



Full length article

## Early developmental delay in children with autism: A study from a developing country

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## ABSTRACT

Early diagnosis is appropriate and important for developmental disorders such as autism spectrum disorder. In many less developed countries, unfortunately, diagnosis of this disorder is delayed. The aim of the present study is to determine whether this disorder can be screened using simple strategies such as comparison of the age of acquisition of motor skills. For this purpose, 124 children with autism were chosen to enter the study, and their parents were asked to retrospectively specify the age of achieving milestones of sitting without support, standing alone and walking alone. Information obtained from the parents was compared with World Health Organization standards. Results indicate that participants (male and female) have significantly delayed age of acquisition of all three skills. Based on this result, it can be suggested that existing standards, as a simple means with low cost and easy availability, can be used for early screening of the disease at a younger age so that treatment can be provided more quickly.

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### 1. Introduction

Autism spectrum disorder, a pervasive developmental disorder, is a subset of autism spectrum disorder that appears with features such as weakness in communication, weakness in socialization and repetitive stereotyped movements (American Psychiatric Association, 2000; Beighley, Matson, Rieske, Konst, & Tureck, 2014; Sipes & Matson, 2014). Also, children with autism have delay in motor skills development and motor function which, of course, do not count as factors in their diagnosis (Holck, Nettelbladt, & Sandberg, 2009; Matson, Mahan, Fodstad, Hess, & Neal, 2010a; Matson, Mahan, Kozlowski, & Shoemaker, 2010b; Ming, Brimacombe, & Wagner, 2007; Page & Boucher, 1998; Provost, Lopez, & Heimerl, 2007; Teitelbaum, Teitelbaum, Nye, Fryman, & Maurer, 1998).

However, children with other disorders have delays in communication skills and growth, including individuals with intellectual disability (Matson et al., 2010b; Perry, Flanagan, Geier, & Freeman, 2009; Stephenson & Dowrick, 2005), Down's syndrome (Coe et al., 1999; Stephenson & Dowrick, 2005), epilepsy (Caplan et al., 2009; Memisevic & Sinanovic, 2009; Stephenson & Dowrick, 2005) and fetal addiction (Arendt, Angelopoulos, Salvator, & Singer, 1999; Bandstra et al., 2002; Bender et al., 1995). Children with autism have more delays in motor skills than those with other developmental disorders (Rogers, Hepburn, & Wehner, 2003), which has been shown by various standard methods and tools to measure motor skills, or by analysis of home-made videos (Adrien, Perrot, Sauvage, & Leddet, 1992; Noterdaeme, Mildenberger, Minow, & Amorosa, 2002; Ozonoff et al., 2008).

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Studies have also compared the motor skills of children with a range of autism disorders with other individuals with developmental disorders more than autism (Matson et al., 2010a, 2010b; Provost et al., 2007), including receptive and expressive communication disorders (Matson et al., 2010a; Provost et al., 2007) and intellectual disability (Provost et al., 2007); these studies have shown some differences. None of the studies reported significant differences, except for the study by Matson et al. (2010a, 2010b), which found that toddlers with autism have lower scores in gross motor skills than other groups affected by developmental disorders in gross motor skills. In fact, researchers found that 25% of the 18–35-month-old toddlers had delayed and impaired motor skills, while the figure for children with pervasive developmental disorders was 17%, and for individuals who had developmental disorders other than autism it was 2.4% (Matson et al., 2010a).

Matson et al. (2010a), in their study which compared the ages of acquiring milestone skills in children with autism, children with pervasive developmental disorder and children with growth failure, found that such children have differences in age of acquisition of all these skills. All groups had developmental delay with respect to the typically developed age. There are a few studies that have shown that people with autism are impaired in their gross and fine motor skills; these researches have studied some limited skills, such as crawling and walking (Adrien et al., 1992; De Giacomo & Fombonne, 1998; Page & Boucher, 1998; Teitelbaum et al., 1998).

In a study of 150, 16–32-month-old children with autism, 9.1% of these children were unable to walk; and 2.2% had developmental delays and impaired speech, and were also unable to walk (Ventola et al., 2007). These results suggest that children with a range of developmental disorders have deficit in their motor skills.

In another study by Hussein, Taha, and Almanasef (2011) conducted in Egypt and Saudi Arabia, it was reported that only children in Saudi Arabia had delayed development in their fundamental motor skills.

The World Health Organization (WHO), through studying different populations, presented graphs and standards for growth for the world's population and sought to make these scales more comprehensive (Onis, 2006). In April 2006, the WHO provided the latest version of its standards for growth of children up to five years old (Onis, 2006). The standard of the WHO is based on data collected since the beginning of 1990, drawing on references to morphology measurements and alternative approaches to provide new tools for motor growth. The new measures are compatible with the prescriptive approaches and are designed to demonstrate growth of children at a certain time and place (Onis, 2006). But these measures are designed for use in typically developed persons (Onis, 2006); in other words, they can be used as criteria for the separation of typically and non-typically people. One of the problems that is unfortunately seen in developing countries is late diagnosis in people with autism, so that many of these people are identified after the age of three and some others after starting school (Samadi, McConkey, & Kelly, 2012). That is why attention cannot be paid directly to the growth process in these individuals from birth.

Since, in future, therapeutic interventions at early ages have an important role in the development of these individuals, it seems that conducting a study to identify the age at which these children achieve basic skills such as sitting, standing and walking could be useful. Most of researches in this area have been done on older people, and we need greater awareness of the age of achieving these skills by these individuals. Therefore, in the present study, the question is whether there is a difference between the ages of achieving the milestones (sitting, standing and walking alone/without support) that can be determined with the help of the WHO standards (Onis, 2006). If this difference is observed, it can be understood that these standards allow us to use them as a tool for early screening of persons suspected of being affected by disorders such as autism.

## 2. Methodology

### 2.1. Participants

The participants for this research included 124 children registered in exceptional school in Tehran. Tehran presents special education for the largest population of children. All the participants for this research were given diagnostic test of autism. In addition to the confirmed test results, additional diagnosis test session was conducted by employing DSM-IV and clinical judgment by a pediatrician who was not involved in the research. All the participants were at same level (high function). The exclusion criteria included neurodegenerative disease, moderate to profound mental retardation, and any developmental and mental comorbidity.

### 2.2. WHO growth reference

This reference is provided by the WHO. In its design, samples from around the world, including Ghana, India, Oman, Norway and the USA, participated in a longitudinal study. The study was performed as a Multicentre Growth Reference Study (MGRS) by the WHO. Children were assessed by these standards from four months old to walking independently. Six basic motor skills that were easily measurable and seemed significant for keeping stature were measured: sitting without support, hands-and-knees crawling, standing with support, walking with support, standing alone and walking alone (de Onis et al., 2012).

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