Parenting stress, salivary biomarkers, and ambulatory blood pressure in mothers of children with Autism Spectrum Disorders

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A R T I C L E   I N F O

A B S T R A C T

Parenting a child with an Autism Spectrum Disorder (ASD) is often associated with high levels of stress. This in turn can undermine the success of early intervention, and lead to poorer health outcomes for parents. The present study investigated the effects of parenting a child with an ASD on self-reported parenting stress, salivary biomarkers, and 24-h ambulatory blood pressure. Seventy-four mothers of 2–14 year olds with an ASD diagnosis completed a questionnaire booklet, which contained measures of parenting stress, and parent and child characteristics. Mothers wore an ambulatory blood pressure monitor, which collected systolic and diastolic blood pressure and heart rate over a 24-h period. Saliva samples were collected for the purpose of measuring cortisol and alpha-amylase levels. High levels of parenting stress and anxiety, and moderately high levels of depression were reported. Mothers were found to have low cortisol levels, suggesting dysregulation of the HPA-axis and cortisol profile. Hierarchical multiple regression analyses revealed that quantity of unmet service needs, sleep problems, socialisation deficits, adaptive behaviour, and the coping strategies of self-blame and behavioural disengagement predicted maternal outcomes. Findings are discussed in relation to their implications for supporting parents of children with ASD.

1. Introduction

Parenting is often stressful, but parents of children with special needs, including parents of children with an Autism Spectrum Disorder (ASD), can experience particularly pronounced levels of stress (e.g., Eisenhower, Baker, & Blacher, 2005; Randall & Parker, 1999). Numerous psychosocial factors associated with stress among parents of children with ASD have been explored. For instance, it has been widely documented that behaviour problems in children can affect parental stress levels. Eisenhower et al. (2005) found that behaviour differences over time were paralleled by differences in maternal stress, such that mothers of children with ASD were at elevated risk for high stress. Other variables found to exacerbate stress levels in this population include earlier diagnosis (Osborne, McHugh, Saunders, & Reed, 2008), lower child adaptive functioning (Hall & Graff, 2011), and an increased number of unmet service needs (Taylor & Seltzer, 2010). However, there are inconsistencies in the literature regarding which variables have the most significant impact on parental stress. This may be partly due to over-reliance in previous research on parent self-reports of stress, and parent reports of child and parent characteristics.

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1.1. Cortisol

Use of physiological measurement has been recommended for studies of stress (Romanczyk & Gillis, 2004). When a person encounters a stressor, this activates their stress-response (Sapolsky, 2004). The hypothalamic–pituitary–adrenal (HPA)-axis is activated during a stress–response, triggering the production of the stress hormone, cortisol. Cortisol can be used as a biomarker of HPA-axis activity, and cortisol levels can be measured non-invasively in saliva samples. Chronic activation of the HPA-axis can increase reactivity to stressors and is associated with increased risk of health problems (Lovallo, 2005). Cortisol has a strong diurnal profile, with levels increasing approximately 50–60% in the first 30–45 min after waking (known as the cortisol awakening response; CAR), and gradually declining throughout the rest of the day (Adam & Kumari, 2009). Dysregulation of the CAR is associated with negative outcomes, such as depression (Clow, Thorn, Evans, & Hucklebridge, 2004). Seltzer et al. (2010) found that mothers of adolescents and adults with ASD had significantly lower levels of daily cortisol than mothers in a control group. Low cortisol, or hypocortisolism, can result in health problems such as decreased immunity and increased vulnerability to stress-related diseases (Heim, Ehlert, & Hellhammer, 2000). Further research is needed to determine if mothers of younger children and adolescents with ASD also experience hypocortisolism.

1.2. Alpha-amylase

The sympathetic nervous system (SNS) also has a crucial role in the stress–response. In particular, the SNS mobilises the body to provide energy for a fight-or-flight response (Sapolsky, 2004). Chronic activation of the SNS is associated with a variety of health problems, such as immune suppression (Granger, Kivlighan, El-Sheikh, Gordis, & Stroud, 2007). Previous research has reported reduced immunity among parents of children with developmental disability (DD), including ASD (Gallagher, Phillips, Drayson, & Carroll, 2009). Salivary alpha-amylase (sAA) has been identified as a marker for stress-induced activity of the SNS (Granger et al., 2007; Rohleder & Nater, 2009). Thus, saliva samples can be used to assess both major stress systems (i.e., the HPA-axis and SNS) among parents of children with ASD.

1.3. Ambulatory blood pressure monitoring

The cardiovascular (CV) system is also activated during the stress-response. During a maximum stress-response, the heart's output of blood can increase by up to five times the resting state (Jones & Bright, 2001). Chronic stress is a significant risk factor for the development of hypertension (i.e., high blood pressure), and hypertension is a risk factor for future development of stroke and coronary heart disease (Sapolsky, 2004). Laboratory-based studies provide useful information about CV responses to stressors, but they may not be representative of how people typically behave or respond to stressors, because of their highly structured nature (Turner, 1994). Ambulatory BP (ABP) monitoring enables repeated measurement of BP and heart rate (HR) under natural conditions. ABP monitoring involves wearing a portable monitor, usually over a 24-h period. The monitor can measure BP and HR at regular intervals while a person continues their typical daily routine. ABP has been reported to be superior to clinical BP in predicting CV mortality (Dolan et al., 2005). Thus, ABP monitoring could provide an important naturalistic measure of CV responses to stressors experienced by parents of children with ASD.

1.4. Aims of the present study

The present study aimed to investigate levels of parenting stress among mothers of children with ASD. Specifically, we aimed to identify psychosocial variables predictive of parent self-report, salivary biomarkers of stress, and level of CV activity in this population. This includes factors that could exacerbate (e.g., child behaviour problems) or mediate (e.g., coping strategies) parenting stress. Regarding salivary biomarkers, in light of previous research (e.g., Seltzer et al., 2010), we aimed in particular to examine whether mothers of children with ASD have blunted cortisol profiles.

2. Method

2.1. Participants

The sample initially comprised 80 mothers of children with an independent diagnosis of an ASD. Six participants were excluded for failing to return questionnaires within the allotted time, leaving a final sample of 74.

2.1.1. Mothers

The mean age of the sample was 41.22 years ($SD = 5.97$), ranging from 26–65 years. Fifty mothers (68%) reported that they were not in employment, while 16 (22%) reported being in part-time employment, and eight (11%) reported being in full-time employment. Mothers reported an average of two ($SD = 2.21$) current illnesses, ranging from 0–9 illnesses.

2.1.2. Children

Fifty-seven (77%) of the children were boys, and 17 (23%) were girls. Children had a mean age of 106.89 months ($SD = 42.83$, range: 33–207 months). Children received their ASD diagnoses when they were on average 52.23 months old