



Distribution of etiology and dysfunction of children with developmental delay in Taiwan

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Introduction

Developmental delay is a non-specific neuropsychiatric symptom. It is necessary to first clarify whether the diagnosis is correct and the pathological manifestations and nature.

Methods

In the Child Development Multidisciplinary Assessment Center of our hospital, 3,925 children from 2010 to June 2021 were evaluated for development. The data were analyzed according to the relevant diseases, underlying etiologies, cause classification, and development retardation categories.

Results

Children with developmental delay also have quite proportion of problems with other nervous systems (such as epilepsy) or non-neural organs (such as visual abnormalities, growth retardation, etc.). These diseases can lead to deprivation of hospitalization, perception or learning opportunities, which may be the cause of developmental delay.

Related disease	Nervous system	Auditory abnormalities	Visual abnormalities	Digestive system	Skeletal system	Cardiovascular system	Other physical illnesses						
							Endocrine metabolic abnormality	Urinary system	Growth retardation	Cleft lip and palate	Articulation Disorders	Others	
Total	Numbers	721	128	441	43	83	274	32	89	364	8	101	298
	Percentage	18.37%	3.26%	11.24%	1.1%	2.11%	6.98%	0.82%	2.27%	9.27%	0.2%	2.57%	7.59%

The causes were divided into three categories: (1) 1388 (35.36%) of neurological causes, (2) 624 (15.9%) of familial causes, and (3) 1870 (47.64%) of those without specific causes.

	Neurogenically	Family hereditary	No specific cause
Number of people	1388	624	1870
Percentage	35.36%	15.9%	47.64%

Among the neurological causes, the further classification including: 481 (12.25%) of labor brain injuries, 89 (2.27%) of congenital brain malformations, 404 (10.29%) of chromosome or genetic abnormalities, 25 (0.64%) patients with neurocutaneous syndrome, 30 (0.76%) patients with neurodegenerative disease, 261 (6.65%) patients with high-risk familial history, and 154 (3.92%) of other causes.

Cause analysis	Neurogenical causes														Family hereditary		No specific cause		
	Labor brain injury		Congenital brain malformation		Chromosomal abnormality		Neurocutaneous Syndrome		neurodegenerative disease		high-risk familial history		Others		P	C	P	C	
Total	Number	167	314	20	69	208	196	2	23	13	17	126	135	56	98	396	228	98	1772
	percentage	12.25%		2.27%		10.29%		0.64%		0.76%		6.65%		3.92%		15.9%		47.64%	

P:possibly, C: certainly

According to the above table, it can be seen that in the process of children development assessment, a multi-disciplinary team is needed. The pediatric neurology focuses on the diagnosis of the cause etiology, and the pediatric rehabilitation department focuses on functional diagnosis. Functional diagnosis is based on standardized assessment results in various development areas, such as: gross motor development, fine motor development, language communication, cognitive learning, social interactions, and emotional behaviors. It requires professional rehabilitation physicians, clinical psychologists, physical therapist, occupational therapist and speech therapist, etc. to complete the assessment.

In the 2010-June 2021 assessment cases, there were 2,792 (71.13%) language delays, 1,838 (46.83%) cognitive delays, and 1,711 (43.59%) motor delays. Accordingly, children with delayed development have a majority of language and cognitive development delay.

Total	Number of person sum	No abnormality	Cognition		Language		Motor		Social emotions		Non-specific		Perception	
			possibly	certainly	possibly	certainly	possibly	certainly	possibly	certainly	possibly	certainly	possibly	certainly
	103	103	767	1071	929	1863	414	1297	417	203	844	193	53	132
	percentage	2.62%	46.83%		71.13%		43.59%		15.8%		26.42%		4.71%	

Conclusions

This study showed that the distribution of children with developmental delay was mostly without specific causes; the prevalence of brain injury from prenatal to postnatal was the highest in neurological causes, and most of them were referred from the outpatient clinic of premature infants in our hospital, gave early intervention to these children. In addition to the nervous system, other problems like visual perception, growth retardation, etc., team physicians should be able to detect individual underlying diseases and developmental delays, and intervene in a timely manner.

The distribution of development disorder categories shows the most in language disorder, followed by cognitive and motor development disorder. However, the existing speech therapists are relatively in shortage, indicating the need to reorganize the appropriate labor supply and medical services for pediatric rehabilitation.