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Commentary

Co-occurring chronic pain and obesity: A call to action

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Recent research has found that it takes almost 4 years longer for youth with co-occurring obesity and pain to be referred to a multidisciplinary pain clinic, compared to youth with healthy weight (Santos et al., 2017), forcing youth with these comorbid conditions to live with untreated pain significantly longer than their healthy weight peers. Furthermore, when these youth are eventually connected with pain services, current multidisciplinary treatment approaches are less effective for them than for youth with healthy weight (Stoner et al., 2017). Despite the fact that research has documented the relationship between pediatric chronic pain and obesity, as well as the ways in which obesity exacerbates the impact of chronic pain on the lives of youth, more research is needed. Additionally, the clinical implications of this co-occurrence remain understudied, especially in pediatrics. This commentary is a call to action for pediatric pain providers and researchers to prioritize this population through the identification of mechanisms underlying this co-occurrence and the development of treatment options to address the unique needs of these youth. This article briefly reviews the literature, and outlines ways that pediatric pain experts can make a difference in the lives of this vulnerable population.

Improving our understanding of the co-occurrence of pediatric chronic pain and obesity is increasingly important, as the prevalence of both conditions is on the rise. Rates of pediatric chronic pain range from 11% to 38%, with headache being the most frequently reported single pain location (King et al., 2011). This is a significant increase in pediatric chronic pain prevalence compared to past decades (Sillanpää & Anttila, 1996; Bandell-Hoekstra et al., 2001). It is well known that chronic pain significantly impairs health-related quality of life (HRQoL; Gold et al., 2009) and is associated with high rates of functional disability (Hainsworth et al., 2007). Similarly, rates of pediatric obesity have tripled since the 1970s (Fryar et al., 2014) and nearly 1 in 5 youth in the United States is obese (Hales et al., 2017). Given the negative impact of obesity on numerous body systems, HRQoL, and mental health outcomes, obesity has been identified as a new childhood disability (Tsiros et al., 2011).

Also concerning is the economic burden associated with treatment of these chronic health conditions. Studies estimate the annual cost of treating pediatric obesity to be $14 billion (Marder & Chang, 2006 and pediatric chronic pain to be $19.5 billion (Groenewald et al., 2014) in direct medical expenses. Both the increasing prevalence rates and the medical costs associated with treatment of these chronic health conditions highlight the need for improved awareness and understanding of these co-occurring conditions.

For several reasons, it is critically important that pediatric pain experts begin to identify ways to better treat and manage pain in youth with comorbid chronic pain and obesity.

1) Pediatric pain clinics already see a significant number of patients with obesity (estimates range from 24-29%; Wilson et al., 2010; Hainsworth et al., 2016; Santos et al., 2017; Stoner et al., 2017), and that number is likely to rise with the increased prevalence of both conditions.

2) Improved functioning via a functional rehabilitation approach is a primary goal of pediatric chronic pain treatment (Lynch-Jordan et al., 2014), yet research has shown that obesity impedes improvement in functioning for youth with chronic pain (Stoner et al., 2017). In fact, obesity renders multidisciplinary treatment for pain management less effective in youth with chronic pain, effectively perpetuating a cycle of disability (Stoner et al., 2017).
3) For females with increased body mass index (BMI), parents report greater pain catastrophizing and functional disability (Santos et al., 2017).
4) As indicated, it takes almost 4 years longer for youth with obesity to be referred to a multidisciplinary pain center, than it does for youth with healthy weight (Santos et al., 2017).
5) These findings likely have implications for adherence to pain treatment plans, especially recommendations for increased physical activity, as these factors are probable contributors to physical inactivity, deconditioning, and reduced confidence in physical functioning (Santos et al., 2017). Indeed, BMI percentile has been found to contribute to mean and peak activity level such that adolescents with chronic pain and greater BMI percentile demonstrate lower physical activity overall (Wilson & Palermo, 2012) and increased activity limitations (Hainsworth et al., 2009; Wilson et al., 2010).

Future research directions

One of the ways that pediatric pain experts can make a difference is by identifying mechanisms underlying the co-occurrence of chronic pain and obesity, which is essential to creating appropriate, effective, and individualized treatment plans for this population. Central sensitization, systemic inflammation, mechanical overload, and autonomic dysfunction may be responsible for the increased prevalence and severity of chronic pain found in individuals with obesity (Paley & Johnson, 2016). For example, dysfunctional adipose tissue (i.e. body fat) found in youth with obesity can secrete pro-inflammatory biomarkers that may result in chronic inflammation and sensitization of nociceptors, resulting in chronic pain (Paley & Johnson, 2016). In addition, the resulting biomechanical changes on the body from obesity over time likely place youth at increased risk for pain through the added burden of weight on the musculoskeletal system (Wearing et al., 2006). Moreover, psychosocial and lifestyle factors have been identified as other contributors to the relationship between pain and weight (Okifuji & Hare, 2015). When one has both conditions, a complex interplay between mood, eating, and chronic pain perpetuates a cycle of psychological and physical disability (Janke & Kozak, 2012). For example, comfort eating to cope with symptoms of depression may increase weight, placing additional pressure on joints and overall body mechanics, resulting in musculoskeletal pain.

Assessment is another important area for future research, especially given expert recommendations advocating for the use of individualized treatment goals with this population that consider age, weight status, and presence of comorbidities (Daniels et al., 2005; Speiser et al, 2005). Assessment for motivation and readiness for change in the youth and family, confidence in ability to make changes, underlying mood symptoms, social stressors (e.g. teasing/bullying), access to resources (e.g. healthy food choices, exercise equipment), existing parental/familial support, sleep hygiene, and current coping skills (e.g. comfort eating) would assist in identifying suitable treatment goals. Additionally, biomechanical assessment would support measurement of treatment outcomes and has been found to be successful in demonstrating outcomes a pilot study of youth with juvenile fibromyalgia (Tran et al., 2016).

Clinical implications

Pediatric pain experts can also begin to develop interventions sensitive to the needs of this population. For example, interventions that promote exercise have been shown to lead to both a reduction in weight and improvements in systemic inflammation in adults (Paley & Johnson, 2016). Additionally, exercise-based interventions have been found to be successful in improving pain and

physical functioning (e.g. Logan et al., 2012; Kashikar-Zuck et al., 2016; Tran et al., 2017; Kashikar-Zuck et al., 2018) in youth with various chronic pain conditions, including neuropathic pain and juvenile fibromyalgia, pointing to the overlap in treatment recommendations for pediatric obesity and chronic pain. These results, paired with the known benefits of exercise on mental health, quality of life, and pain perception (Koltyn, 2000), support the recommendation for inclusion of exercise as part of the treatment plan for youth with comorbid chronic pain and obesity. Adult studies have shown that weight loss can improve pain outcomes, via a reduced load on weight-bearing joints (Messier et al., 2013), improved joint alignment (Felson et al., 1992), and enhanced posture (Janke et al., 2007). A pilot study has shown that Hatha yoga is a promising intervention for youth with both conditions, and may be a way to engage in physical activity without exacerbating existing pain concerns (Hainsworth et al., 2014). Although there is significant evidence to support the inclusion of exercise in pain treatment programs, adherence to exercise plans is notoriously low. Another factor to monitor is the potentially increased pain experienced following the re-initiation of physical activity, which may lead to fear of movement and avoidance of future physical activity above and beyond that found in youth with chronic pain alone (Rabbitts et al., 2014; Sil et al., 2015). Accordingly, future research is needed to create appropriate exercise guidelines for this population (Paley & Johnson, 2016). Furthermore, while well-established evidence-based interventions for treating obesity in youth exist, including family-based behavioral treatment (FBT) and parent-only behavioral treatment for children (Altman & Wilfley, 2015), they have not been evaluated in the pediatric chronic pain and future research should evaluate the effectiveness of these interventions, including components such as behavioral goal setting for both youth and parents and parental modeling, with this comorbid population. Finally, the combination of diet- and exercise-based interventions has been found to be most effective in improving pain and weight-related outcomes in adults with co-occurring chronic pain and obesity (Janke et al., 2007), pointing to the need for the inclusion of professionals with expertise in exercise and nutrition as a part of a multidisciplinary pain treatment team.

Medical providers and psychologists trained in pediatric pain are poised to make a difference in the lives of youth suffering from comorbid chronic pain and obesity. It may be that there is increased buy-in and reduced stigma for pain treatment compared to weight-based interventions, making pediatric pain clinics a potential first touch point for this population. However, addressing obesity in the context of chronic pain must be done with sensitivity. Although the majority of parents of youth with chronic pain and obesity are more concerned about their child's weight than those with a healthy weight, they may be unaware of the relationship between obesity and chronic pain and many parents fail to see how discussions of weight, nutrition, and physical activity are relevant to pain treatment (Hainsworth et al., 2016). Accordingly, pediatric pain providers and psychologists would benefit from training in the recognition of excess weight and in ways to discuss the relationship between pain and weight in a non-judgmental and collaborative way in the context of an appointment for pain. Overall, these findings highlight the need for increased psychoeducation for patients and families regarding the relationship between chronic pain and obesity, especially the ways in which weight status can at best stall and at worst prohibit effective pain treatment.

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