



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, 4,298 children from 2010 to 2023 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	Other physical illnesses									
				Digestive system	Skeletal system	Cardiovascular system	Endocrine metabolic abnormality	Urinary system	Growth retardation	Cleft lip and palate	Articulation Disorders	Others	
Total	Numbers	822	152	494	47	94	298	40	103	433	10	100	348
	Percentage	18.3%	3.38%	11%	1.05%	2.09%	6.64%	0.89%	2.3%	9.64%	0.22%	2.23%	7.75%

The causes were divided into three categories: (1) 1568 (34.91%) of neurological causes, (2) 736 (16.39%) of familial causes, and (3) 2128 (47.38%) of those without specific causes.

	Neurogenically	Family hereditary	No specific cause
Number of people	1568	736	2128
Percentage	34.91%	16.39%	47.38%

Among the neurological causes, the further classification including: 534 (11.89%) of labor brain injuries, 91 (2.03%) of congenital brain malformations, 491 (10.93%) of chromosome or genetic abnormalities, 27 (0.6%) patients with neurocutaneous syndrome, 37 (0.82%) patients with neurodegenerative disease, 335 (7.46%) patients with high-risk familial history, and 183 (4.07%) 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	P	C	P	C	P	C	P	C	P	C				
Total	Number	187	347	20	71	277	214	3	24	16	21	183	152	68	115	500	236	104	2024
	Sum	534		91		491		27		37		335		183		736		2128	
	percentage	11.89%		2.03%		10.93%		0.6%		0.82%		7.46%		4.07%		16.39%		47.38%	

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 2010-2023 assessment cases, there were 3,243 (72.21%) language delays, 2,081 (46.34%) cognitive delays, and 2,045 (45.54%) motor delays. Accordingly, children with delayed development have a majority of language and cognitive development delay.

	No abnormality	Cognition		Language		Motor		Social emotions		Non-specific		Perception		
		possibly	certainly	possibly	certainly	possibly	certainly	possibly	certainly	possibly	certainly	possibly	certainly	
Total	Number of person	123	901	1180	1026	2217	445	1600	471	241	1003	204	54	149
	sum	123	2081		3243		2045		712		1207		203	
	percentage	2.74%	46.34%		72.21%		45.54%		15.85%		26.88%		4.52%	

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.