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How Psychological and Nonpharmacological Treatment Modalities Reduce the Disease Burden of Amplified Musculoskeletal Pain Syndromes in Pediatrics

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How Psychological and Nonpharmacological Treatment Modalities Reduce the Disease Burden of Amplified Musculoskeletal Pain Syndromes in Pediatrics

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INTRODUCTION

Chronic musculoskeletal (MSK) pain is defined as pain perceived by a patient lasting longer than three months and is characterized by significant functional disability and emotional distress.³ One area of study investigates amplified musculoskeletal pain syndrome (AMPS), which is a general term for non-inflammatory MSK pain.⁴ Chronic pain conditions classified as AMPS include, but are not limited to, complex regional pain syndrome (CRPS), chronic MSK pain (CMP), or juvenile fibromyalgia.⁵ While the exact pathophysiology of AMPS is still not well understood, it is believed that central sensitization amplifies the neural pain signal, which elicits the inappropriate sense of pain in the absence of a noxious stimulus or inflammation.⁶ Currently, medications, such as opioids, are continuously used to treat pediatric chronic pain despite evidence that demonstrates the efficacy of psychologic and exercise-based interventions for pediatric patients with AMPS.^{5,7}

PURPOSE

This literature review will compare cognitive behavioral therapy (CBT), exercise and physical therapy (PT), as well as occupational therapy (OT), all of which have been found to alleviate the disease burden of AMPS. While the literature analyzes these treatment modalities in conjunction with each other, this review compares non-pharmacological treatment modalities in isolation against medication use.

METHODS

A database search included the following search terms: "nonpharmacological treatment" AND "pediatric chronic musculoskeletal pain," "psychological intervention" AND "pediatric chronic musculoskeletal pain," and "exercise" AND "pediatric chronic musculoskeletal pain." Related terms were substituted for "pediatric chronic musculoskeletal pain" to find additional articles related to AMPS. Inclusion criteria focused on pediatric patients (<18 years old) diagnosed with chronic MSK pain or other rheumatic conditions, and varied by sex, race, specific disease symptoms, and tertiary care access. A qualitative comparison was measured, using multiple sources which based most of their outcomes on an association between patient perception of disease burden with a given treatment modality.

RESULTS

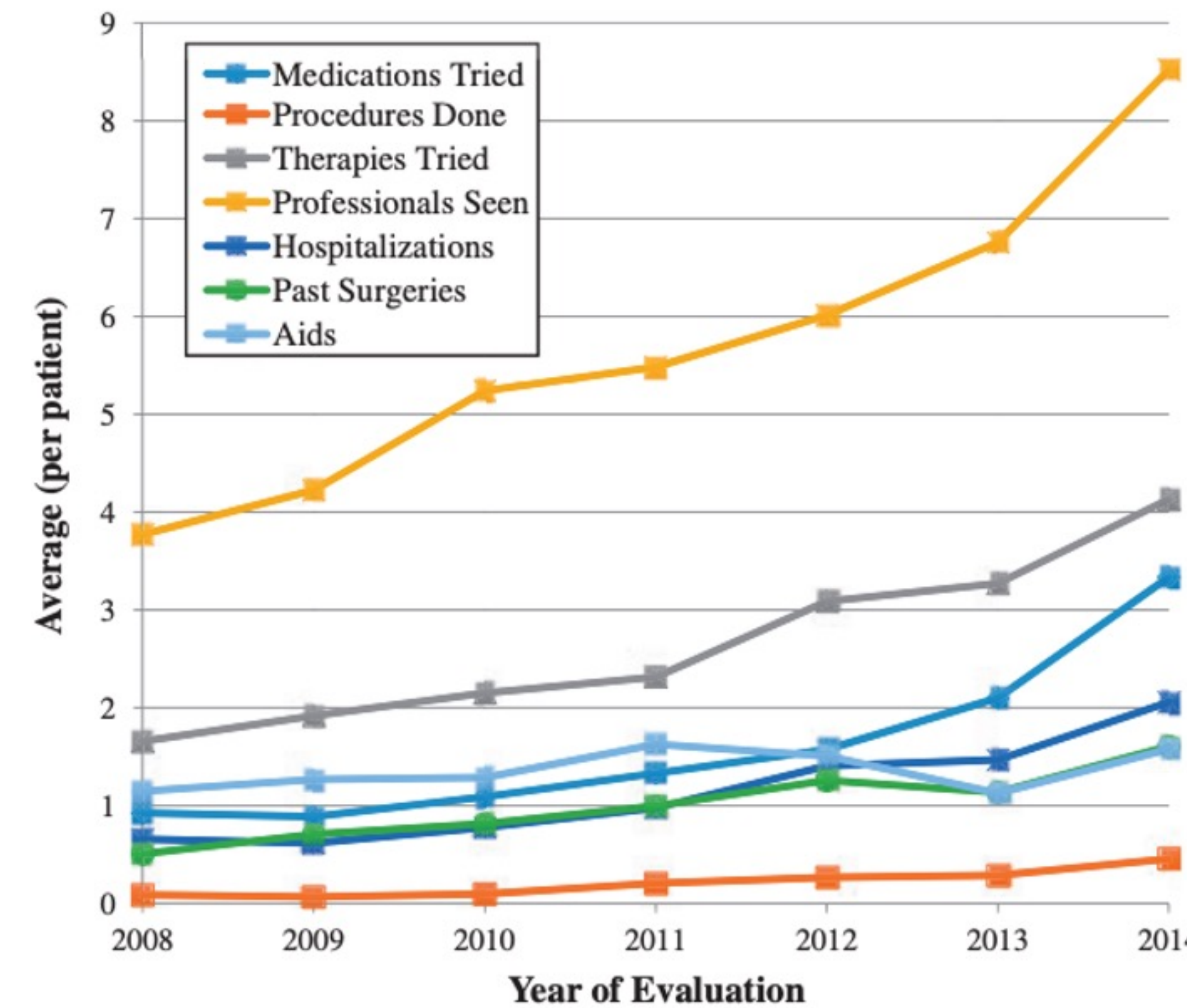


Figure 1. Various aspects of medicalization in adolescent AMPS treatment since 2008. Adapted from "Trends in medicalization of children with amplified musculoskeletal pain syndrome" by EL Kaufman, J Tress, and DD Sherry, 2017, *Pain Medicine*, 18, p839.

The Functional Disability Index or Inventory (FDI) has demonstrated reliability and validity, with higher scores representing greater functional disability.

Medicalization of AMPS

Medical therapy is not proven to improve patient reported pain scores and exposes pediatric patients to possible iatrogenic injury.⁹ 11.6 to 20% of pediatric patients with chronic pain are prescribed opioids.¹² Despite the ineffectiveness of medication for chronic pain, the trend in medicalization of AMPS is increasing (Figure 1).

Psychotherapy

Episodes of acute and chronic pain trigger heightened thoughts and perceptions of pain in patients, potentially leading to a cycle of persistent pain and prolonged disability.¹⁵ Cognitive behavioral therapy (CBT) is a common form of psychotherapy intended to help individuals respond to challenging situations in a more effective manner.¹⁴

Physical Therapy (PT), Occupational Therapy (OT), and Desensitization

PT that consists of high-intensity aerobic activities, strengthening exercises, and yoga stretching reduced the FDI, resulting in full restoration of physical function in 95% of participants in a randomized control trial. In addition to the physical coping strategies of OT, desensitization, which is a technique used to decrease physical sensitization, has a known correlation to increased function via increasing sensory stimuli exposure.^{22,25}

DISCUSSION

Comparative Analysis of Nonpharmacologic Treatment in AMPS

The biopsychosocial model is the foundation for the current non-pharmacologic approach consisting of CBT, PT, and OT. The global effects of a multifaceted treatment may be related to the unknown mechanism by which pain signals "short circuit" to elicit the "amplified" pain cycle.²⁷ Therefore, tailored intervention within each discipline may be beneficial for individual treatment plans (Figure 2).²² The mainstay treatment of AMPS is exercise and physical therapy to retrain the affected nerves causing significant pain. However, further research is indicated as there is insufficient education on pediatric pain management in many fields. Future studies should investigate CBT and resiliency training, correlate PT regimens with FDI scores, and analyze the impact of OT's utility in the comprehensive treatment of AMPS.

CONCLUSION

While this literature review was able to effectively compare chief components of the interdisciplinary treatment approach for AMPS, there is limited research investigating the individual quality of CBT, PT, and OT. Additional studies must be conducted to understand why a multidisciplinary approach is beneficial in reducing disease burden. Comparative analyses of various levels of interdisciplinary treatment can further support this approach as a first-line option. It is possible that such research may lead to critical insight on AMPS pathogenesis and increased provider aware. Furthermore, adherence to multidisciplinary treatment should be evaluated with respect to outcome. The prompt diagnosis and treatment of AMPS in children may reduce pediatric exposure to pain medications with no benefit and reduce the overall burden of disease in a child's life. Ultimately, the literature demonstrates the effectiveness of CBT, PT, and OT in treating AMPS and, when used in conjunction, provide maximal disease burden relief.

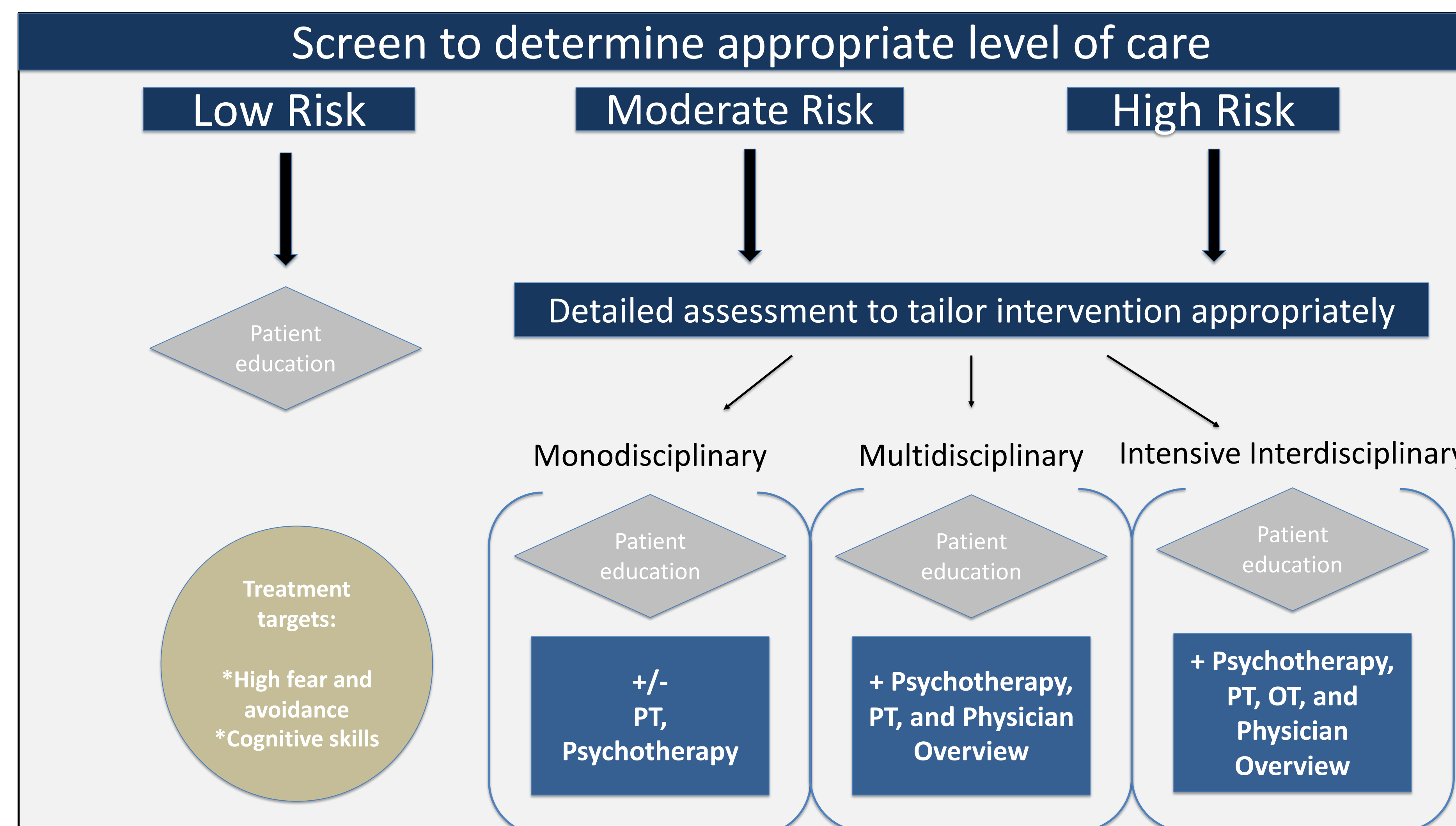


Figure 2. Schematic overview of Potential Future Directions for Clinical Practice. PT=Physical Therapy; OT=Occupational Therapist. Adapted from "Best-Evidence for the Rehabilitation of Chronic Pain Part 1: Pediatric Pain" by LE Harrison et al., 2019, *Journal of Clinical Medicine*, 8(9):1267, pg 13.

REFERENCES

