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Age of autism spectrum disorder diagnosis is associated with child's variables and parental experience

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ABSTRACT

Early diagnosis of autism spectrum disorder (ASD) is highly important as it enables an early start to intervention. The current study examined familial (parental ages; education; having an older sibling) and child (gender; reported and observed autism symptoms severity; adaptive skills) related variables that might predict the age of ASD diagnosis. The study included 551 participants, age range 15–72 months, diagnosed with ASD who underwent comprehensive medical and behavioral assessment using standardized tests. Of the child's examined variables, the severity of the social interaction impairment reported by the parents and having a history of developmental regression was associated with an earlier age of ASD diagnosis. In contrast, the severity of the restricted and repetitive behaviors was associated with delayed age of ASD diagnosis. Vineland Adaptive Behavior Scales scores lower or higher than the group's mean (70 points) were associated with a relatively delayed age of ASD diagnosis. Of the familial variables, only having an older sibling was associated with an earlier diagnosis. Professionals should be aware that subtle signs of ASD, developmental delay and close to normal adaptive functioning might delay age of ASD diagnosis. Educating parents on "red flags" for ASD and periodic surveillance in early childhood are important.

1. Introduction

Autism spectrum disorder (ASD) is a neurobehavioral disorder comprised of social-communication and social interaction deficits, along with restricted, repetitive behavior (RRB), interests or activities, as is now defined in DSM 5 (APA, 2013). The presence and intensity of these deficits are variable and constitute a heterogenic spectrum (Johnson & Myers, 2007). The signs and symptoms are usually notable prior to three years of age (Levy, Mandell, & Schultz, 2009). The prevalence of ASD is continuously rising and is currently estimated as approximately 1–2% in the general population (Blumberg et al., 2013; Kogan et al., 2009), with a male:female ratio ranging from 4.3 to 6.8:1 (Fombonne, 2005; Zachor & Ben-Itzchak, 2011). ASD has a strong genetic predisposition, and the chance of a second sibling being diagnosed with this disorder is 10–20% (Constantino, Zhang, Frazier, Abbacchi, & Law, 2010; O'Roak & State, 2008; Ozonoff et al., 2011). Developmental regression in

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language, play and social domains has been reported in 20–33% of cases with ASD (Ben-Itzchak, Ben-Shachar, & Zachor, 2013; Werner & Dawson, 2005).

Until 2013, the diagnosis of ASD was based on meeting criteria specified in the DSM-IV TR (APA, 2000) that included symptoms in three core domains, social interaction, communication and RRB. In the new DSM 5, the social and communication domains were combined and a diagnosis of ASD must include RRB symptoms. The signs of ASD usually appear prior to the age of three years (Levy et al., 2009). Nonetheless, the diagnosis of ASD is commonly delayed, with a mean age of diagnosis ranging from three to six years according to different studies (Goin-Kochel, Mackintosh, & Myers, 2006; Latif & Williams, 2007; Mandell, Novak, & Zubritsky, 2005). Early diagnosis of ASD is highly important as it enables an early start to intervention. Although parents have concerns early on, the ASD diagnosis is sometimes delayed because the initial contact is with the family pediatrician who may not be aware of the subtle symptoms of ASD (reviewed in: Matson, Rieske, & Tureck, 2011). Therefore, studies have looked at variables affecting age of ASD diagnosis. A few studies reported that parents of children with ASD usually noticed aberrant behaviors in the first two years of life, although the definitive diagnosis was obtained later (Baghdadli, Picot, Pascal, Pry, & Aussilloux, 2003; Chawarska et al., 2007; De Giacomo & Fombonne, 1998). Guinchat et al. (2012) concluded that parents who noticed general concerns regarding the child's activity, motor development and emotional problems were worried earlier but received a later diagnosis.

A negative correlation between the severity of ASD symptoms and the age of diagnosis was reported, as some studies have shown an earlier age of diagnosis of autism, comparing to a later diagnosis of Asperger's syndrome and pervasive developmental disorder not otherwise specified (PDD-NOS) that present with milder symptoms (Mandell et al., 2005; Rhoades, Scarpa, & Salley, 2007). In another study, earlier diagnosis of ASD was made in children with more pronounced hand flapping, toe walking hypersensitivity to pain and odd play (Mandell et al., 2005). Other studies did not find an association between the appearance of stereotypical movements and the age of parental suspicion and/or age of diagnosis of ASD. These studies found that the abnormalities that had alerted parental awareness were primarily language delay, followed by abnormal social response (Chawarska et al., 2007; De Giacomo & Fombonne, 1998). There are conflicting reports on how the existence of co-morbid developmental delay is related to the age of ASD diagnosis. Some have indicated that developmental delay may delay a diagnosis of ASD (Gardiner & Larocci, 2012; Turygin, Matson, Williams, & Belva, 2014), while others did not find any association with age of ASD diagnosis (Chawarska et al., 2007; Kishore & Basu, 2011). Several studies found that children from families of a higher socio-economic level were diagnosed with ASD earlier than children from families of a lower socio-economic level (Fountain, King, & Bearman, 2011; Mandell et al., 2005; Pinto-Martin & Levy, 2004). Another study showed that higher parental education was associated with earlier age of ASD diagnosis (Fountain et al., 2011). Maternal age was directly related to parental age of recognition, meaning that advanced maternal age was related to delayed recognition (Chawarska et al., 2007). In contrast, De Giacomo and Fombonne (1998) found no relationship between the age of parental recognition of ASD symptoms and the family's socio-economic status or the child's gender. Chawarska et al. (2007) reported that the child's birth order in the family and the presence of a former sibling with ASD were not associated with parental age of ASD symptoms recognition. Regarding gender, a survey on 2500 children with ASD showed females, particularly those with no additional cognitive impairment, were diagnosed later than males (Giarelli et al., 2010). Overall, the results of these studies did not find specific variables that were consistently associated with the age of ASD diagnosis.

It is well known that early intervention in ASD improves outcome (Ben-Itzchak & Zachor, 2011; Howlin, Magiati, & Charman, 2009). Thus, it is highly important to identify variables that might affect age of diagnosis leading to earlier or delayed diagnosis of ASD. The aim of the current study was to examine the association between familial and child related variables and the age of diagnosis of ASD in early childhood. Specifically, the study addressed the contribution of different familial variables, including parental ages and education, having an older sibling and having a sibling with ASD on the age of ASD diagnosis. In addition, the study examined the contribution of child related variables, including, gender, reported and observed autism symptoms severity, developmental regression and adaptive skills that might predict the age of ASD diagnosis.

2. Methods

2.1. Setting and procedures

The study was conducted at a tertiary national center for diagnosis, treatment and research in the field of ASD. The participants were referred to the center for a comprehensive assessment of a possible diagnosis of ASD by pediatricians, teachers, other professionals and parents. The evaluation included a neurological assessment by a pediatric neurologist, and behavioral and cognitive evaluations by a skilled interdisciplinary team (clinical and educational psychologists, speech and language pathologist). Assessment of ASD was obtained using standardized tests, the Autism Diagnosis Interview-Revised (ADI-R) (Le Couteur, Rutter, & Lord, 2003) and the Autism Diagnosis Observation Schedule (ADOS) (Lord, Rutter, DiLavore, & Risi, 1999), information from the educational facility and meeting criteria for autism/ASD based on DSM-IV TR criteria (APA, 2000). When the results of the standardized tests were not corroborated, additional observation of the child by one of the professional team in the natural environment was provided. Based on all these information sources, the team arrived at the best clinical judgment regarding a definite ASD diagnosis. Assessment of adaptive skills was made by parental interviews using the Vineland Adaptive Behavior Scales (VABS) (Sparrow, Balla, & Cicchetti, 1984; Sparrow, Cicchetti, & Balla, 2005).