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Determinants of activity and participation in preschoolers with developmental delay

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ABSTRACT

According to the International Classification of Functioning, Disability and Health model endorsed by the World Health Organization, activity (the execution of a task or action by an individual), and participation (involvement in a life situation) are important components in the assessment of health and functioning of an individual. The purpose of this study was to compare the activity performance and school participation of preschool children with developmental delay (DD) and age-matched typically developing children, and to identify the determinants of activity and participation in preschoolers with DD. Fifty-four children with DD (37 boys, 17 girls; mean age: 66 months) and 54 age-matched typically developing children (34 boys, 20 girls; mean age: 65 months) were recruited from the mainstream preschools with integrated program units. Activity and participation were evaluated using the Vineland Adaptive Behavior Scales (VABS) and School Function Assessment (SFA). Other factors that may influence activity and participation such as impairments in sensory, motor, and mental functioning, and other contextual factors (e.g. family income) were also measured. The DD group had significantly lower VABS ($p < 0.001$) and SFA ($p < 0.001$) scores than controls, indicating suboptimal activity and participation. Multiple regression analysis revealed that deficits in social and motor skills, and in inattention/hyperactivity, were significantly associated with activity and participation in children with DD, accounting for approximately 35–37% of the variance in the VABS and SFA scores ($p < 0.001$). In conclusion, deficits in social and motor functioning, and attention-deficit hyperactivity disorder-related symptoms, are important determinants of activity and participation in preschoolers with DD. One may consider targeting these specific areas to enhance activity and participation amongst these children.

1. Introduction

Developmental delay (DD) is a clinical term used to describe significant lag in the achievement of developmental milestones in two or more domains (e.g. gross/fine motor proficiency, cognition, speech/language, social skills) (Petersen, Kube, & Palmer, 1998). According to the International Classification of Functioning, Disability and Health (ICF) model endorsed by the World Health Organization (WHO), a disorder or disease may lead to changes in three different aspects, namely, body functions and structures (physiological and psychological functions of body systems), activity (the execution of a task or action by an individual), and participation (involvement in a life situation) (WHO, 2001).

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Many children with DD encounter difficulties integrating into the school environment (i.e. activity and participation). In addition to impairments of body functions, the ICF model states that various contextual factors, including environmental (e.g. availability of support service) and personal factors (e.g. age) can have a significant influence on activity and participation (Mihaylov, Jarvis, Colver, & Beresford, 2004). However, few studies have adopted the ICF model when assessing the functional status of children (Battaglia et al., 2004; Law et al., 2004; Schenker, Coster, & Parush, 2005a).

Furthermore, while several studies have examined activity and participation amongst school-aged children with developmental disabilities (Egilson & Coster, 2004; Eriksson, Welander, & Granlund, 2007; Schenker et al., 2005a; Schenker, Coster, & Parush, 2005b), research on preschool children is scarce. The integration of preschool-aged children with DD into the early education environment is an important area of research. The early identification of poor activity and participation and other associated factors at the preschool stage is essential to promoting the successful transition and integration into the elementary school setting (Wong, 2002). To date, the influence of different body impairments and contextual factors in restricting activity and participation amongst preschoolers with DD remains largely unknown.

In Hong Kong, children aged 2–6 years with mild disability typically attend mainstream preschools known as integrated kindergarten-cum-child care centers (KG-cum-CCCs). Although an integrated program designed to provide extra support for children with disability is in place at these centers, no major changes have been made to the content of the curriculum or to pedagogy (Opertti & Belalcazar, 2008). Culturally, children in Hong Kong are expected to strive for academic excellence, be obedient to teachers and cooperate with classmates (Phillipson, 2007). In light of these unique educational and cultural factors, the determinants of activity and participation of children with DD in Hong Kong are likely to be very different from those observed in western countries. A local study on this important topic is thus warranted.

The objectives of this study were to: (1) compare various aspects of body functions (i.e. sensory, motor, mental), activity and participation between preschoolers with DD and age-matched typically developing children (i.e. control group); and (2) identify which aspects of body function and contextual factors are the most important determinants of activity and participation amongst preschoolers with DD.

2. Methods

2.1. Study design

This was a cross-sectional, exploratory study.

2.2. Participants and sampling

Children in the DD group had to fulfil the following inclusion criteria: (1) be formally diagnosed with DD by an interdisciplinary team at a child assessment center of the Department of Health, with DD defined as having a score ≥ 1 standard deviation (SD) below the mean as measured by the Griffiths Mental Developmental Scale (i.e. developmental quotient <80) (Griffith, 1984); (2) Chinese in origin; (3) use Cantonese as the first language; (4) aged from 5 years to 5 years 11 months, as these children will soon face the transition to elementary school; and (5) at least 6 months of attendance at the existing integrated preschools. Children were excluded if they had other serious illnesses that precluded participation in the study. The control children also had to fulfill the above criteria, except inclusion criterion (1).

All sample size calculations were based on a statistical power of 0.80 and alpha of 0.05. Several studies involving parent- or teacher-completed developmental questionnaires have reported an attrition rate ranging from 9.5% to 28% due to withdrawal of consent or questionnaires that are either not returned or not fully completed (Hong Kong Christian Service, 1991; Rajkumar, Yovan, Raveendran, & Russell, 2008; Squires, Potter, Bricker, & Suzanne, 1998). Considering the previous findings and the fact that this was only a cross-sectional study with no follow-up evaluation required, an attrition rate of 15% was deemed acceptable in this study. In Hwang, Davies, Taylor, and Gavin (2002), the School Function Assessment (SFA) scores of children with learning disabilities and a control group were 73.85 (SD = 19.56) and 97.86 (SD = 3.43), respectively, which translates into a large effect size (1.62). Assuming a large effect size (convention: 0.80), and power of 0.80, the minimum sample size to detect a significant between-group difference in outcomes (objective 1) is 30 for each group (children with DD and controls) (Portney & Watkins, 2009). Regarding correlation analysis (objective 2), Liss et al. showed that adaptive functioning had a moderate to strong correlation with various cognitive impairments ($r = 0.35–0.79$) amongst school-aged children with developmental disorders (Liss et al., 2001). Therefore, for multiple regression analysis with 4 predictors and an effect size of 0.3 (medium to large), a minimal sample size of 52 for the DD group would be required (Portney & Watkins, 2009).

In Hong Kong, children aged 2–6 years with mild disability typically attend mainstream preschools known as integrated KG-cum-CCCs, where they attend classes in regular classrooms together with typically developing children. All participants were recruited from these centers. The ratio of the number of integrated programme units in the three geographical regions of Hong Kong, namely, Hong Kong Island, Kowloon, and the New Territories, was approximately 1:2:3. In the first stage of sampling, based on the aforementioned ratio and the minimum sample size required as calculated above, a total of 54 integrated programme units were randomly selected (Hong Kong Island, 9; Kowloon, 18; New Territories, 27). In the second stage, for each of the 54 selected centers, the preschool teacher randomly chose one child with DD and one typically developing child by drawing ballots. A total of 108 preschoolers (54 children with DD and 54 controls) were successfully