

## BACKGROUND

Prolonged pain tends to develop into a combination of physical, psychological, and social disabilities. Current lines of research are investigating the incorporation and integration of mindfulness, pain science education, and traditional physiotherapy in the treatment of chronic pain. Other studies have revealed conflicting results for multicomponent approaches to address chronic pain management. Still, there is enough published support for clinical guidelines to recommend multicomponent rehabilitative approaches, including a combination of movement or exercise, mindfulness, and pain neuroscience education, to improve chronic musculoskeletal pain (Chou et al 2007). One study found that patients with chronic low back pain can achieve positive outcomes with an intensive stretching, strengthening, and aerobic conditioning in a group environment exercise program (Ogston et. Al 2016). In a separate study, mindfulness was found to improve psychological distress, depressive symptoms and pain catastrophizing which in turn may aid in the improvement of chronic pain symptoms (Brooks et al. 2018). Pain Neuroscience Education (PNE) is a method of educating patients about the neurophysiology of pain that aims to reconceptualize pain from an indicator of damage to an interpretation of input signals by the brain and nervous system (Lane et al. 2018). In combining all three of these mentioned approaches, Samaritan Lebanon Community Hospital's Department of Physical Therapy has developed and are currently implementing an integrative pain rehabilitation program in a rural setting called the "Movement, Mindfulness, and Pain Science" program (MMaPS). The curriculum for a MMaPS program is designed through an integrative modality approach. The aim is to reduce the risk of injury, impairment, functional limitation and disability associated with chronic pain, and may include the improvement and maintenance of health, fitness, function and quality of life in all age populations.

## OBJECTIVE

The objective of this observational, retrospective case series was to identify trends in physical function and pain-related outcome markers of the MMaPS program participants in order to determine whether a multimodal therapeutic approach could improve or worsen chronic pain in affected individuals.

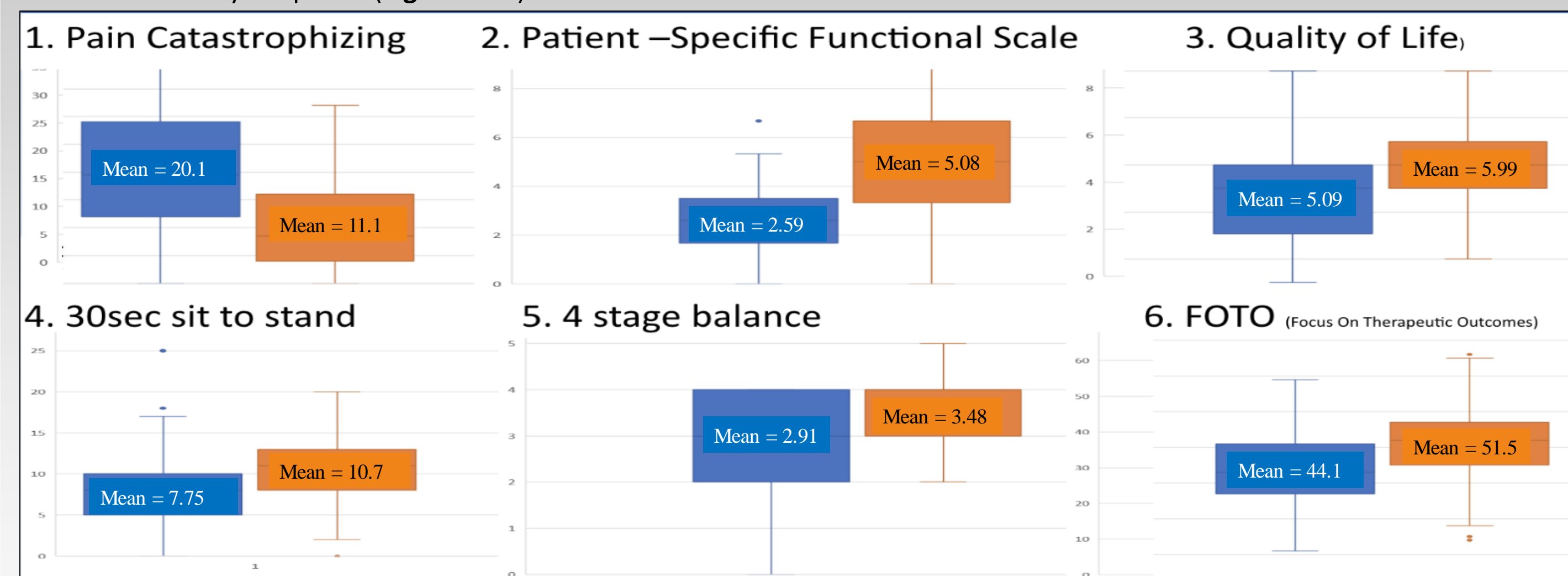


## MATERIALS AND METHODS

The MMaPS Program occurred in 8-week intervals, with two sessions per week in the span 2-hours (4 hours total per week). Participants could enroll in the program twice per year, requiring at least a 2-month break in between each program. Each session included a movement, mindfulness, and pain science activity conducted and supervised by physical therapists (Table 1). Eligible participants included all adults over the age of 18 experiencing chronic pain with a physical therapy referral. Each accepted participant was individually evaluated prior to and after the program by physical therapists with measured outcome markers from various observational and survey diagnostic tests: the Pain Catastrophizing (PC) Scale, Quality of Life (QOL) Scale, 30 Second Sit to Stand Test, 4-stage Balance Test, Patient-Specific Functional Scale (PSFS), and Focus on Therapeutic Outcomes (FOTO). The Pre- and post- data of measured outcome markers were collected from 116 participants between May 2018 and Dec 2019, and were analyzed and compared retrospectively using the Wilcoxon Signed-Rank Test.

## RESULTS

Regarding patient demographics, the average participant age was identified as 56 years, with 35 males, 80 females, and 1 unknown gender. Results showed statistically significant improvements for all outcome markers ( $p < 0.001$ ): the average PC Scale decreased by 10 points, the average QOL Scale increased by 0.9 points, the average 30 Second Sit to Stand improved by 2.9 seconds, the average 4-stage Balance test score increased by 0.6 points, the average PSFS score increased by 2.5 points, and the average FOTO score increased by 7.4 points (Figures 1-6).



Figures 1-6 illustrate a significant decrease in Pain Catastrophizing and a significant increase in Patient Specific functional Scale, Quality of Life, 30s sit to stand, 4 stage balance, & FOTO

Outcome measures (N=116)	Pre-test Mean score (SD)	Post-test Mean score (SD)	p-value
Pain Catastrophizing Scale	20.1 (10.5)	11.1 (9.23)	<0.001
Quality of life scale	5.09 (2.01)	5.99 (1.98)	<0.001
Patient Specific Functional Scale	2.59 (1.45)	5.08 (2.16)	<0.001
30s Sit to Stand	7.75 (5.15)	10.7 (5.33)	<0.001
4 stage balance	2.91(1.09)	3.48 (0.77)	<0.001
FOTO score	44.1(10.5)	51.5 (11.5)	<0.001

**MOVEMENT:** Posture, pacing, DOMS, partner movements, tai chi, yoga, mindful walking, dancing, chair exercises, floor transfers, balance, ROM, stretching, strengthening, aerobics, HIIT, circuits.

**MINDFULNESS:** 5 facets of mindfulness (observe, describe, non-judging, non-reactive, & acting with awareness), ANTs, emotions, values & identity, radical acceptance, post traumatic growth, guided meditations, diaphragmatic breathing, setting intentions, media: Shauna Shapiro: the power of mindfulness: what you practice grows stronger.

**PAIN SCIENCE:** Pain triangle, SMART goals, central sensitization, pacing, graded exposure, polyvagal theory & titanic model, handful of health, contributing factors of pain, resiliency, drug cabinet of the brain, expressive writing, pain ≠ tissue damage, imaging statistics, DIMs and SIMs, cycle of change, fear avoidance cycle. Media: Lorimer Moseley: The Role of he Brain in Chronic Pain, Joe Dispenza: Neurons That Fire Together Wire Together, Michelle Pol-er: 100 Days Without Fear, Brené Brown: The Power of Vulnerability & Listening to Shame.

Table 1

## CONCLUSIONS

The MMaPS program captured improvements in physical and pain-related markers for participants. All measured outcomes were found at statistically significant levels ( $p < 0.001$ ), contributing to the growing evidence that an integrative pain management program may be an effective alternative in improving physical function and reducing pain for chronic pain patients. Furthermore, a multimodal group program approach may reduce costs for pain alleviation treatment in comparison to traditional therapies and improve health outcomes for outpatient settings. Inherent limitations of an observational case series exist without a control group. Thus, future studies should investigate and compare the efficacy of similar integrative and multimodal pain management programs with a standardization of outcome markers to improve predictive abilities of statistical models. Other experimental studies should also evaluate and compare group versus individual-based therapy settings in order to determine potential variation in outcomes due to program environment. Lastly, quality evidence is needed regarding the cost effectiveness of multidisciplinary programs, as they may require substantial staff and financial resources from the health care system.

## REFERENCES

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