsening the symptoms and Kinesiophobia.1 There are both pharmacological and non-pharmacological interventions to treat fibromyalgia. There are a lot of emerging technologies in physiotherapy, in that the virtual reality-based exergaming plays a major role in pain management. Virtual reality is a computerized system that stimulates activity, promotes motor learning and transfers to real world task [4-6]. Exergame combines physical activity with cognitive task. The virtual reality-based exergaming activates the movement in the real world through the feedback which stimulates the motor, sensory and mental function and promotes active participation of the subjects. The VRE have emerged as a promising therapy for different population by providing a three-dimension environment and multisensory stimulation to the users. The virtual reality exergaming is being used as a pain management in various conditions. The objective of this literature review is to synthesize and critically evaluate existing evidence on effects of virtual reality exergaming on pain, functional disability and quality of life in women with FMS and to assess the effectiveness of this in managing pain and quality of life.

2. Method

A literature review was conducted using electronic databases such as Google Scholar, PEDro, PubMed, and Research Gate to identify relevant studies on the impact of virtual reality exercise on fibromyalgia syndrome in women. Keywords such as fibromyalgia, chronic pain, diffuse myofascial pain syndrome, fatigue syndrome, quality of life, exergaming, and virtual reality were utilized to extract articles. Studies published between 2017 and December 2026 were considered. The selected studies quality was assessed using the PEDro scale, which is a reliable and validated tool commonly used in Physiotherapy. The quality of the included study scored between 7- 9 points and met the following inclusion criteria:

- Published in English-language, peer-reviewed journals
- Randomized controlled trials (RCTs) or cross-sectional studies
- Women participants aged 18 to 67 years
- Inclusion of patients diagnosed with chronic pain
- Primary outcomes assessed pain intensity and functional disability, while secondary outcomes included physical fitness and quality of life

Exclusion criteria included studies that focused exclusively on women diagnosed with other musculoskeletal conditions or men with fibromyalgia syndrome (FMS). The initial number of articles identified in electronic databases was 195. 87 articles were obtained for further screening after removing the duplicates. The systematic review selected 7 articles [7-10] that met the rigorous inclusion criteria after removing articles published in different languages, non-RCT, with no outcome, and poor-quality studies. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram was employed to visually represent the study selection process, thereby ensuring transparency and accountability in the review's methodology. Shown in Figure 1 and 2 through studies search, selection and inclusion process.

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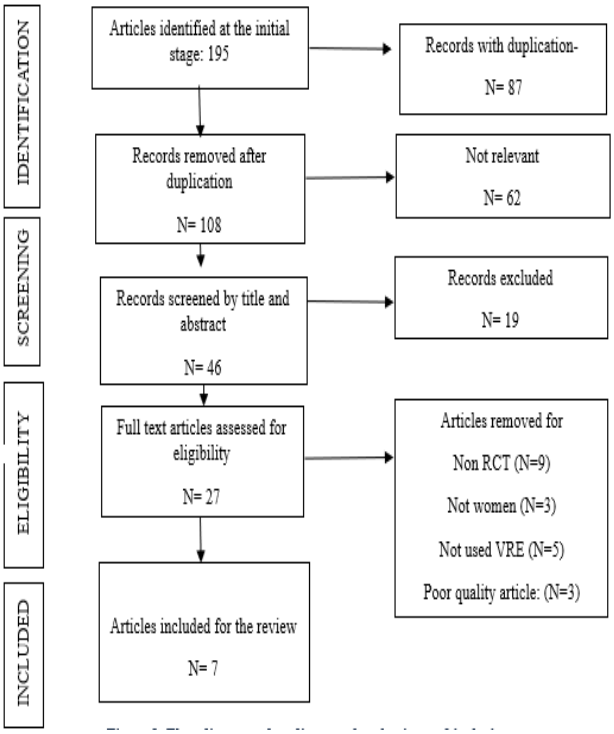

Figure 1 Flow diagram of studies search, selection and inclusion process.

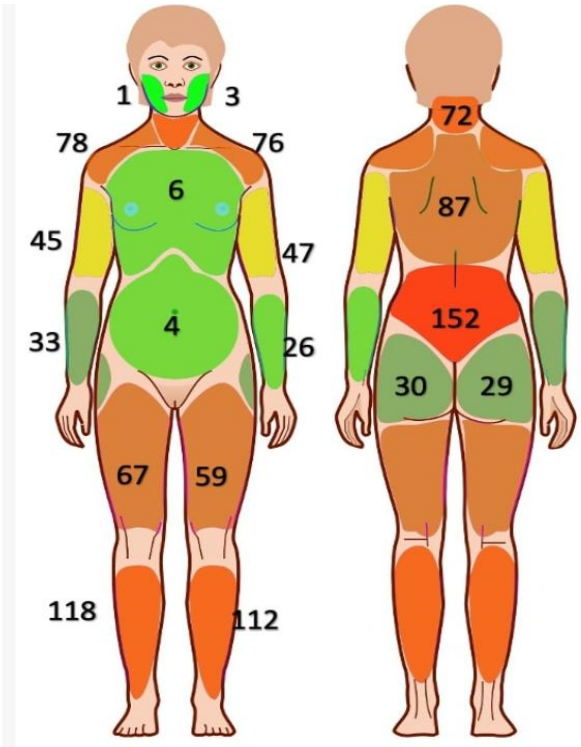

Figure 2 Area Wise Prevalence of Chronic Pain Expressed in Number of Subjects Having It.

3. Results and Discussion

3.1. Results

Several experimental studies have investigated the effectiveness of exergaming and virtual reality (VR)–based rehabilitation programs for women with fibromyalgia. The rationale behind these interventions is that VR and exergames provide interactive, motivating, and multisensory environments that may improve adherence to exercise programs while reducing pain and improving functional capacity. Most of the reviewed studies used randomized controlled trial (RCT) designs, which are considered a high level of evidence for evaluating treatment effectiveness. The interventions commonly involved exergame-based physical activity programs, immersive virtual reality training, or virtual rehabilitation protocols lasting between 8 weeks and 24 weeks. These interventions were compared with conventional exercise programs or usual care. The primary outcomes measured included pain intensity, physical function, balance, muscle strength, cardiorespiratory fitness, mobility, and quality of life. The reviewed studies show that exergaming and virtual reality (VR) interventions are effective in the rehabilitation of women with fibromyalgia. Randomized controlled trials reported improvements in lower-body strength, agility, cardiorespiratory fitness, and health-related quality of life, along with a reduction in pain intensity. Exergame interventions also improved physical function, motor–cognitive performance, mobility, balance, and reduced fear of falling [11-13]. Virtual rehabilitations further enhanced muscle activity, peak torque, and static balance, indicating improved neuromuscular performance. Additionally, immersive VR combined with exercise improved functional capacity, treatment acceptability, and patient engagement. Overall, these findings support the use of VR and exergaming to improve pain, functional ability, balance, and quality of life in individuals with fibromyalgia.

3.2. Discussion

The results of this review indicate that virtual reality exergaming has a positive effect on pain, functional disability, and quality of life in women with fibromyalgia syndrome. The immersive effect of VR

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Table 1 Virtual reality exergaming and its effects on pain

Sl.No	Study	No. Of Participants	Weeks Of Intervention	Conclusion
1.	Villafaina Et Al., (2019)	56 Women With Fibromyalgia (30–75 Yrs)	24 Weeks, 2 Sessions/Week (1 Hour Each)	Exergames Improved Pain Intensity And Perceived Health Status (Hrqol). More Benefits Seen In Patients With Worse Baseline Condition.
2.	Villafaina Et Al., (2020)	55 Women With Fibromyalgia	24 Weeks Exergaming (120 Min/Week, 2 Sessions)	Exergaming Improved Lower-Body Strength and Cardiorespiratory Fitness. Strength Reduced After Detraining, But Fitness Improvements Remained.
3.	Úbeda-D'ocasar Et Al., (2026)	(Sample Divided Into Intervention Groups G1, G2, Cg – Exact Total Not Clearly Stated In Snippet)	Short-Term (1-Month Follow-Up Post Intervention)	Significant Improvements Seen In Fibromyalgia Impact (Fiq), Quality Of Life (Eq-5d), Kinesiophobia, Central Sensitization, And Disability Scores After Intervention.

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4.	Juan Pedro Martin-Martinez Et Al.,(2019)	Fifty-Five Women With Fibromyalgia, Recruited From The Local Fibromyalgia Association, Were Randomly Assigned To One Of The Two Groups: Exercise Group And Control Group.	The Exercise Group Completed 24 Weeks of Supervised And Group-Based Exergame Protocol, Divided Into Two Sessions Of 60 Minutes. The Intervention Was Focused On Mobility, Postural Control, Upper And Lower Limbs Coordination, Aerobic Fitness, And Strength.	Exergame Is An Effective Tool To Improve The Physical Fitness In Women With Fibromyalgia Under Single Or Dual-Task Conditions.
5.	Collado-Mateo et al., (2017)	76 women with fibromyalgia	8 weeks exergame intervention (exercise group vs control group)	Exergames significantly improved mobility (Timed Up & Go test), balance, and reduced fear of falling in women with fibromyalgia.
6.	Marcelo Silva de Carvalho et al. (2021)	35 women aged ≥18 years (Wii group n=16, Control n=19)	20 sessions; 3 sessions/week; 1 hour per session	Exergaming has the potential to increase peak torque in dorsiflexion and plantarflexion in women with fibromyalgia. It also reduces tender point count (hyperalgesia) similar to flexibility exercises but does not significantly improve static balance.

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may distract from pain perception and increase engagement in physical activity, which may reduce pain perception in women with fibromyalgia syndrome. Moreover, regular engagement in exergaming may increase graded physical activity, which may improve pain tolerance and management of symptoms in women with FMS [14-16]. The positive effect of exergaming on functional ability may be due to the task-oriented and repetitive nature of exergaming, which may increase muscle strength, balance, coordination, and mobility in women with fibromyalgia syndrome, thereby reducing functional ability in daily life. Additionally, exergaming increases psychological well-being in women with fibromyalgia syndrome, thereby improving health-related quality of life. Therefore, it may be concluded from the results of this review that virtual reality exergaming may be considered as a promising adjunct rehabilitation for improving pain, functional disability, and quality of life in women with fibromyalgia syndrome shown in Table 1.

Conclusion

Based on the findings of the reviewed studies, virtual reality exergaming (VRE) appears to be an effective non-pharmacological intervention for women with fibromyalgia syndrome. The evidence suggests that VRE can help reduce pain, improve functional ability, and enhance quality of life while also contributing to improvements in balance, mobility, muscle strength, and cardiorespiratory fitness. Additionally, the interactive and engaging nature of virtual reality may increase motivation and adherence to exercise programs. Therefore, VRE can be considered a promising adjunct rehabilitation approach in the management of fibromyalgia syndrome. However, further large-scale studies are recommended to confirm its long-term effectiveness.

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References

[1] Úbeda-D'Ocasar E, Moreno-Crespo Y, Cimadevilla-Fernández-Pola E, Hernández-Lougedo J, Navas-Mosqueda Á, Caballero-Corella M, et al. Therapeutic use of virtual reality for patients with fibromyalgia and chronic neck pain: randomized controlled trial. JMIR Rehabil Assist Technol. 2026 Jan 23;13:e81158. doi:10.2196/81158.

[2] Bhargava J, Hurley JA. Fibromyalgia. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025 Jan–. Available from: https://www.ncbi.nlm.nih.gov/books/NBK540974/.

[3] Gupta V, Mishra D, Singh S, Chowhan V, Thorat S, Krishna K, Kansurkar S. Community based study of prevalence and social factors for chronic pain and fibromyalgia in women from Western India. Arthritis Rheumatol. 2024;76(Suppl 9). Available from: https://acrabstracts.org/abstract/community-based-study-of-prevalence-and-social-factors-for-chronic-pain-and-fibromyalgia-in-women-from-western-india/.

[4] Ruschak I, Montesó-Curto P, Rosselló L, Aguilar Martín C, Sánchez-Montesó L, Toussaint L. Fibromyalgia syndrome pain in men and women: a scoping review. InHealthcare 2023 Jan 11 (Vol. 11, No. 2, p. 223).

[5] Galvez-Sánchez CM, Reyes del Paso GA. Diagnostic criteria for fibromyalgia: critical review and future perspectives. Journal of clinical medicine. 2020 Apr 23;9(4):1219.

[6] Arout CA, Sofuoglu M, Bastian LA, Rosenheck RA. Gender differences in the prevalence of fibromyalgia and in concomitant medical and psychiatric disorders: a national veterans health administration study. Journal of women's health. 2018 Aug;27(8):1035-44.

[7] Bardelli CL, Chittaro L, Longhino S, Quartuccio L. An immersive virtual reality exergame as a patient education approach in fibromyalgia: pilot study. Digital health. 2025 Jan;11:20552076241304904.

[8] Peng Y, Wang Y, Zhang L, Zhang Y, Sha L,

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Dong J, He Y. Virtual reality exergames for improving physical function, cognition and depression among older nursing home residents: A systematic review and meta-analysis. Geriatric nursing. 2024 May 1;57:31-44.

[9] Villafaina S, Borrega-Mouquinho Y, Fuentes-García JP, Collado-Mateo D, Gusi N. Effect of exergame training and detraining on lower-body strength, agility, and cardiorespiratory fitness in women with fibromyalgia: Single-blinded randomized controlled trial. International journal of environmental research and public health. 2020 Jan;17(1):161.

[10] Villafaina S, Collado-Mateo D, Dominguez-Munoz FJ, Fuentes-Garcia JP, Gusi N. Benefits of 24-week exergame intervention on health-related quality of life and pain in women with fibromyalgia: A single-blind, randomized controlled trial. Games for health journal. 2019 Dec 1;8(6):380-6.

[11] Martín-Martínez JP, Villafaina S, Collado-Mateo D, Pérez-Gómez J, Gusi N. Effects of 24-week exergame intervention on physical function under single-and dual-task conditions in fibromyalgia: a randomized controlled trial. Scandinavian journal of medicine & science in sports. 2019 Oct;29(10):1610-7.

[12] Collado-Mateo D, Dominguez-Muñoz FJ, Adsuar JC, Merellano-Navarro E, Gusi N. Exergames for women with fibromyalgia: A randomised controlled trial to evaluate the effects on mobility skills, balance and fear of falling. PeerJ. 2017 Apr 20;5:e3211.

[13] de Carvalho MS, Carvalho LC, Alves RD, Menezes FD, Gomes ED, Frazin A, Iunes DH. Analysis of the muscular activity, peak torque in the lower limbs, and static balance after virtual rehabilitation in women with fibromyalgia: a randomized controlled study. Games for Health Journal. 2021 Jun 1;10(3):190-7.

[14] Garcia-Palacios A, Herrero R, Vizcaíno Y, Belmonte MA, Castilla D, Molinari G, Baños RM, Botella C. Integrating virtual reality with activity management for the treatment of fibromyalgia: acceptability and preliminary efficacy. The Clinical journal of pain. 2015 Jun 1;31(6):564-72.

[15] Gulsen CP, Soke FP, Eldemir KP, Apaydin YP, Ozkul CP, Guclu-Gunduz AP, Akcali DT. Effect of fully immersive virtual reality treatment combined with exercise in fibromyalgia patients: A randomized controlled trial. Assistive Technology. 2022 May 4;34(3):256-63.

[16] Botella C, Garcia-Palacios A, Vizcaı´no Y, et al. Virtual reality in the treatment of fibromyalgia: a pilot study. Cyberpsych Beh Soc Net. 2013;16:215–223.