

# Effects of Cooled Compression Exercise Technology on Health, Sleep, And Quality Of Life In Veterans



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## INTRODUCTION

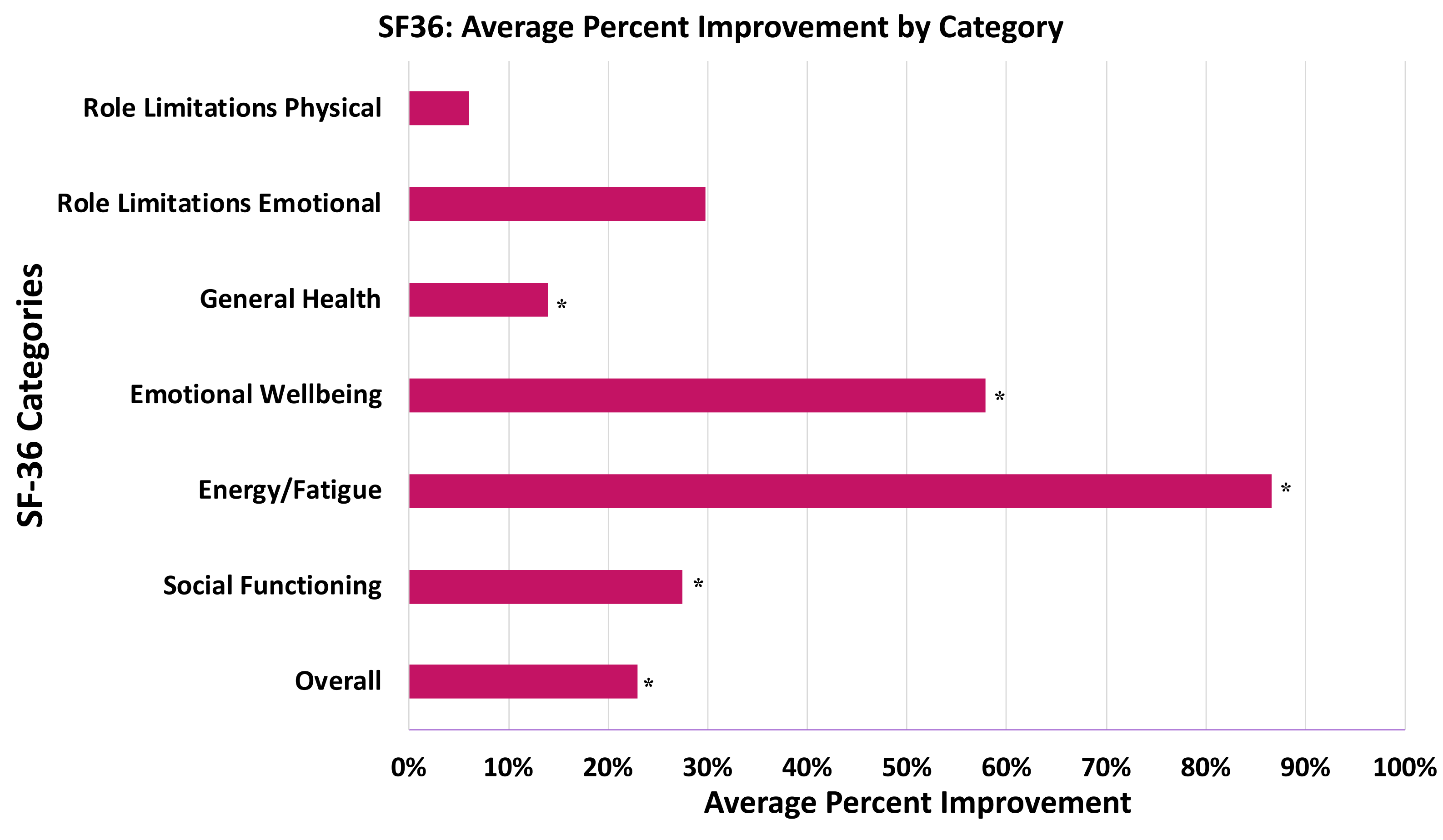
- Veterans are disproportionately affected by mental health disorders compared to their civilian counterparts.<sup>1</sup>
- Long wait times at the Veteran's Health Administration pose barriers to care.<sup>2</sup>
- Combination of low-pressure compression and cooling has shown elevated levels of growth hormone and testosterone and depressed nighttime cortisol, implicating a benefit to sleep.<sup>3</sup>
- The veteran population suffers disproportionately from poor quality of sleep, which can put them at risk for comorbidities.<sup>4</sup>
- Several studies have found an association between poor quality of sleep and conditions such as obesity, coronary artery disease, and depression.<sup>5-6</sup>
- This study hopes to provide an accessible option to manage symptoms of mental health disorders in Veterans.

## METHODS

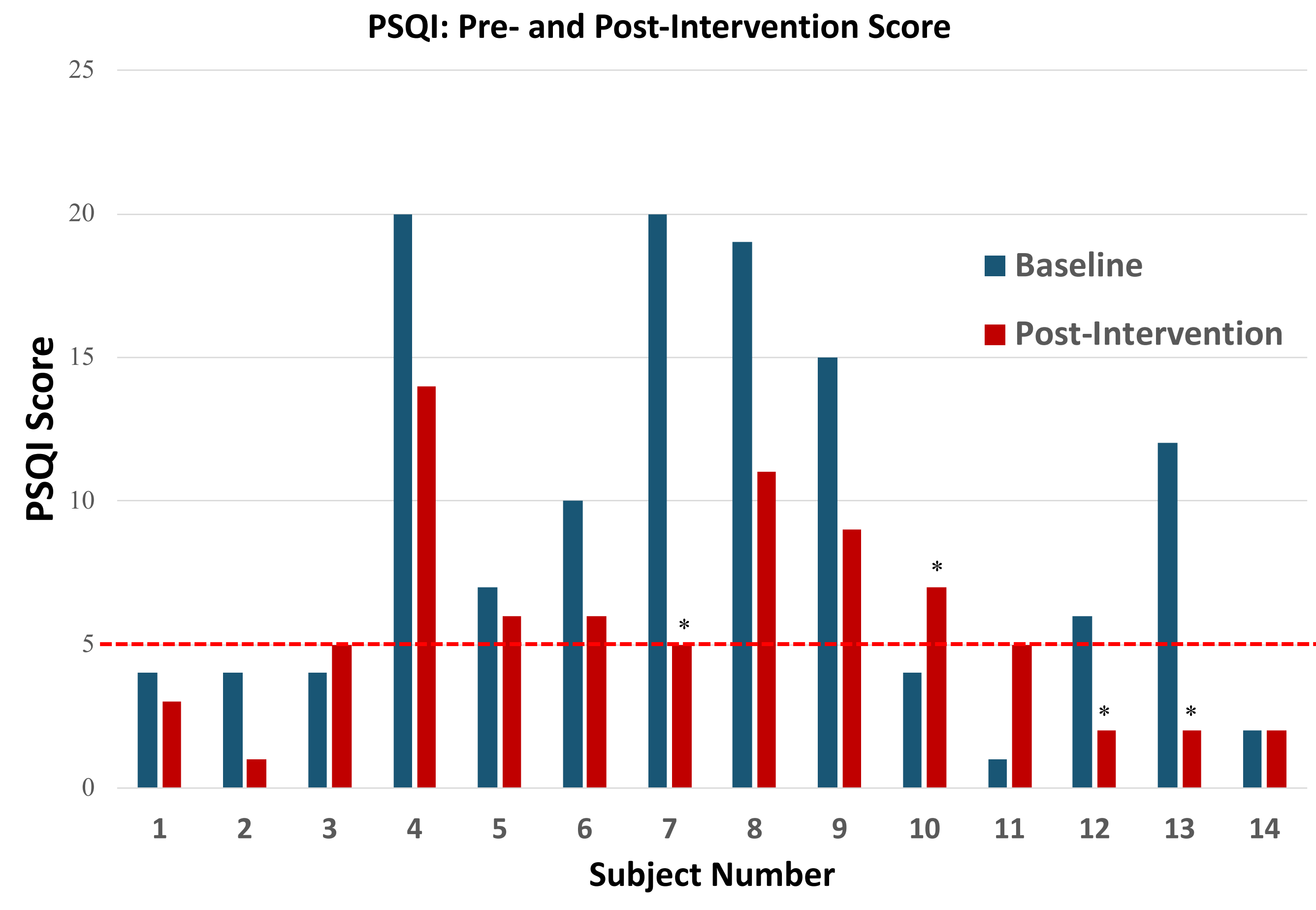
- 14 veterans completed 24 sessions in 12 weeks.
- Measurements at baseline and endpoint: sleep quality (Pittsburg Sleep Quality Index), quality of life (RAND Short Form 36), and respiratory dysfunction (Nijmegen Questionnaire).
- Sessions: 21-minute exercise protocol with cooled compression cuffs on arms (40mmHg) and thighs (65mmHg), followed by 10 minutes of lying on a cooling mat.



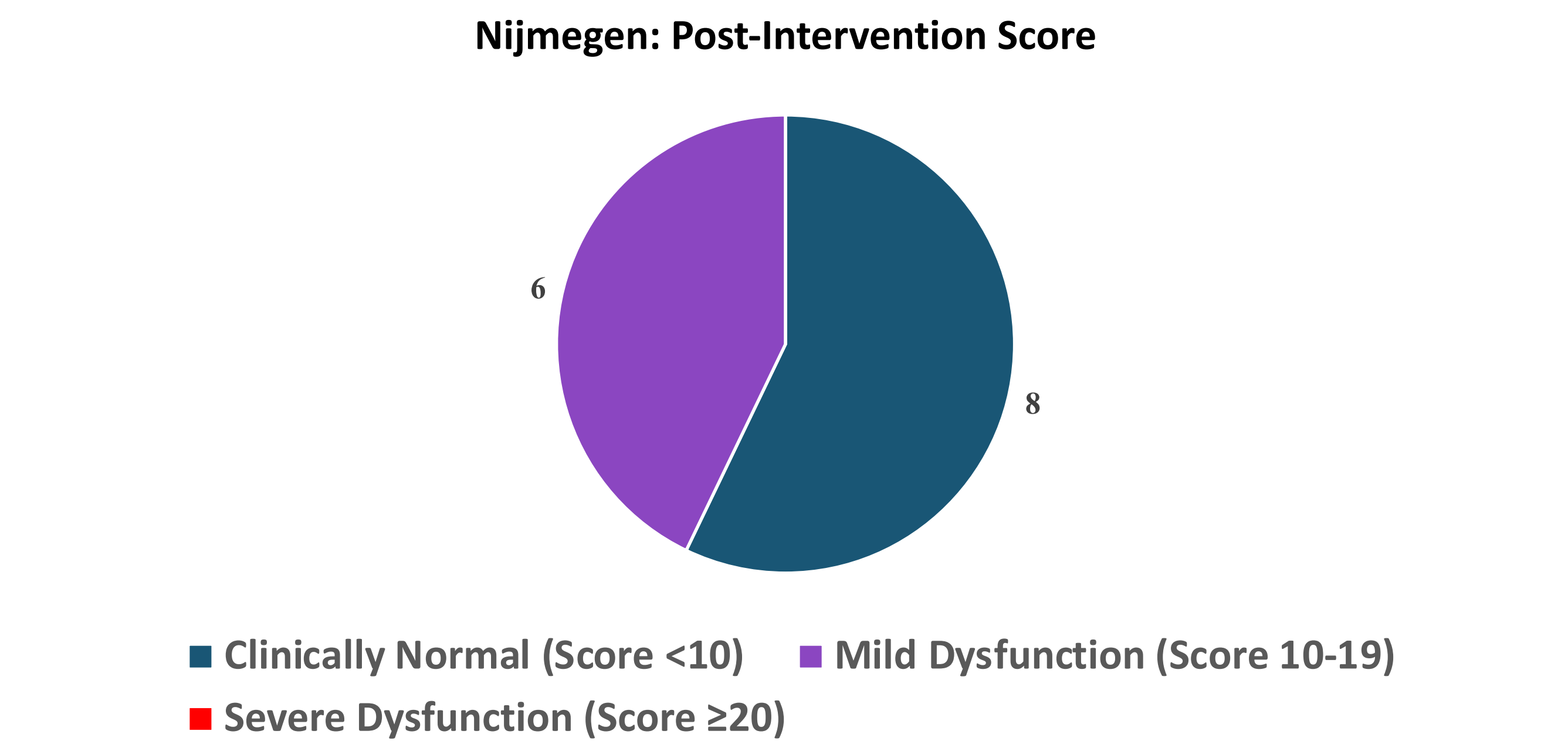
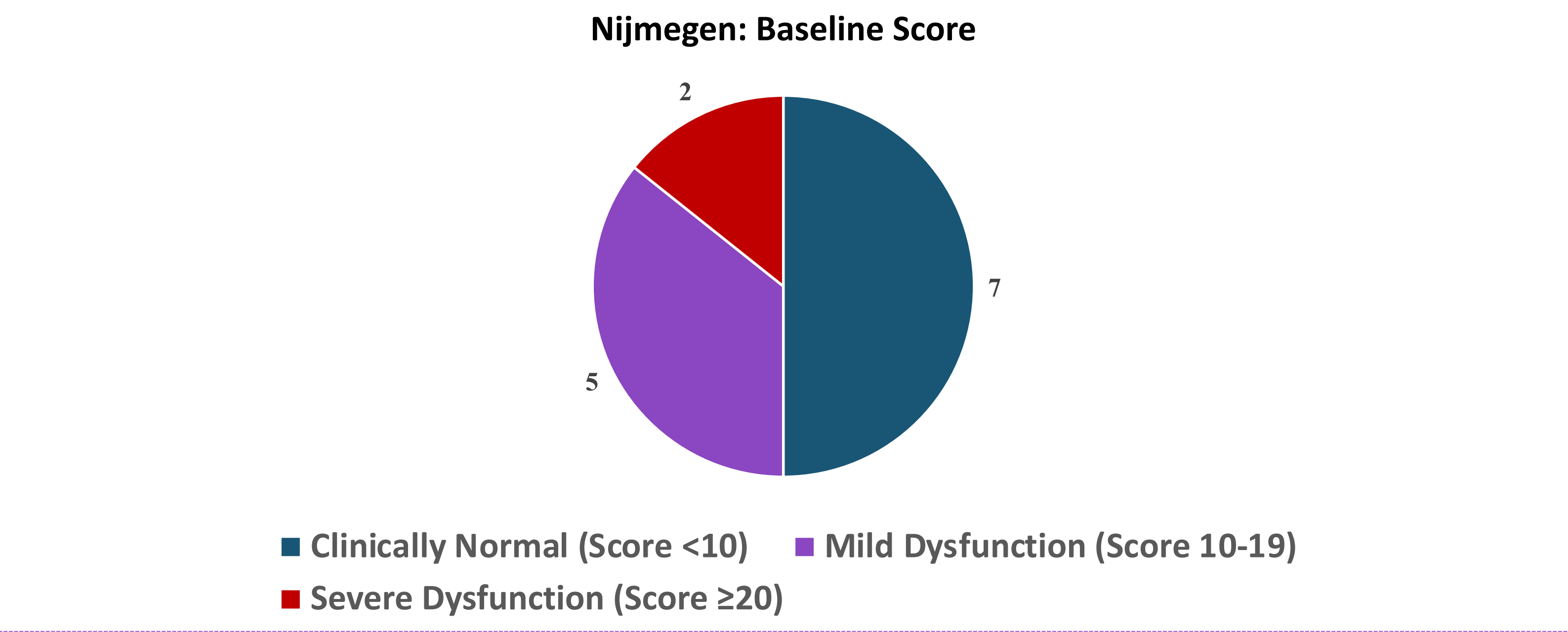
## RESULTS



**Figure 1: Quality of Life Percent Improvement: 57% improved in QoL (p=0.03) with significant improvements in subcategories (General Health p=0.05, Emotional Wellbeing p=0.005, Energy/Fatigue p=0.043, Social Functioning p=0.006).**



**Figure 2: Sleep Quality Changes: 71% improved sleep quality (p=0.02). A score 5 or above is considered more clinically severe. Of the 57% of subjects with scores >5, 100% saw improvements in their sleep.**



**Figure 3: Respiratory Dysfunction Changes: 71% decreased in adverse respiratory symptoms (p=0.06). However, when focusing on those with worse baselines, improvements became much more significant (p=0.02). Which is to say, those starting with unhealthier scores saw greater improvements.**

## DISCUSSION

Given that Veterans' suicide rate is 21% higher than the civilian rate, it is important to consider novel approaches that may abate this worrying statistic.<sup>7</sup> Subjects improved in all measures especially when focusing on those that started with more unhealthy scores. The findings of this pilot study suggest Vasper™ could act as an effective supplement or alternative to therapies for depression, anxiety, insomnia, post-traumatic stress, etc.

## WORKS CITED

1 Norris FH, Slone LB. Understanding research on the epidemiology of trauma and PTSD. PTSD Research Quarterly. 2013; 24(2-3):1-13. Available from: [www.ptsd.va.gov/professional/newsletters/research-quarterly/V24n23.pdf](http://www.ptsd.va.gov/professional/newsletters/research-quarterly/V24n23.pdf).  
2 VA Office of the Inspector General, Office of Audits and Evaluations. Veteran Health Administration audit of veteran wait time data, choice access, and consult management in VISN 6. Washington DC: Veteran Health Administration; 2017 Mar 2. Available from: <https://www.va.gov/oig/pubs/VAOIG-16-02618-424.pdf>.  
3 Prinz PN, Bailey SL, Woods DL. Sleep impairments in healthy seniors: roles of stress, cortisol, and interleukin-1 beta. Chronobiol Int. 2000;17(3):391-404. doi:10.1081/cbi-100101053.  
4 Mustafa M, Erokwu N, Ebose I, et al. Sleep problems and risk for sleep disorders in an outpatient veteran population. Sleep Breath. 2005; 9: 57-63.  
5 Chang PP, Ford DE, Mead LA, et al. Insomnia in young men and subsequent depression: the Johns Hopkins precursors study. Am J Epidemiol. 1997;146(2):105-114. doi:10.1093/oxfordjournals.aje.a009241.  
6 Tanielian T, Jaycox LH, Schell TL, et al. Invisible wounds: mental health and cognitive care needs of America's returning veterans. RAND Research Brief. 2008. DOI: 10.7249/RB9336.  
7 Petzel RA. 2012 Suicide data report. Washington DC: Department of Veteran Affairs; 2012. Available from: <https://www.va.gov/opa/docs/Response-and-ExecSum-Suicide-Data-Report-2012-final.pdf>.