Research in Developmental Disabilities 37 (2015) 64–80

Contents lists available at ScienceDirect

Research in Developmental Disabilities

Review article

A systematic review of sensory-based treatments for children with disabilities

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ARTICLE INFO

Article history:
Received 18 August 2014
Received in revised form 24 October 2014
Accepted 9 November 2014
Available online 25 November 2014

Keywords:
Childhood developmental disorders
Intellectual disability
Autism spectrum disorder
Systematic review

ABSTRACT

Sensory-based therapies are designed to address sensory processing difficulties by helping to organize and control the regulation of environmental sensory inputs. These treatments are increasingly popular, particularly with children with behavioral and developmental disabilities. However, empirical support for sensory-based treatments is limited. The purpose of this review was to conduct a comprehensive and methodologically sound evaluation of the efficacy of sensory-based treatments for children with disabilities. Methods for this review were registered with PROSPERO (CRD42012003243). Thirty studies involving 856 participants met our inclusion criteria and were included in this review. Considerable heterogeneity was noted across studies in implementation, measurement, and study rigor. The research on sensory-based treatments is limited due to insubstantial treatment outcomes, weak experimental designs, or high risk of bias. Although many people use and advocate for the use of sensory-based treatments and there is a substantial empirical literature on sensory-based treatments for children with disabilities, insufficient evidence exists to support their use.

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http://dx.doi.org/10.1016/j.ridd.2014.11.006
0891-4222/

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1. Introduction

Sensory integration theory (Ayres, 1972) hypothesizes that interferences in the neurological processing and integration of sensory inputs interrupts or impedes functioning and typical behaviors in individuals with sensory dysfunction. Sensory dysfunction is thought to impair sensory systems (i.e., vestibular, proprioceptive, auditory, tactile) and the neurological processing of sensory information, which negatively impacts development and learning. Sensory-based treatments are designed based on sensory integration theory to provide individualized, controlled sensory experiences to help modulate responses to environmental input (Baranek, 2002). These activities use a variety of sensory modalities (e.g., vestibular, touch, auditory), a range of passive (e.g., wearing a weighted vest, massage) to more active (e.g., jumping on a trampoline, climbing a wall) activities, and target hyper- or hypo-sensitivities. The driving principle for the use of sensory-based treatments is to improve sensory processing, self-regulation, increase adaptive functioning, and help the child participate in daily activities (Ayres, 1979; Baranek, 2002).

According to sensory integration theory, providing specific sensory-rich inputs is purported to improve neurological processes that integrate sensory information. It is unknown, however, whether atypical responses to sensory inputs signify a specific disorder or are characteristic of several developmental and behavioral disabilities. There are no universally accepted frameworks for diagnosing sensory dysfunction and there have been no studies that have specifically or accurately measured these neurological processes. In a recent policy statement, the American Academy of Pediatrics (AAP) (2012) announced that sensory dysfunction should not be diagnosed. Moreover, there is not a universally accepted protocol for implementing sensory-based treatments. Although many proponents of sensory-based treatments cite the diversity of individual needs as the rationale for the lack of a universal protocol, the extent to which an intervention is implemented with fidelity (i.e., adherence to its underlying theoretical and clinical guidelines) is crucial to ensure the intervention can be replicated for clinical and research purposes. Until then, the status of the intervention as an evidence-based practice can and should be questioned.

Most professional disciplines that intervene with children with disabilities have adopted evidence-based guidelines and ethical standards (e.g., Individuals with Disabilities Education Act, 2004). However, sensory-based treatments, which continue to lack empirical support (Lang et al., 2012), have gained popularity and are a common practice, especially by occupational therapists (Parham et al., 2007) and for children with autism spectrum disorder (ASD) (Case-Smith, Weaver, & Fristad, 2014; Green et al., 2006; Olson & Moulton, 2004). This is likely because children with ASD often present with sensory abnormalities (Baranek, David, Poe, Stone, & Watson, 2006; Ben-Sasson et al., 2009; Boyd et al., 2010). Using a sensory integration theoretical framework, a myriad of sensory-based treatments are used to address these sensory abnormalities (e.g., wearing weighted vests or blankets, massage therapy, brushing, therapy balls). These treatments can be costly, involve significant time and resources to implement, and might be used in place of other empirically based treatments. A number of systematic reviews of sensory-based treatments show limited or inconclusive empirical support (Baranek, 2002; Case-Smith et al., 2014; Lang et al., 2012; May-Benson & Koomar, 2010; Schaaf & Blanche, 2011). For example, Case-Smith et al. (2014) separated comprehensive sensory integration therapies and focal-based treatments for children with autism (e.g., weighted vests). They noted no support for focal treatments, and "low to moderate" support for sensory integration therapies (Case-Smith et al., 2014, p. 7). Their findings for sensory integration therapy, albeit positive, were primarily based on small RCTs and measurements using goal attainment scaling by parents or teachers who were not blind to study condition (e.g., Pfeiffer, Koenig, Kinnealey, Sheppard, & Henderson, 2011; Schaaf et al., 2013). They go on to indicate that it is too early to conclude that sensory integration therapy "is ultimately effective" for children with autism (Case-Smith et al., 2014, p. 12). Despite these and other limited findings, the widespread use of sensory-based treatments continues. Many proponents of sensory-based treatments cite methodological flaws with the extant reviews. Further, no reviews to date have conducted a comprehensive analysis of these treatments across children with all types of disabilities. This is relevant because sensory-based treatments might be more effective for children with specific disabilities or symptomatology. Comprehensive rigorous evaluation of the efficacy of sensory-based treatments for children with disabilities is important for ethical, clinical, and financial perspectives. The purpose of this review is to meet this need.

2. Method

The methods used in this review were consistent with current recommendations of the Cochrane and Campbell Collaborations, (Higgins & Green, 2008) and the What Works Clearinghouse (2013) and reported according to the