



The psychophysiological impact of childhood autism spectrum disorder on siblings



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ARTICLE INFO

Article history:

Received 18 March 2015

Received in revised form 21 October 2015

Accepted 24 November 2015

Available online 23 December 2015

Keywords:

Cortisol

Behaviour problems

Depression

Siblings

Social support

ABSTRACT

Objective: The negative impact of caring for a child with autism spectrum disorder (ASD) on parents' psychophysiological functioning has been widely evidenced. However, siblings, who also face emotional, social and physical challenges associated with having a brother/sister with ASD, have been less widely studied. This study examined the psychophysiological impact of childhood ASD on siblings.

Methods: A sample of 25 siblings of children with ASD (and their mothers) and a control group of 20 siblings of neuro-typical children (and their mothers) completed questionnaires assessing: (a) demographic and lifestyle information, (b) family characteristics, (c) child behaviour problems, (d) social support and (e) depressive symptomatology. Saliva samples were collected at several time points on two consecutive days, and estimates of the cortisol awakening response (CAR), diurnal cortisol slope and mean diurnal cortisol output were derived.

Results: Total depressive symptoms were higher in siblings of children with ASD compared with controls. Group differences with respect to depressive symptomatology were driven more by emotional than functional problems. With respect to physiological functioning, groups were comparable on all cortisol indices. In siblings of children with ASD, social support, especially from parents and close friends, predicted total depressive symptoms, as did the behaviour problems of their brother/sister with ASD.

Conclusion: Siblings of children with ASD experience greater emotional problems and overall depressive symptoms compared with a control group. Interventions that enhance social support, as well as helping siblings better understand the behaviour problems of their brother/sister with ASD, might be effective for alleviating depressive symptoms.

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1. Introduction

Caring for a child with a developmental disability (DD) such as ASD has been widely used as one model for examining the effect of chronic stress on psychophysiological functioning (Lovell & Wetherell, 2011). Indeed, the challenges of caring for a child with a DD, which include financial hardship (Kogan et al., 2008), social isolation (Yantzi, Rosenberg, & McKeever, 2006), negotiating a fragmented service system (Griffith & Hastings, 2013), stigma and social judgement (Cantwell, Muldoon, & Gallagher, 2015), far outstrip those of parenting a neuro-typical child. That caregivers of children with a DD experience increased psychological distress has been widely evidenced, with studies reporting on higher levels of psychological

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symptoms such as perceived stress (Cantwell, Muldoon, & Gallagher, 2014), hopelessness (Bandeira et al., 2007), anxiety (Ruiz-Robledillo and Moya-Albiol, 2013) and depression (Cantwell et al., 2015; Smith & Grzywacz, 2014). In addition, compared with parents of neuro-typical children, caregivers' levels of anxiety and depression were found to be more likely to satisfy criterion for clinical mood disorder (Gallagher, Phillips, Oliver, & Carroll, 2008). That caregiving stress is associated with poorer psychological functioning was also demonstrated in two recent meta analyses (Easter, Sharpe, & Hunt, 2015; Hayes & Watson, 2013) and review studies (Cousino & Hazen; Fairthorne, de Klerk, & Leonard, 2015). The stress of caring for a child with a DD has also been linked with alterations in a variety of health relevant, physiological parameters. For example, perturbations in cardiovascular (Gallagher & Whiteley, 2012), neuroendocrine (Bella, Garcia, & Spadari-Bratfisch, 2011; Ruiz-Robledillo and Moya-Albiol, 2013; Seltzer et al., 2009) and immune (Gallagher & Hannigan, 2014; Lovell, Moss, & Wetherell, 2012) functioning have been widely implicated as plausible physiological pathways linking chronic caregiving stress with downstream disease.

Fewer studies have examined the psychophysiological impact of childhood disability on other family members living at home. This is surprising given that siblings, much like their parents, face a number of challenges associated with having a brother/sister with a DD. For example, to alleviate some of the burden on their parents, siblings often take on additional household chores and responsibilities (Dyke, Mulroy, & Leonard, 2009), thus limiting opportunities for social and peer interaction, and extracurricular activities (Barak-Levy, Goldstein, & Weinstock, 2010; Moyson & Roeyers, 2012). In addition, parents, who are overburdened by their caregiving role, have been found to be less physically and emotionally available for their other children (Macks & Reeve, 2007). Indeed, in two recent qualitative studies, sibling adjustment was, along with lack of support and stigma, one of the biggest concerns raised by caregivers of children with a DD (Ludlow, Skelly, & Rohleder, 2012; Oruche, Gerkenmeyer, Stephan, Wheeler, & Hanna, 2012). Perhaps most challenging, many siblings actively contribute to the caretaking role, participating in activities such as feeding, dressing and bathing their disabled brother/sister (Randall & Parker, 1999).

Relative to normative controls, siblings of children with a DD such as ASD have been found to report higher levels of separation anxiety (Lobato et al., 2011), emotional problems (Petalas, Hastings, Nash, Lloyd, & Dowe, 2009) and internalising behaviours (Fisman, Wolf, Ellison, & Freeman, 2000). Findings from a review paper (Barlow & Ellard, 2006) and recent meta analysis (Vermaes, van Susante, & van Bakel, 2012) also suggested that siblings of children with a DD might be at greater risk for psychological adjustment difficulties, with internalising behaviours and depressive symptoms found to be higher when compared with a control group. However, not all findings have been consistent, such that several studies observed no effect (Benson & Karlof, 2008; Tomeny, Barry, & Bader, 2012), or an adaptive effect (Macks & Reeve, 2007), of childhood disability on siblings' psychological functioning. These inconsistent findings highlight the need for additional research in this area.

Siblings' psychological adjustment to childhood disability has been shown to be moderated by a range of variables. For example, family characteristics such as socioeconomic status (Macks & Reeve, 2007; Petalas et al., 2009), family size (Kaminsky & Dewey, 2002; Labay & Walco, 2004) and parental stress (Giallo & Gavidia-Payne, 2006) have been shown to predict emotional and internalising problems in siblings of children with a DD. In addition, research has shown that siblings' psychological well being is, at least in part, affected by characteristics of their disabled brother/sister, especially their behavioural problems. For example, in two recent studies, child behaviour problems (CBP), and in particular, hyperactivity and conduct behaviours positively predicted depression symptoms in their siblings (Meyer, Ingersoll, & Hambrick, 2011; Neece, Blacher, & Baker, 2010). These findings resonate with studies involving parental caregivers of children with a DD, where CBP were found to account for much of the variance in caregivers' feelings of depression (Gallagher et al., 2008; Lovell, Moss, & Wetherell, 2015). Most recently, in a study involving siblings of children with ASD, Shivers, Deisenroth, and Taylor (2012) found that CBP, along with maternal stress, uniquely predicted siblings' feelings of anxiety. Perceived availability of social support has also been shown to be influential for the psychological adjustment of siblings of children with a DD. For example, socially supported siblings, much like their parents, have been found to report lower levels of negative affective symptoms such as depression (Barrera, Fleming, & Khan, 2004), loneliness (Kaminsky & Dewey, 2002) and anxiety (Nolbris et al., 2010).

The impact of childhood disability on siblings' physiological functioning has, we believe, yet to be determined. Cortisol, the final effector hormone of the hypothalamic–pituitary–adrenal (HPA) axis, displays a robust basal diurnal pattern; levels are high in the morning upon waking, reach an acrophase 30–45 min post waking (i.e., the cortisol awakening response: CAR), gradually decline across the day (i.e., diurnal cortisol slope) and reach a nadir around midnight (Saxbe, 2008). However, if overused by chronic (i.e., repeated) stress, the normal operating levels of physiological, stress responsive systems such as the HPA axis have been shown to shift. For example, atypical patterns of cortisol secretion characterized by flatter cortisol slopes (Seltzer et al., 2009), greater CAR magnitude (Ruiz-Robledillo and Moya-Albiol, 2013) and hypo-secretion of cortisol across the day (Bella et al., 2011; Seltzer et al., 2010) have been observed in parental caregivers of children with a DD. Moreover, alterations in basal HPA activity have been implicated as one physiological indicator for downstream disease outcomes such as infectious disease (Edwards, Hucklebridge, Clow, & Evans, 2003), cardiovascular pathologies (Seldenrijk, Hamer, Lahiri, Penninx, & Steptoe, 2012) and sleep problems (Lasikiewicz, Hendrickx, Talbot, & Dye, 2008).

Like their parents, the sustained social, physical and emotional sequelae associated with having a brother/sister with a DD might, via repeated activation of physiological processes such as the HPA axis, confer potential health implications for siblings. Indeed, basal stress hormone activity, though yet to be investigated in siblings of children with a DD, has been

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