



The influence of Chinese one-child family status on Developmental Coordination Disorder status



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ABSTRACT

We conducted a population-based study on Developmental Coordination Disorder (DCD) in mainland China to explore the influence of one-child status in Chinese families on DCD. A total of 4001 children selected from 160 classes in 15 public nursery schools. The Movement Assessment Battery for Children assessed motor function. The prevalence of DCD in Chinese one-child families (8.7%) was higher than that in multi-child families (5.9%). Chinese one-child family status (compared with younger children in multi-child families) were negatively related with total score (-1.793), Manual dexterity (-0.228), Aiming and catching (-1.145), Balance (-0.433) of MABC-2 and DCD (OR = 2.294) when adjusted for the children's and family's characteristics, and perinatal factors (each $p < 0.05$). As one of the studies in this Chinese context, it provides a platform for future intervention programs in one-child families in preventing children's developmental disorders.

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1. Introduction

The development of motor competence is an important aspect of child development. DCD is a neurological disorder that impairs motor coordination in performing daily activities (American Psychiatric Association, 2000). It is listed in the fourth Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) and classified in the fifth revision (DSM-5) as a motor disorder in the category of neurodevelopmental disorders (American Psychiatric Association, 2013). Studies have reported the prevalence of DCD were 4–6% in school-aged children. Children with DCD may suffer from cognitive and social deficits, in addition to displaying behavioral problems that result in disturbances in peer and family relationships, as well as poor academic achievement (Piek & Dyck, 2004; Raeymaecker, 2006).

The motor development during infancy and childhood is dependent upon and influenced by the growth and maturity characteristics of the child (morphological, physiological, and neuromuscular). A few studies have explored possible prenatal, perinatal and neonatal factors which associated with DCD in both term (Hua et al., 2014) and premature children

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(Cooke, 2005; Davis, Ford, Anderson, & Doyle, 2007; Goyen & Lui, 2009). As the motor development occurs in a specific social context, the environment in which a child is reared is important. Each context places specific demands on the motor competencies and physical activities of infants and children. The quality of living conditions, the family size or number of siblings and overall socioeconomic circumstances are potentially important factors to take under consideration. However, compared with the recent studies supporting the roles of biological factors on DCD, research on environmental, social and interpersonal aspects was less robust (Froehlich et al., 2011; Pheula, Rohde, & Schmitz, 2011). The family environment quality seems to be directly associated with the intellectual and motor development of the family members (Poresky & Henderson, 1982). Family structure, such as being a single child in a family with either two biological parents or with a single parent/step-parent, may play a role in child developmental disorders since the older siblings may serve as a model for new motor activities for the infant (Rydell, 2010; Vollebergh et al., 2005). Studies have investigated the role of siblings in motor development. Barr and Hayne's (2003) study has showed that in families with older siblings, infants at the age 12 months to 18 months performed more spontaneous imitative acts than those infants without older siblings. Reid, Stahl, and Striano (2010) reported that infants with siblings produced relatively more goal directed actions than infants without older siblings. It is assumed that there is linkage between having siblings and infant motor production which reflect, at least in part, the role of siblings in shaping motor development.

Current birth planning (jihua shengyu) program of People's Republic of China, has been one of the largest and most dramatic population-control campaigns in the world. Under this policy regime, each household has few children. According to Chinese culture, it is children's responsibility to support their parents when they become elders. As a result, the child in one-child families, often described as the 'only hope' of the family, has become more precious to parents than ever (Jing, 2000). The parents with one child may try to protect their children from physical harm and provide their less opportunity for outdoor activities. In the absence of siblings and outdoor activities, the children in Chinese one-child families may suffer from impairments in motor development.

However, information about the relationship between the single child status and motor developmental disorders in Chinese population is lacking. A case-control study (Du Prel Carroll et al., 2012) has reported Chinese one-child family was significantly associated with children diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). Few studies have been conducted to explore the relationship of single child status in Chinese family with children's motor development and DCD.

To explore motor development in one-child families in China, we therefore conducted a pilot study in Suzhou City, one of the most developed areas in China with rigorous operation of the 'one-child' policy. We hypothesized that one-child status in Chinese families may be related with DCD. We aimed: (1) to explore the prevalence of DCD in Chinese one-child families and multi-child families, and (2) to examine the associations of single child status in Chinese families with children's motor development and DCD.

2. Materials and methods

2.1. Participants

Stratified clustered sampling, using grade and school as stratification variables, was used to select 160 classes (the primary sampling units) from randomly selected 15 public nursery schools distributed throughout the five main districts in Suzhou City which is adjacent to Shanghai of China. A total of 4416 children were recruited in the study from March to June 2010. The mothers of these children were asked to fill out a questionnaire concerning their family structure and other socio-demographic features before the tests for children. Of the 4110 questionnaires those were returned (the response rate were 93.1%), 105 had to be excluded due to their missing items. Finally, 4005 children with no missing questionnaires participated in the MABC-2 and WPPSI test. Of these children, three were excluded because they felt physically uncomfortable during the test and failed to complete the whole tasks, and one was excluded because his global intelligence below 70 according to the WPPSI test (one of standards for admission to general school in Chinese was the students' with normal intelligence). A total of 4001 children were included in the analysis. The children were included in the DCD group if they scored at or below the 15th percentile of the age-specific norm of MABC-2 and who met the DSM-IV criteria: (1) performance in daily activities that require motor co-ordination is substantially lower than would be expected given the child's age and intellectual ability, (2) this disturbance significantly interfered with their daily life and academic achievement, and (3) the symptoms of the children were not caused by a known physical disorder such as neurological deficits or mental retardation. The study was approved by the local Education Board and Ethics Committee of Children's Hospital of Suzhou University. Participation in the study was voluntary. Oral parental consent and students' assent were obtained before the investigation and tests. All of the information acquired was kept confidential and only accessible to the researchers.

2.2. Measures

The Movement Assessment Battery for Children-Second Edition (MABC-2) (Henderson, Sugden, & Barnett, 2007) is a measurement for screening children with Developmental Coordination Disorder and other movement impairment. It is composed of a performance test, and a checklist. MABC-2 refers to a series of fine, gross, and balance motor tasks. The total score of MABC-2 were the sum of the standard score of all eight items. In present study, we aim to administrate the age band 1 of the MABC-2 test which refers only to children aged 3–6 years. The datasheets and the guidelines of MABC-2 purchased

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