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TITLE

A Virtual Multicomponent Behavioral Pain Recovery Intervention Improves Chronic MSK Pain and Condition

ABSTRACT

INTRODUCTION

Chronic musculoskeletal (MSK) pain, particularly back pain, is a leading cause of disability and major contributor to healthcare utilization and costs.¹ It can be driven by central sensitization (maladaptive central pain processing) rather than structural damage.² In a study of chronic spine pain, 88% of cases were attributed to central sensitization.³ Behavioral and psychological approaches that help individuals reframe chronic pain as a non-threatening, centrally driven process can reduce central sensitization and improve pain and function.⁴ These findings support the need for interdisciplinary cognitive and behavioral interventions, however, gaps in effective, accessible, and multidisciplinary care persist. To address this, a multicomponent pain recovery program was developed to target reversible abnormal brain signaling in pain-related networks through education, coaching, and practice.

OBJECTIVES

This retrospective study evaluated the real-world implementation of a virtual pain recovery intervention leveraging neuroscience-informed and behavioral strategies on patient-reported outcomes in chronic MSK pain with central sensitization.

MATERIALS and METHODS

Eligibility required MSK pain >3 months or a psychological component. Participants were referred by their provider or self-enrolled (2024 – 2025). The insurance-reimbursable intervention consisted of one-on-one virtual coaching, ongoing asynchronous messaging, and self-guided psychoeducational modules on symptom reframing, threat reappraisal, emotional awareness, and cognitive change. Pain intensity (past week) and overall improvement were assessed monthly using the Numeric Rating Scale (NRS; range 0 to 10) and Patient Global Impression of Change (PGIC; range 1=“very much improved” to 7=“very much worse”), respectively. Engagement and outcomes (baseline to month 6) were analyzed using descriptive statistics and linear regression.

RESULTS

1,620 participants reported chronic MSK pain as their primary symptom; average age 55 (SD 15.6) years, baseline NRS 5.9 (SD 1.91). Among the cohort, 38% reported back pain, 18% fibromyalgia, 9% neck pain; the remaining participants reported one of 17 other MSK symptoms. On average, participants completed 8.7 (SD 6.1) coaching sessions from baseline to month 6. MSK participants reported NRS improvements from baseline to month 1 (−0.61, SD 1.56) and baseline to month 6 (−1.13, SD 1.89); PGIC outcomes showed continued improvement trends from month 1 (3.35, SD 0.86) to month 6 (2.45, SD 0.92) (Table 1). Participants with clinically significant MSK pain (baseline NRS ≥ 4) reported slightly greater NRS improvements from baseline to month 1 (−0.74, SD 1.55) and baseline to month 6 (−1.31, SD 1.9) (Table 2). The back pain subcohort reported similar improvements (Table 3). Number of coaching sessions and coaching minutes in month one were associated with improvement in PGIC ($p < .001$) at one month after controlling for baseline NRS.

CONCLUSION

A virtual pain recovery program targeting central sensitization was associated with reduced pain intensity and perceived meaningful improvement in symptoms among individuals with chronic MSK pain as early as one month. By month 3, MSK participants achieved meaningful reductions in pain intensity (NRS decrease ≥ 1) on average. These findings warrant larger, randomized studies to confirm efficacy and long-term durability.

FIGURE & TABLE LEGEND

Table 1. Average Monthly Patient-Reported Outcomes (All MSK Participants, Baseline n=1620)

Month	Change in NRS from Baseline <i>Mean (SD), n</i>	PGIC <i>Mean (SD), n</i>
1	−0.61 (1.56), 1199	3.35 (0.86), 1121
2	−0.9 (1.88), 919	2.93 (0.93), 855
3	−1.07 (1.96), 701	2.76 (0.98), 646
4	−1.06 (1.95), 555	2.63 (0.92), 515
5	−1.11 (1.87), 443	2.53 (1.02), 411
6	−1.13 (1.89), 361	2.45 (0.92), 324

Table 2. Average Monthly Patient-Reported Outcomes Among MSK Participants with Significant Baseline Pain (n=1444)

Month	Change in NRS from Baseline <i>Mean (SD), n</i>	PGIC <i>Mean (SD), n</i>
1	-0.74 (1.55), 1057	3.37 (0.85), 996
2	-1.08 (1.84), 810	2.95 (0.92), 757
3	-1.23 (1.97), 616	2.8 (0.98), 570
4	-1.28 (1.9), 476	2.68 (0.9), 441
5	-1.29 (1.87), 379	2.58 (1.0), 350
6	-1.31 (1.9), 311	2.5 (0.89), 278

Note: NRS ≥4 was used to identify clinically significant baseline pain

Table 3. Average Monthly Change in NRS Among Back Pain Subcohort

Month	All Back Pain Participants (n=613) <i>Mean (SD), n</i>	Back Pain Participants with Significant Baseline Pain (n=550) <i>Mean (SD), n</i>
1	-0.63 (1.58), 445	-0.78 (1.54), 395
2	-0.91 (1.86), 351	-1.1 (1.83), 310
3	-1.15 (1.88), 257	-1.33 (1.83), 230
4	-1.03 (1.94), 212	-1.26 (1.87), 185
5	-1.15 (1.81), 165	-1.39 (1.71), 143
6	-0.93 (1.82), 131	-1.17 (1.77), 111

Note: Includes participants who reported primary MSK symptom of back pain or low back pain.

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