

Virtual Reality Guided Meditation for Patients with Chronic Pain and Stress: A Pilot Study

Liu, K.^{1,2}, Madrigal, E.¹, Chung, J.¹, Parekh, M.¹, Kalahar, C.¹, Nguyen, D.¹, Bennett, N.¹, Menon, S.¹, Timmerman, M.^{1,3}, Harris, O.^{1,3,4}

¹Veterans Affairs Palo Alto Health Care System, ²Palo Alto University, Department of Psychology, ³Stanford University School of Medicine ⁴Defense and Veterans Brain Injury Center

BACKGROUND

- Meditation has therapeutic benefits for depression, anxiety, pain, and stress (Marchand, 2012)
- Difficulty learning how to meditate is commonly cited as a barrier to meditation practice (Lomas, Edginton, Cartwright, & Ridge, 2014)
- Mindfulness experts largely agree on VR being a feasible technique to practice mindfulness (Navarro-Haro et al., 2017)

OBJECTIVE

- 1) Demonstrate that VR in the veteran outpatient population is an effective tool to facilitate meditation and relaxation practice to reduce stress and chronic pain
- 2) Examine the feasibility of meditation using VR in the veteran population, specifically in the Polytrauma and PM&R cohort

METHODS

Participants:

- 31 veterans (mean age = 55.2; 93.5% male) from an outpatient polytrauma clinic with various chronic pain conditions and varying levels of stress

VR-Guided Meditation:

- Oculus Go stand-alone VR headset with Guided Meditation VR application (Cubicle Ninjas)
- 10-minute session with same ambient music, same Zen-meditation script, and participant-chosen 360° virtual environment (e.g. mountain, forest, beach, desert, lake, or cave)

Pain and Stress Self-Report Measures:

- Two 11-point Numerical Rating Scales (NRS; Ferreira-Valente, Pais-Ribeiro, & Jensen, 2011; Karvounides et al., 2016)
 - One scale measuring pain and one scale measuring stress (high score = more pain or stress), administered both before and after meditation session

Physiological Measures:

- Systolic/diastolic blood pressure and heart rate
 - Physiological markers of stress (Johnston & Anastasiades, 1990) collected both before and after meditation session)

Feasibility Survey:

- Pre-session survey
 - Collected information about demographics, health conditions, prior familiarity with VR technology, and attitudes towards VR technology before meditation session
- Post-session survey
 - Collected information about attitudes towards VR-guided meditation, concerns about VR, and opinions about the VR experience



RESULTS

Overall...	Agree or Strongly Agree
I enjoyed using VR	77.4%
I enjoyed the specific guided meditation module	67.7%
I was satisfied with the length of the module	80.6%
I was comfortable using the headset	87.1%
I could use this on my own	83.9%
I could see myself...	Agree or Strongly Agree
Using VR for entertainment	71.0%
Using VR for therapeutic benefits	87.1%
Wanting to use the latest technology	77.4%
Wanting to use in a clinic setting	48.4%
Wanting to use at home	87.1%
I think VR technology would...	Agree or Strongly Agree
Improve my mood/emotional well-being	74.2%
Improve my pain	64.5%
Improve my compliance with health behaviors	58.1%
Decrease feelings of fear/anxiety/depression	64.5%
Improve my focus	67.7%
I am concerned about...	Agree or Strongly Agree
It worsening my symptoms	9.7%
Relying too much on VR	3.2%
Experiencing dizziness, nausea, vertigo, etc. after using	6.5%

	Pre-Session (SD)	Post-Session (SD)	Mean change	p-value	Effect size (Cohen's d)
Pain rating (0 – 10)	5.28 (2.69)	4.20 (2.44)	1.08	p < .001	0.42
Stress rating (0 – 10)	5.27 (3.05)	3.72 (2.81)	1.55	p < .001	0.53
Systolic BP (mmHg)	125.6 (17.4)	118.9 (15.9)	6.7	p = 0.001	0.40
Diastolic BP (mmHg)	78.7 (10.3)	75.0 (9.5)	3.6	p < .001	0.36
Heart rate	73.6 (13.3)	69.1 (13.1)	4.5	p < .001	0.34

Survey results indicated participants:

- Preferred to use VR at home (87.1%) versus in a clinic setting (48.4%)
- Felt comfortable using VR on their own (83.9%)
- Did not express concerns regarding using VR (83.9%)

Paired-sample t-tests of outcome measures showed:

- Significant small to medium effects of VR session on pain and stress ratings
- Small but significant decreases in blood pressure and heartrate following VR session

Additionally, analysis of interaction effects via hierarchical linear regression showed that these decreases were not moderated by age of participant, pain type, or prior familiarity with VR

CONCLUSION

- Past literature suggests practicing meditation promotes improvements in stress and chronic pain, however access to these benefits is limited by difficulty associated with meditation practice
- Results of the current study demonstrate that VR technology may be feasible as a facilitator of meditation practice for patients with stress and chronic pain, allowing them to access the therapeutic benefits of meditation
- Participants indicated a preference for VR-guided meditation sessions in their own home rather than in a clinic setting and most felt they could use VR on their own, suggesting that VR-guided meditation could be implemented in the patient's home and done independently of a provider
- Therapeutic benefits of VR-guided meditation are consistent regardless of user's age, pain type, or prior familiarity with VR
- Despite the preliminary evidence for the feasibility of VR-guided meditation, future studies are needed to examine the long-term effects of repeated sessions with a larger sample size with comparisons to a control group

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