Research in Developmental Disabilities 30 (2009) 1054–1061

Contents lists available at ScienceDirect

Research in Developmental Disabilities

Comorbidity of motor and language impairments in preschool children of Taiwan

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ARTICLE INFO

Article history:
Received 10 February 2009
Accepted 16 February 2009

Keywords:
Developmental Speech and Language Disorder
Developmental Coordination Disorder
Speech/language
Motor skill
Co-occurrence

ABSTRACT

Comorbidity of motor and speech/language impairments was investigated in 363 preschool children between the ages of 5 and 6 years (boys: 205, age 6.04 ± 0.48 years; girls: 158, age 5.98 ± 0.53 years). The children were sampled from two municipals of Taiwan, and were determined to present no apparent neurological, musculoskeletal, cardiopulmonary system impairment or mental insufficiency. They were administered with three speech/language tests and a motor test (Movement Assessment Battery for Children, or M-ABC). The results showed a significant correlation between the total score of the motor test and the total score of each of the speech and language tests. Regression analysis that controlled for IQ (C-TONI) further showed that manual dexterity, but not ball skills or balance, of M-ABC was predictive of all scores on the speech and language tests. To determine a deficit on a test, a score at or below the 10th percentile of the norm or a score at or below 1.25 SD from the group mean was established as the cutoff. For the speech/language impairment, a deficit on at least two out of the three tests also applied. Following these criteria, 22 children (6.1%) were identified to have Developmental Speech and Language Disorder (DSLD), and 45 (12.4%) to have Developmental Coordination Disorder (DCD). Comorbid DSLD and DCD were found in six children (1.65%). Chi-square analysis revealed a significant

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0891-4222/$ – see front matter
doi:10.1016/j.ridd.2009.02.008

correlation between DSLD and DCD ($p < .03$). The odds of DSLD was higher (by about three-fold) among the children with DCD than among the children without (0.15 vs. 0.05). Comorbid motor and speech/language impairments in preschool children appear to be a significant clinical condition that requires the attention of the therapeutic community. Manual dexterity, in particular, seems to be an important clue for understanding the shared mechanism of motor and speech/language impairments.

1. Introduction

Developmental Speech and Language Disorder (DSLD) is a condition in which children show slower than average performance in speech and language without any explainable physical, mental, emotional, or environmental reasons (Visscher, Houwen, Scherder, Moolenaar, & Hartman, 2007). Interchangeable terms have been used in the literature (e.g., specific language impairment, Hill, 2001; developmental language impairment, Webster, Majnemer, Platt, & Shevell, 2005) to refer to this condition. The prevalence of DSLD in the western countries was reported to be around 1.3–7.4% depending on the definition used (Bishop, 1987; Keating, Turrel, & Ozanne, 2001; Shriberg, Tomblin, & McSweeny, 1999). It was reported to be 5% among children from 4 to 15 years of age in Taiwan (Lin, 1984).

Children who are characterized by impairment in motor skills which significantly interferes with their academic achievement and activities of daily living and which is not explainable by any medical or intellectual conditions such as cerebral palsy or mental retardation are diagnosed to have Developmental Coordination Disorder (DCD, American Psychiatric Association, 1994). The prevalence rate was reported to be around 6% of children at the age of 5–11 years old (American Psychiatric Association, 1994).

A number of studies have found that children with DSLD are not just impaired in speech and language. Some of them also have difficulties in non-linguistic tasks, such as attention (Gross-Tsur, Manor, Joseph, & Shalev, 1996), perception (Powell & Bishop, 1992), working memory (Alloway & Archibald, 2008), and motor skills (Cermak, Ward, & Ward, 1986; Hill, 1998; Hill, Bishop, & Nimmo-Smith, 1998; Rintala, Pienimäki, Ahonen, Cantell, & Kooistra, 1998; Robinson, 1991; Visscher et al., 2007). In this study, we focused on the motor skills of the children with DSLD.

Several studies have demonstrated that the children with DSLD were poor in many aspects of motor performance, including eye–hand coordination skill (Bradford & Dodd, 1994; Bradford & Dodd, 1996; Estil, Whiting, Sigmundsson, & Ingvaldsen, 2003; Jenkins & Lohr, 1964; Owen & McKinlay, 1997), ball skill and balancing (Powell & Bishop, 1992). However, contradictory results have also been reported (Estil et al., 2003; Jenkins & Lohr, 1964; Johnston, Stark, Mellits, & Tallal, 1981). Across studies, the percentage of the children with DSLD who have comorbid DCD also varies widely, ranging from 20% to 71% (Cermak et al., 1986; Hill, 1998; Hill et al., 1998; Rintala et al., 1998; Robinson, 1991; Visscher et al., 2007; Webster et al., 2006). Furthermore, it remains unclear which motor skills are most associated with DSLD.

Previous studies that examined the comorbidity of DSLD and DCD all focused on school-aged children (Webster et al., 2005). Understanding the relationship between motor skills and speech/language skills at preschool age is important for early intervention. It may also shed light on the mechanism of the developmental disorders.

Development is affected by biological as well as cultural and environmental factors (Cole, Cole, & Lightfoot, 2005). Different languages have different characteristics. Therefore, the comorbidity of motor and speech/language impairments may not be the same in different countries. The purpose of the present study was to examine the motor performance of the children with DSLD, and to determine the comorbidity rate of DSLD and DCD in preschool children of Taiwan, a Chinese speaking country.