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# Research in Developmental Disabilities



## Gender and geographic differences in the prevalence of reportable childhood speech and language disability in Taiwan



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### ABSTRACT

Speech and language disability (SLD) is not uncommon in children. However, data at the national level are limited, and geographic differences are seldom evaluated. Starting from 1980, the local governments in Taiwan has begun to certify disabled residents for providing various services and report cases to the central government according to the law, and the central government maintains a registry of reported cases, which provides a unique opportunity for studying SLD at the national level. Using the registry data from 2004 to 2010, we calculated the prevalence of SLD by age, gender, and geographic area and assessed the changes over time. Because the government discourages the certification under 3 years of age, we excluded cases under 3 years old from the analyses. We found that from 2004 to 2010 the registered cases between 3 and 17 years old increased from 1418 to 1637 per year, and the prevalence generally increased every year in all age groups except in 12–14 years of age. In each year there were more boy cases than girl cases, and the prevalence rate ratio increased from 1.50 to 1.83 ( $p < 0.05$  in all years), with an increasing trend over time ( $p < 0.01$ ). A higher prevalence was observed in the rural areas over the years, and the prevalence rate ratio increased from 1.35 to 1.71 ( $p < 0.05$  in all years), with an increasing trend over time ( $p < 0.01$ ). Further studies identifying the risk factors contributed to the increases might help the prevention of SLD in the future.

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## 1. Introduction

Speech and language disability (SLD) is a cluster of developmental disorders that may affect a person's ability in communication, which is important in school performance, career development, and daily social life. According to the [American Speech–Language–Hearing Association \(2014\)](#), a speech disorder is characterized by having problems with voice or the inability to produce speech sounds correctly or fluently, and a language disorder is characterized by having trouble understanding others or sharing thoughts, ideas, and feelings completely. SLD can be developed in both children and

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adults, but the reported prevalence ranges widely. For example, the Second National Sample Survey on Disability of China on 2,526,145 individuals found the prevalence of speech disability was 0.53% in 2006 (Zheng, Zhang, Chen, Pei, & Song, 2008), but a house-to-house survey of 10,147 families in rural communities in the north of the West Bank found the prevalence of speech disability was as high as 11.4% around the same time (Hamdan & Al-Akhras, 2009). In the United States, it was estimated that 5% to 8% of preschool children were affected by speech and language delay (US Preventive Services Task Force, 2006). In addition to differences in the incidence of SLD, the large variation in the reported prevalence across studies may be attributable to differences in the case definition, age range, and case finding method (Durkin, 2002; Karbasi, Fallah, & Golestan, 2011).

When developed in the childhood, SLD has a larger impact and may persist into later life (American Speech–Language–Hearing Association, 2014; Glogowska, Roulstone, Peters, & Enderby, 2006; US Preventive Services Task Force, 2006), and therefore it is a great concern of parents. For example, in a study of Australian children aged 4–5 years, 25.2% of the parents had concerns about the expressive language ability of their children and 9.5% had concerns about their receptive language ability, which led to accessing speech–language pathologist (SLP) services in 14.5% of the children (McLeod & Harrison, 2009).

SLD is not uncommon in children, but geographic differences in terms of urbanization are seldom evaluated. Even though the number of related studies is limited, the results are inconsistent. While a survey of 10,147 rural families in the West Bank found a high prevalence of speech disability as 11.4% (Hamdan & Al-Akhras, 2009), a survey of 25,196 rural families in Pakistan found the prevalence of speech delay was only 0.047% (Ibrahim & Bhutta, 2013). A study compared 100 children 1–60 months old each from two suburban and one urban communities of Mexico and found the prevalence of language failure was higher in one of the suburban community (22%), while the other two had the same prevalence of 13% (Guadarrama-Celaya et al., 2012). However, the number of participants was small, and the difference did not reach statistical significance.

According to the Disabled Welfare Law (1980), the local governments in Taiwan certify the disabled residents and provide various services, and the Ministry of Health and Welfare maintains a registry of reported cases. The Department of Statistics of Ministry of Health and Welfare (2014) publishes summary data each year and the registry data of Taiwan present a rare opportunity for studying the epidemiology of SLD at the national level. In a previous study, we analyzed the data and found a constant increasing trend in the prevalence of SLD from 2000 to 2011 (Lai, Tseng, & Guo, 2013), but we did not compare SLD between the two genders or evaluate the geographic difference. Therefore, we used the data from 2004 to 2010 to assess the changes in prevalence, gender, and geographic differences of SLD in Taiwanese children over time.

## 2. Methods

### 2.1. The disability registry system in Taiwan

The promulgation of the Disabled Welfare Law in 1980 is a milestone in the history of promoting disability registry in Taiwan. The categorization system covered seven types of disabilities (SLD, visual impairment, hearing impairment or balance disability, disability of limbs, intellectual disability, multiple disabilities, and other disabilities listed by the Department of Health) initially (Disabled Welfare Act, 1980), and nine other types were added from 1981 to 2001 (Physically and Mentally Disabled Citizens Protection Act, 2001). “Multiple disabilities” means the concurrence of two or more disabilities (Department of Health, 2008).

According to the law, the local governments began to certify disabled residents and provide various services in 1980, and patients with disabilities can make applications for certification through the local government office in their residential areas. The local governments report cases to the central government, and the Ministry of Health and Welfare maintains a registry of reported cases. We have adopted the registry data to conduct a series of studies on developmental disabilities (Lai, Tseng, & Guo, 2011; Lai, Tseng, Hou, & Guo, 2012a, 2012b; Lai et al., 2013; Lai, Tseng, Lin, & Guo, 2014).

### 2.2. Case definition

The Taiwan Ministry of Health and Welfare registers all the cases of disability who are issued with a certificate by the local governments. Before a certificate can be issued, a patient needs to be confirmed as a case of SLD by a physician who was accredited by the government (Department of Health, 2006, 2008). According to the law, a case of SLD is defined as “Significant impairment in language comprehension, verbal expression, speech intelligibility, speech fluency, or vocal quality which interferes with communication.” Children with comorbidity of hearing impairment, intellectual disability, autism spectrum disorders, and multiple disabilities were excluded from the analyses (Department of Health, 2008).

### 2.3. Data collection

The Department of Statistics of Taiwan Ministry of Health and Welfare publishes Statistical Yearbook each year (Ministry of Health and Welfare, 2014) (before the re-organization of the government in 2013, the reports were published by the Ministry of the Interior), and we analyzed the data from 2004 to 2010. The information includes the numbers of cases by age. Because the government discourages the certification under 3 years of age, we limited our analyses to those who were at least 3 years old (Department of Health, 2002).

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