

The Feasibility & Effectiveness of Meditation Virtual Reality on Reducing Pain for Older Adults with Knee Osteoarthritis

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Introduction

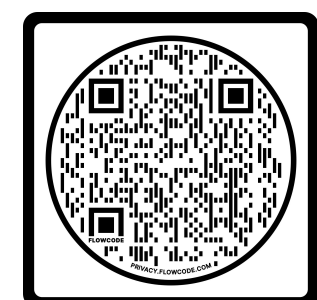
- Urgent need for nonpharmacological pain treatments
- Virtual Reality (VR) shown to be feasible & effective in reducing pain for variety of populations
- Limited evidence & knowledge within occupational therapy (OT) on feasibility of VR for treating older adults' pain in the clinic
- Preliminary studies with older adults & VR demonstrate minimal side effects, high enjoyment levels, & preference for relaxation with realistic images [1, 2, 4]
- VR enhances meditation for individuals by:
 - distracting individuals from the real world
 - increasing sense of presence
 - providing interesting environment to meditate in [3]
- Purpose:** to evaluate feasibility & effectiveness of VR in reducing pain for older adults (60+) with chronic knee osteoarthritis (OA)

Methods

- Participants recruited via Rally (online research recruitment platform), fliers in Brigham & Women's Hospital Pain Management Center, Tufts Clinical Trials
- Attended single, 60-90 minute on-site study visit to:
 - Engage in 10-minute Guided Meditation VR program w/ guided arm movements
 - Choices provided for music, location, mood
 - Provide data on pain factors, emotional distress, affect, VR experience, & feasibility factors
- Data collected at 3 different time points:
 - Pre VR:** Immediately prior to VR (during visit)
 - Post VR:** Immediately post VR (during visit)
 - Follow-up:** 24-48 hours post study visit (at home)

*Standardized questionnaires:

- Brief Pain Inventory-Short Form (BPI-SF)
- Pain Catastrophizing Scale (PCS)
- Pain Intensity Numerical Rating Scale (NRS)
- iGroup Presence Questionnaire (IPQ)
- Simulator Sickness Questionnaire (SSQ)
- Meditation Experience Questionnaire (MEQ)
- Patient Global Impression of Change (PGIC)
- Positive & Negative Affect Scale (PANAS)
- PROMIS Emotional Distress: Anxiety, Depression, & Anger
- Survey of Pain Attitudes (SOPA)
- User Engagement Scale (UES)

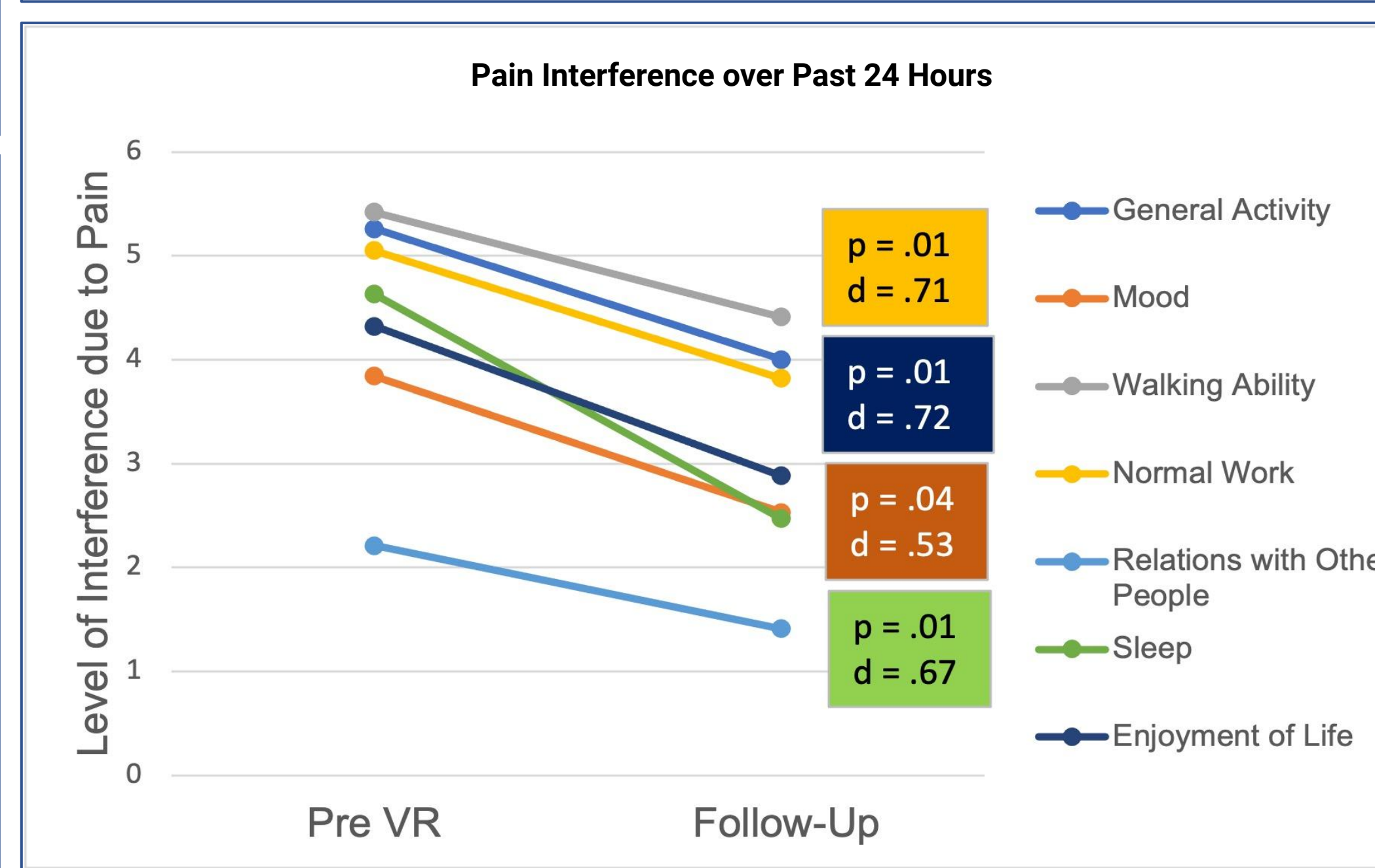
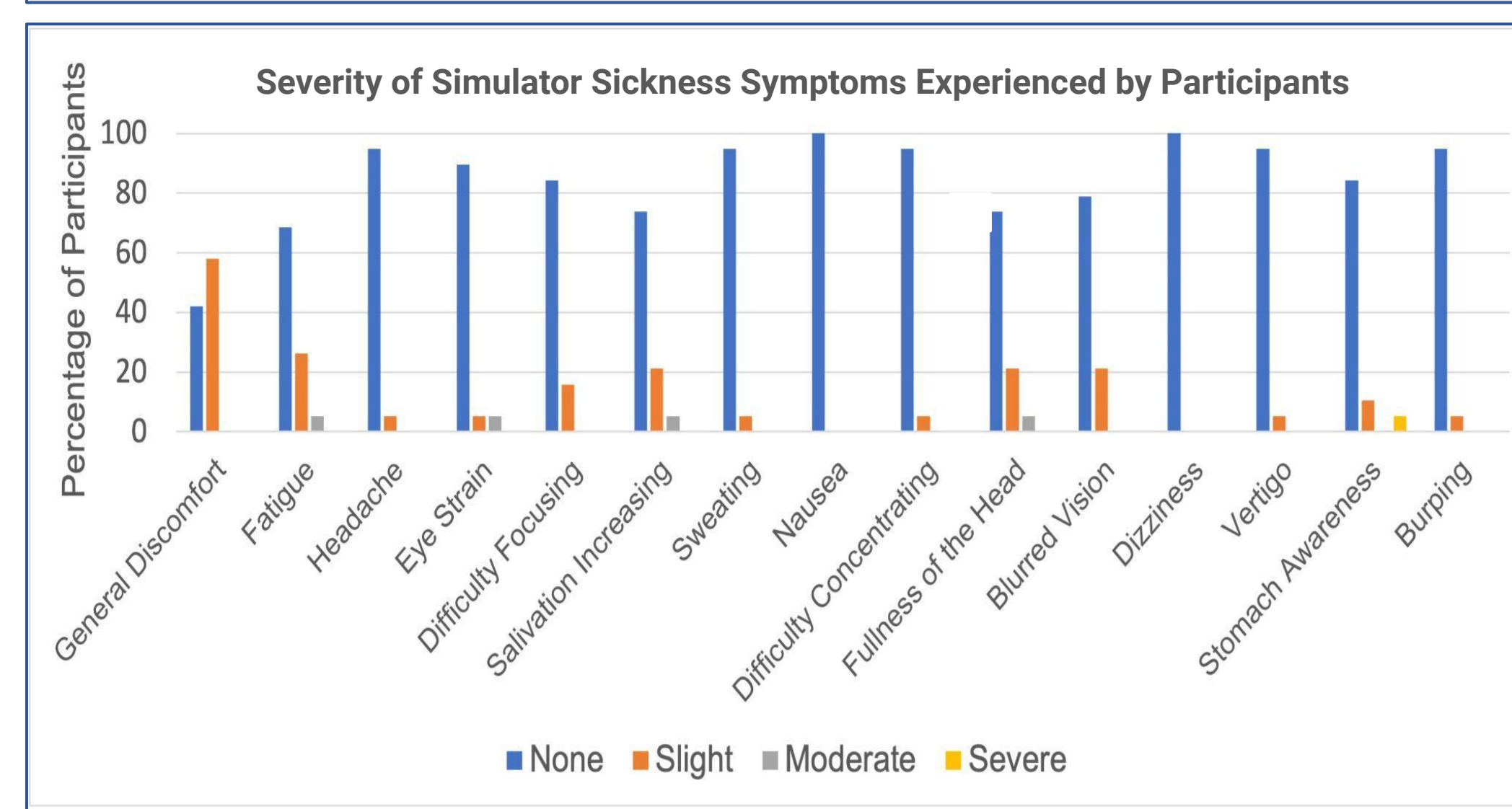
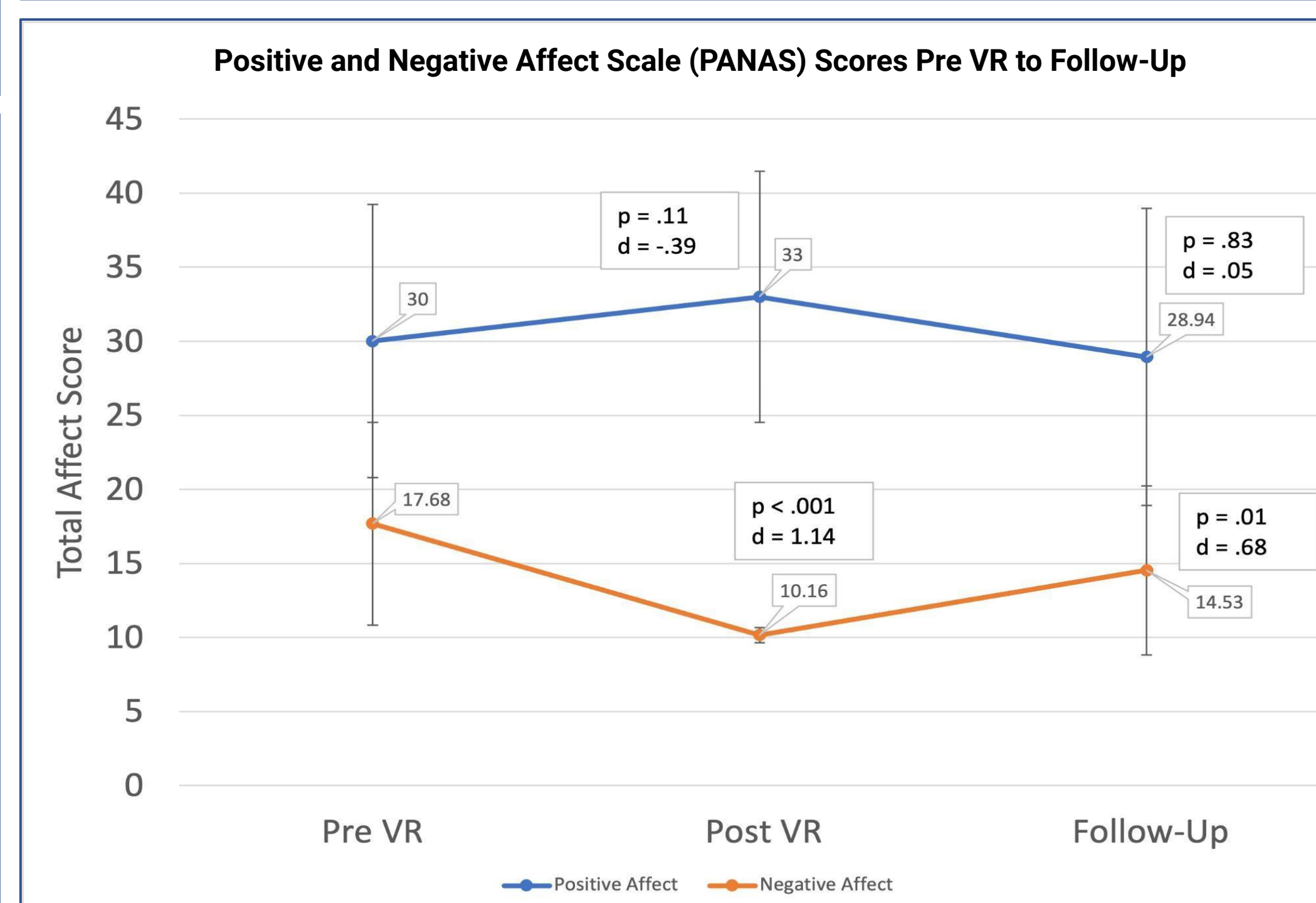
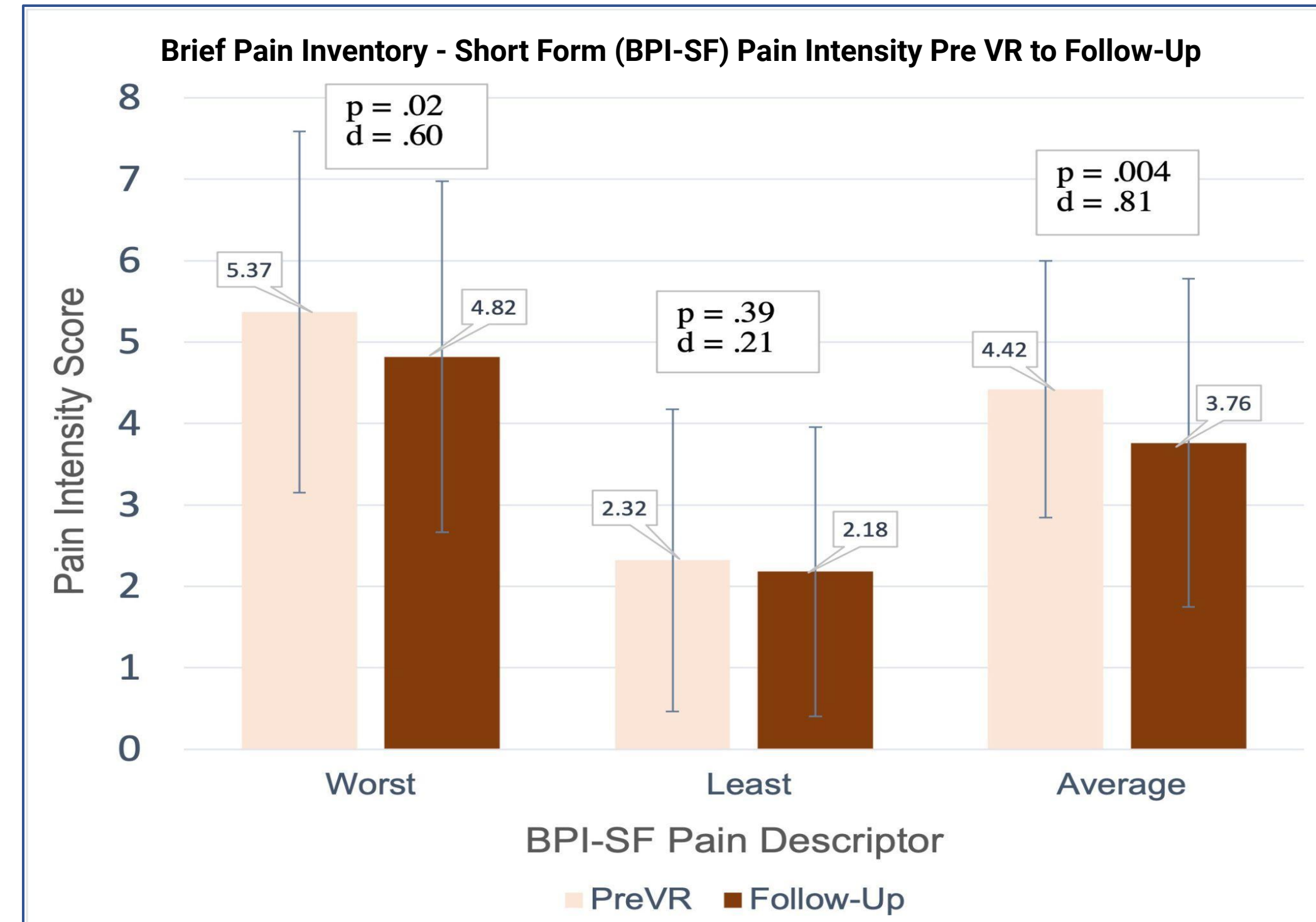
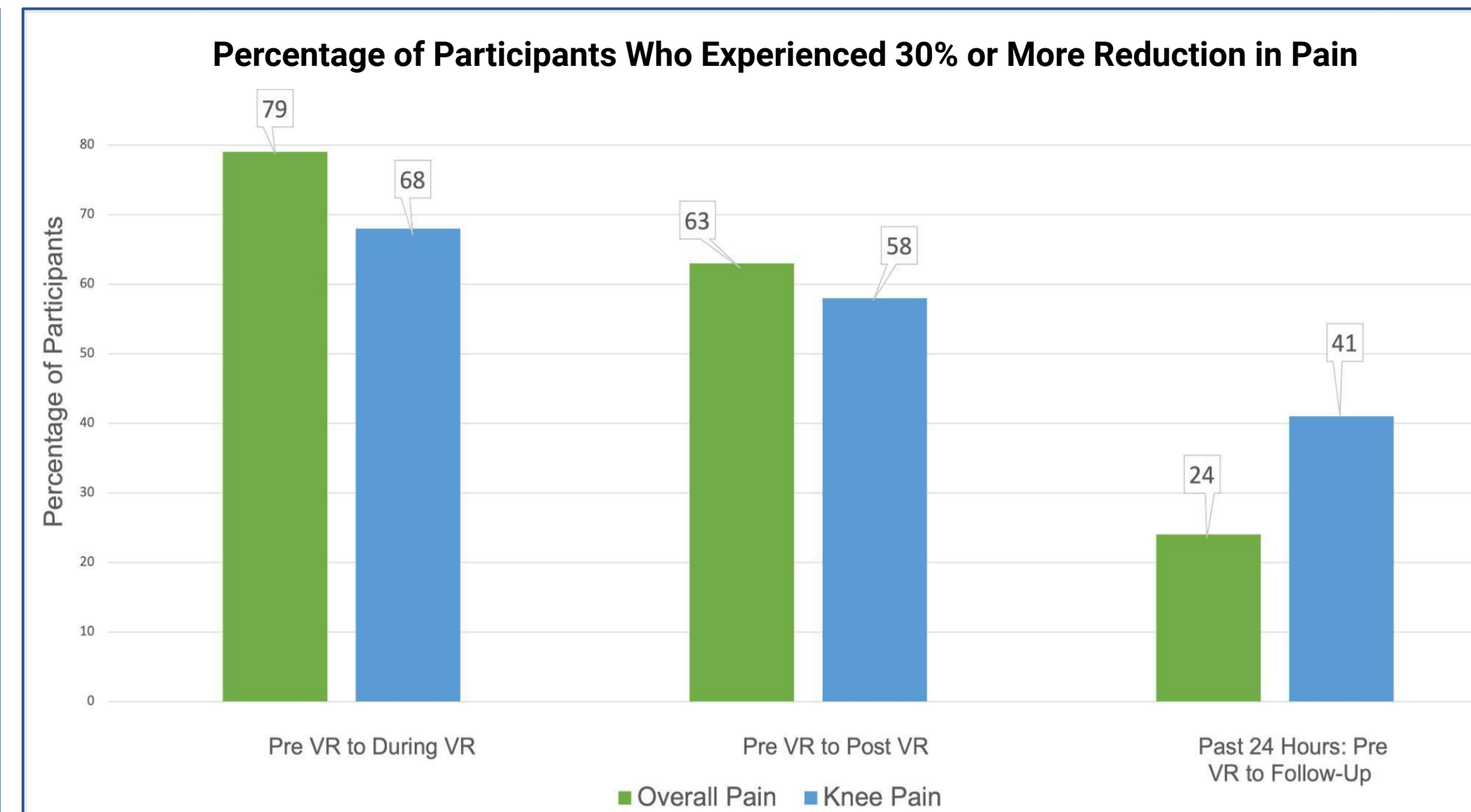
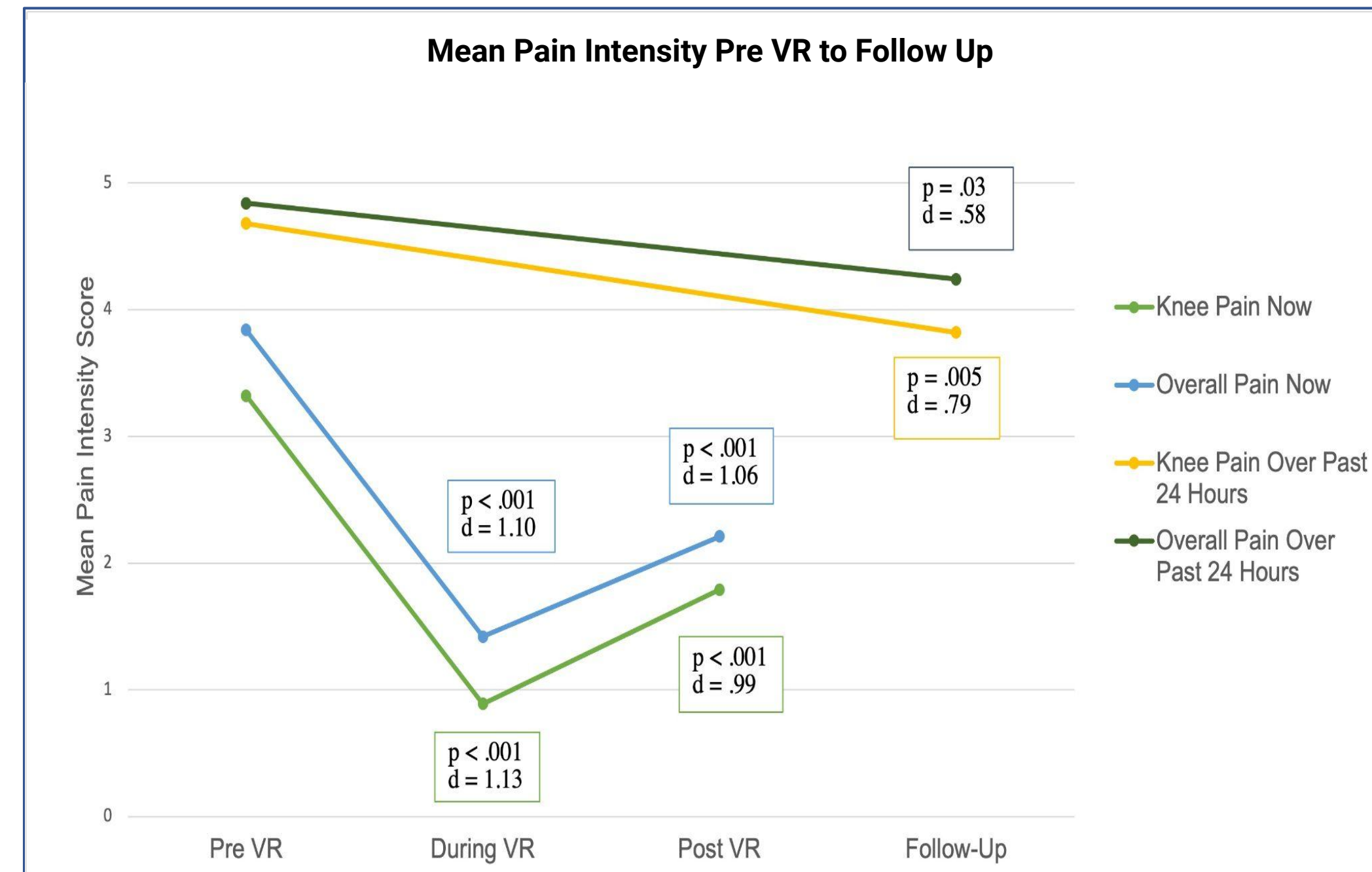


Scan for more details on surveys provided

Participants

- n = 19 older adults (age: 67.9 ± 4.6, min 63-max 77)
- 100 % diagnosis of chronic knee osteoarthritis (OA)
- 68.4% female, 84.2% white | 94.7% non-Hispanic
- 3-35 years of chronic pain
- 42.1% of participants used VR before once/twice

Results



Discussion

- Pain:**
 - Pain Intensity:** significant reduction in overall & knee pain w/ moderate to large effect during VR, post VR, & at follow-up. Highest pain reduction → 73% in knee pain during VR.
 - Pain Interference** (the extent to which pain hinders engagement with activities, as well as sleep and enjoyment in life): significant moderate to large decrease for normal work, sleep, & enjoyment of life from baseline to follow-up
 - Conclusion:** findings suggest VR meditation had moderate-large analgesic effects on pain intensity & pain interference primarily at post VR, with some lasting effects into next day.
- Psychosocial Factors:**
 - Affect:** significant large decrease in neg. affect pre → post VR, with significant moderate decrease persisting at follow-up
 - Mood:** significant moderate decrease in pain interference related to mood pre VR → follow-up
 - Conclusion:** findings suggest VR meditation intervention had positive impact on psychological state related to pain
- Feasibility:**
 - Enjoyment:** < 50% tried VR before & majority enjoyed experience, using words such as “relaxing” & “captivating”
 - Side Effects:** limited simulator sickness symptoms reported
 - Conclusion:** older adults had positive VR experience with limited adverse side effects & want to try VR again
- Limitations:**
 - small sample size (n=19)
 - single application
 - within-subject design
 - short-term follow-up

Conclusion

- VR further supported as feasible & effective nonpharmacological tool for older adults to treat chronic overall & knee-specific pain
- Older adults may have higher ability to participate in meaningful daily activities up to 24-48 hours after VR meditation
- OTs can utilize innovative & customizable VR technology in OT clinic to provide older adults with additional methods to manage their pain with minimal side effects & high enjoyment levels [1]
- Future direction:** rigorous, randomized controlled trials with multiple applications & long-term follow-up needed to better understand analgesic effects & mechanisms behind VR

References

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94.7% of participants said they wanted to try VR again to treat their pain

Many older adults described their VR experience as...

- captivating
- pleasant
- relaxing
- calming