



Longitudinal analyses of geographic differences in utilization rates of children with developmental delays who participation in early intervention services

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ARTICLE INFO

Article history:

Received 4 May 2012

Accepted 4 May 2012

Available online 12 June 2012

Keywords:

Developmental delays

Early intervention

Disability

Geographic difference

Health policy

ABSTRACT

The purposes of the present study were to describe the longitudinal utilization rates of participation in early intervention services of children with developmental delays, and to examine the geographical difference of services in this vulnerable population. We analyzed service utilization of the developmentally delayed children based on data of governmental reported early intervention services from year 2003 to 2009 in Taiwan. Results show that, the utilization rate of early intervention services was 9.18% (range = 6.96–12.09%) of children in 0–5 years during the past 7 years. Mean utilization rate in age group of 0–2 years was 8.32% (range = 5.73–10.93%), and age group of 3–5 years was 9.92% (range = 7.78–13.78%). We found that the utilization rate in all children aged 0–5 years ($R^2 = 0.93$; $p < 0.001$), boy group ($R^2 = 0.93$; $p < 0.001$) and girl group ($R^2 = 0.92$; $p = 0.001$) were significant increased gradually. The higher utilization rate of early intervention services (aged 0–5 years) were more likely to locate in the north cities (Keelung City = 14.65%; Taipei City = 13.49%), east areas – Hualien County (14.03%), Taitung County (11.76%) and central or south counties such as, Chiayi City (14.05%), Tainan City (12.47%), and Miaoli County (12.38%). Hsinchu County (5.97%), Kaohsiung City (6.21%), Taichung County (6.74%), Taipei County (6.95%) have lower utilization rates of early intervention in Taiwan. The study highlights that the health care system should close the gaps in geographic disparities of early intervention services for children with developmental delays, and respond timely to the needs of these vulnerable children and their families.

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1. Introduction

Developmental delay is a common public health problem in children, and is thought to predict a future diagnosis of intellectual disability (Accardo & Capute, 1995). Children with developmental delays are defined as significant delay in two or more of the following developmental domains: gross/fine motor, speech/language, cognition, social/personal, and activities of daily living (Majnemer & Shevell, 1995; Kinsbourne & Graf, 2001), and they are those who present with delays in the attainment of developmental milestones at the expected age (Moeschler, 2008). There are many different screening

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scales for developmental delays (Grossman et al., 2010; Limbos & Joyce, 2011), the previous studies estimated the prevalence in general population as high as 5–10% (Smith & Simons, 1975; Drillien, Pickering, & Drummond, 1988; Simeonsson & Sharp, 1992; Batshaw, 1993; Developmental Disabilities Act, 1994), or up to 15% (Boyle, Decoufle, & Yeargin-Allsopp, 1994; Yeargin-Allsopp & Boyle, 2002). The etiology of global developmental delay is highly heterogeneous (Curry et al., 1997) and is associated with age-specific deficits in adaptation and learning skills (Shevell et al., 2003). Those etiologies include various genetic and environmental processes, with the most common causes being Down syndrome and the fragile X chromosome (Hartley, Salt, Dorling, & Gringras, 2002), maltreated infants and toddlers (Scarborough, Lloyd, & Barth, 2009), and family history was also a factor that negative for early problems in child development or any neurological conditions (Blum, Bird, & Stein, 2009). Identification of children with developmental delays before the age of 3 years is essential (Grossman et al., 2010), however, there is limited information of these prevalence rates in Taiwan. Therefore, the present paper was to describe the longitudinal utilization rates of participation in early intervention services of children with developmental delays, and to analyze the utilization difference in vary geographic areas.

2. Methods

According to Article 6 of the Children and Juvenile Welfare Law (2004) in Taiwan, it stipulates the developmentally delayed children who is not achieving new skills in the typical time frame and/or is exhibiting behaviors that are not appropriate for the age level may have a developmental delay. These delays included in the following areas: cognitive, fine and/or gross motor, language, or psychosocial developments. Those children with developmental delays diagnosed and defined by the medical and allied health professionals, and then reported to the children welfare authorities for the further arrangement of early intervention services. The reporting data of early intervention services was complied by the Department of Statistics, Bureau of Children Welfare and Department of Social Welfare Services, Ministry of the Interiors, Taiwan, Republic of China, which was a well-established register system to collect data of reporting number of early intervention services for developmentally delayed children (MOI Department of Statistics, 2011a). There were many variables in the data set which include reporting service number, year, administrative area, gender, and age.

The present study analyzes utilization rates of early intervention of developmentally delayed children based on data of the 2003–2009 governmental reported early intervention services in Taiwan (MOI Department of Statistics, 2011a, 2011b), particularly in the difference of geographic areas. We analyzed data by using SPSS 18.0 software in the study, the statistical methods included number and percentage to describe the utilization rates of geographic differences in developmentally delayed children, and trend tests to examine the overtime change of utilization rates from 2003 to 2009 in Taiwan. We also used geographic information system (GIS) to describe and analyze the different utilization rates of early intervention in vary administrative areas in the study.

3. Results

Table 1 presents the utilization rate of early intervention in children with developmental delays (per 1000 children) in difference year and trend test from the year 2003 to 2009 in Taiwan. In average, the service prevalence rate was 9.18‰ (range = 6.96–12.09‰) of the general population in 0–5 years during the past 7 years. Mean utilization rate in age group of 0–2 years was 8.32‰ (range = 5.73–10.93‰), and age group of 3–5 years was 9.92‰ (range = 7.78–13.78‰). Fig. 1 illustrated the boy group was higher than girl's in the early intervention utilization. Table 1 also described and tested the overtime trend change of utilization rate of early intervention in developmentally delayed children by year from 2003 to 2009 in Taiwan. Among children with aged 0–5 years, we found that the utilization rate in general population ($R^2 = 0.93$; $p < 0.001$), boys ($R^2 = 0.93$; $p < 0.001$) and girls groups ($R^2 = 0.92$; $p = 0.001$) were significantly increased during the past 7 years. In different age and gender groups also found the increased trend patterns in utilization of early intervention in developmentally delayed children in the past 7 years.

Table 1
Utilization rate of early intervention in developmentally delayed children by year and age, 2003–2009 (per 1000 children).

Age	Gender	Year							Mean	Trend test	
		2003	2004	2005	2006	2007	2008	2009		R^2	p Value
0–2	All	5.73	5.93	7.02	8.20	10.14	10.93	10.28	8.32	0.91	0.001
	Boys	7.05	7.39	8.57	10.22	12.38	13.55	12.88	10.29	0.93	0.001
	Girls	4.29	4.34	5.31	5.98	7.70	8.05	7.44	6.16	0.87	0.002
3–5	All	8.80	7.78	8.22	9.23	10.41	11.23	13.78	9.92	0.79	0.007
	Boys	11.56	10.16	11.03	12.17	13.95	14.86	17.95	13.10	0.81	0.005
	Girls	5.79	5.19	5.15	6.01	6.52	7.24	9.20	6.44	0.73	0.015
Total (0–5)	All	7.40	6.96	7.69	8.76	10.29	11.08	12.09	9.18	0.93	<0.001
	Boys	9.49	8.92	9.94	11.27	13.22	14.23	15.51	11.80	0.93	<0.001
	Girls	5.10	4.81	5.22	6.00	7.08	7.63	8.35	6.31	0.92	0.001

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