

# Characteristics and Rehabilitation Services Requirements of Children in Cognitive Motor Training Class: A Survey in Taichung County

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**Aims.** The purpose of this study was to investigate the characteristics and rehabilitation services requirements of children in cognitive motor training class in Taichung County.

**Methods.** Two physiatrists interviewed children and their parents from eight elementary schools. Perinatal history and physical performance were studied in these children. Information in 187 sets of questionnaires was analyzed. Participants were grouped into four categories according to their major deficit: 18 children (10%) with attention deficit hyperactivity disorder, 64 children (34%) with cerebral palsy (CP), 40 children (21%) with developmental delay, and 65 children (35%) with mental retardation.

**Results.** Most of the mothers had normal deliveries, except for the mothers of CP children (48% had an abnormal delivery and 22% required oxygen). Concerning the perinatal history, CP children had a higher incidence of admissions to intensive care unit (47%,  $p < 0.01$ ), respiratory complications (30%,  $p < 0.05$ ), and blood transfusions (16%,  $p < 0.01$ ). In the postnatal period, over 78% of these children had been admitted to the hospital for illness. Forty-one children (22%) had joint contracture, mainly in the ankle joint (83%). During this study, 48% of the children were receiving rehabilitation services. A high percentage of parents, 92%, hoped their child could be enrolled in a rehabilitation program in the future, 67% of parents hoped their child could receive speech therapy in the future.

**Conclusions.** This study can be used as an important reference to arrange rehabilitation services for children in educational organizations. ( *Mid Taiwan J Med* 2000;5:43-8 )

## Key words

attention deficit hyperactivity disorder, cerebral palsy, developmental delay, mental retardation, rehabilitation

## INTRODUCTION

It is important for students with disabilities to receive adequate education-related rehabilitation services, such as occupational

therapy and physical therapy, and to participate in educational programs [1].

Revised in 1997, the Special Education Act regulates that rehabilitation and training should be provided to students with disabilities according to their special needs and individualized educational programs should be developed for every disabled student [2]. During the past 10 years, since the passage of

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**Table 1. Maternal conditions during pregnancy in children who attended cognitive motor training classes**

Maternal conditions	ADHD (n = 18)	CP (n = 64)	Developmental delay (n = 40)	MR (n = 65)	<i>p</i> value
Previous abortion	3 (17)*	7 (11)	5 (13)	8 (12)	NS
Subjective good health	18 (100)	36 (56)	37 (93)	59 (91)	< 0.05
Received regular examinations	18 (100)	60 (94)	36 (90)	54 (83)	NS
Took medication	0 (0)	5 (8)	5 (13)	7 (11)	NS
X-ray examination	0 (0)	0 (0)	1 (3)	2 (3)	NS
Smoked	0 (0)	0 (0)	0 (0)	1 (2)	NS
Alcohol consumption	0 (0)	1 (2)	0 (0)	0 (0)	NS

\* Data in the parentheses represent percentages; ADHD = attention deficit hyperactivity disorder; CP = cerebral palsy; MR = mental retardation; NS = not significant.

**Table 2. Maternal and infant conditions during perinatal period in children who attended cognitive motor training classes**

	ADHD (n = 18)	CP (n = 64)	Developmental delay (n = 40)	MR (n = 65)	<i>p</i> value
<b>Maternal conditions</b>					
Abnormal delivery	3 (17)*	31 (48)	10 (25)	20 (31)	< 0.05
Cesarean section	3 (17)	16 (25)	8 (20)	9 (14)	NS
Needed oxygen supply	0 (0)	14 (22)	1 (3)	4 (6)	< 0.01
Endotracheal intubation	0 (0)	5 (8)	1 (3)	4 (6)	NS
Used medication	1 (6)	7 (11)	4 (10)	6 (9)	NS
<b>Infant conditions</b>					
Prematurity	2 (11)	13 (20)	3 (8)	6 (9)	NS
Twin/multiple pregnancy	0 (0)	1 (2)	0 (0)	0 (0)	NS
Admitted to ICU	2 (11)	30 (47)	11 (28)	14 (22)	< 0.01
Respiratory complications	0 (0)	19 (30)	5 (13)	17 (26)	< 0.05
Nonphysiologic jaundice	2 (11)	24 (38)	17 (43)	28 (43)	NS
Phototherapy	2 (11)	8 (13)	8 (20)	15 (23)	NS
Blood exchange	0 (0)	2 (3)	3 (8)	10 (15)	NS
Blood transfusion	0 (0)	10 (16)	0 (0)	0 (0)	< 0.01

\* Data in the parentheses represent percentages; ADHD = attention deficit hyperactivity disorder; CP = cerebral palsy; MR = mental retardation; NS = not significant; ICU = intensive care unit.

the original Special Education Act in 1984, few schools have provided therapeutic services for children with handicaps. In Taichung County, the Fung Yuen Elementary School and Wu Fung Elementary School began rehabilitation services in 1995 by providing cognitive motor training classes for children. In 1997, six more elementary schools, Jan Ping, See Ling, Dai On, Seek Chun, Soun Ten, and Dai Do also launched the same rehabilitation services for children with handicaps. In these cognitive motor training classes, children with different developmental histories and disabilities may need specific rehabilitation services. To provide children with effective and efficient rehabilitation services, we performed this

study to determine the characteristics of children in these cognitive motor training classes and their rehabilitation requirements.

## SUBJECTS AND METHODS

From April to October 1997, two psychiatrists with the help of special education teachers, interviewed children enrolled in cognitive motor training classes and their parents at eight elementary schools in Taichung County. Basic data and related information were obtained from the parents using questionnaires. Diagnoses and related disabilities were recorded from histories taken from parents and teachers, interviews with

**Table 3. Medical history of children who attended cognitive motor training classes**

	ADHD (n = 18)	CP (n = 64)	Developmental delay (n = 40)	MR (n = 65)	<i>p</i> value
Admitted to hospital for illness	12 (67)*	47 (73)	34 (85)	54 (83)	NS
Seizure history	5 (28)	34 (53)	19 (48)	40 (62)	NS
Ophthalmic disease	1 (6)	13 (20)	13 (33)	23 (35)	< 0.05
Hearing impairment	1 (6)	3 (5)	5 (13)	11 (17)	NS
Heart disease history	1 (6)	9 (14)	5 (13)	7 (11)	NS

\*Data in the parentheses represent percentages; ADHD = attention deficit hyperactivity disorder; CP = cerebral palsy; MR= mental retardation; NS = not significant.

**Table 4. Rehabilitation services requirements in children who attended cognitive motor training classes**

	Occupational therapy	Physical therapy	Speech therapy	Other therapy
Different kinds of therapies received by the children at the time of the study (%)	48	46	25	21
Different kinds of therapies parents hope their child could receive in the future (%)	66	54	67	9

the children, physical examinations, and information noted from their disability certificates. Cerebral palsy (CP) was diagnosed if a disorder of movement and posture was present without progressive lesions or injury affecting the immature brain. Information from disability certificates was also used to confirm the diagnosis. Attention deficit hyperactivity disorder (ADHD) was diagnosed with criteria from the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) [3]. Mental retardation (MR) was diagnosed mainly with criteria from the DSM-IV, alternately from the disability certificate. The remaining children with developmental delay due to various causes were classified into the developmentally delayed group. In cases of mixed diagnosis, children were classified into the group in which they had most closely matched criteria. Totally, 217 children were interviewed. Thirty subjects were excluded due to incomplete information. The remaining 187 sets of information were interpreted and analyzed statistically with the SAS system. Chi-square test was used for discrete variable comparisons between the diagnostic categories. If greater than 20% of the cells had expected counts less than 5,

Fisher's exact test (2-tail) was used. Analysis of variance together with Tukey's pairwise comparison was used for continuous variable comparisons between the diagnostic groups.

## RESULTS

The mean age of these children was  $112 \pm 43$  months old, with a range of 26 months to 200 months. The educational level of 85% of their fathers and 88% of their mothers was high school or below. The children in these cognitive motor training classes were grouped into four diagnostic categories: ADHD, 18 children; CP, 64 children; developmental delay, 40 children; and MR, 65 children. Their average total family incomes were  $34780 \pm 16480$ ,  $37270 \pm 15560$ ,  $42960 \pm 19660$  and  $32590 \pm 13050$  NT dollars monthly for ADHD, CP, developmentally delayed and MR groups, respectively. The average ages of the mothers during pregnancy were  $27 \pm 4$ ,  $27 \pm 5$ ,  $27 \pm 6$  and  $27 \pm 5$  years old for ADHD, CP, developmentally delayed and MR groups, respectively. CP children were born with lower birth weight ( $2532 \pm 789$  g) when compared with the other groups ( $p < 0.01$ ). ADHD children showed a male predominance,

with male/female ratio of 5:1. The male/female ratio for CP and MR were 1.3:1 and 1.1:1 respectively. While the developmentally delayed group demonstrated female predominance with a male/female ratio of 0.4:1.

Except for the mothers of the CP children, most mothers subjectively felt healthy during their pregnancy. Most underwent regular examinations and seldom received x-rays, smoked, took medication or consumed alcohol during pregnancy (Table 1). Concerning the perinatal history, mothers of CP children had higher incidences (48%) of abnormal delivery ( $p < 0.05$ ) and more frequently demanded oxygen supply (22%) during the perinatal period ( $p < 0.01$ ) than the mothers of the other groups of children (Table 2). In the perinatal period, CP children had a higher incidence of admissions to intensive care unit (ICU) (47%,  $p < 0.01$ ), respiratory complications (30%,  $p < 0.05$ ), and blood transfusions (16%,  $p < 0.01$ , Table 2). Concerning the medical history of these children, over 78% (147/187) of these children had been admitted to the hospital for their illnesses (Table 3). When compared with ADHD children, the other groups of children had a higher incidence of ophthalmic disease (Table 3).

Concerning the musculoskeletal condition of these children, we noted that 41 (22%) had joint contracture, with 83% of the contracted joints occurring in the ankle. During this study period, 48% of the children were enrolled in a rehabilitation program. Among them, 48%, 46%, 25% and 21% were receiving occupational therapy, physical therapy, speech therapy and other therapy respectively (Table 4). A high percentage of parents (92%) hoped their children could enter a rehabilitation program in the future.

## DISCUSSION

The children in the cognitive motor training class in Taichung County were

grouped into four diagnostic categories. Among them, ADHD children showed male predominance with a male/female ratio of 5:1, which is in agreement with previous reports [4,5]. The CP group was also noted to have more male children than female children, with a male/female ratio of 1.3:1, which is similar to the ratio noted in previous studies of CP children in Taiwan [6,7]. CP children were born with lower birth weight when compared with the other groups. This suggests that low birth weight is a risk factor for CP [8-10].

Higher percentage of CP children's mothers did not have subjective good health during pregnancy. They also had a higher percentage of abnormal delivery and oxygen requirement during the perinatal period, suggesting that complications of labor are risk factors for CP [11]. CP children may have a higher incidence of perinatal complications as noted by higher incidences of ICU admissions and blood transfusions during the perinatal period. Higher percentage of CP children had respiratory complications, suggesting that these are risk factors for CP [6,12,13].

There was a lower percentage of associated disabilities such as ophthalmic disease and hearing impairment in our CP children when compared with previous reports [10,14]. This suggests that CP children in our study had less severe disabilities, thus allowing them to participate in cognitive motor training classes, while the more severely disabled children received less education and stayed at home [15,16]. Our data also revealed that over 80% of the contracted joints occurred in the ankle. This implies that motor impairment in lower extremities may predispose the ankle joint to contracture.

Only about half of the children received rehabilitation at the time of study. Among them, 48% received occupational therapy and 25% received speech therapy. However 66% and 67% of parents hoped their child could receive occupational therapy and speech therapy, respectively, in the future. Thus, there is a substantial demand for these therapies.

This demand indicates that more speech therapy and occupational therapy programs are needed in educational organizations. Therefore, the current condition should be extended to include a variety of rehabilitation services, as well as an adequate amount of these services, for children in educational organizations.

In conclusion, this study described the characteristics of children in cognitive motor training classes in Taichung County and investigated different types of rehabilitation they received at the time of the study, as well as their future requirements. This information can be used as an important reference to arrange rehabilitation services for children in educational organizations .

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## 台中縣地區知動教室兒童之特性及復健需求研究

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**目的** 本研究目的是為了解台中縣知動教室兒童之特性及身心障礙情形，以利推展到校復健治療。

**方法** 於1997年4月至10月間在八間學校對217位參加知動教室兒童及家長進行理學檢查及問卷調查，共得有效問卷187份。診斷分類為注意力不足過動(n = 18, 10%)、腦性麻痺(n = 64, 34%)、發展遲緩(n = 40, 21%)及智力障礙(n = 65, 35%)四組。

**結果** 兒童平均年齡為112 ± 43個月，出生體重以腦性麻痺兒童較輕(2532 ± 789公克,  $p < 0.01$ )。注意力不足過動症及腦性麻痺兒童以男生居多，分別為83%及56%；發展遲緩兒童則以女生所佔比例較高(72%)；智力障礙兒童男女人數相差不多。大部份母親懷孕期間健康良好，以自然生產居多，腦性麻痺兒童母親於週產期使用氧氣比例較高(22%)，於新生兒期間腦性麻痺兒童有較高比例曾住加護病房(47%)，曾經輸血(16%)或有呼吸併發症病史(30%)。這群兒童中41人(22%)有關節攣縮，其中34人(83%)發生在踝關節。問卷調查時約有半數兒童(48%)接受復健治療，其中接受職能治療者有48%，物理治療有46%，語言治療25%，其他治療21%。有92%之家長希望他們的小孩未來能接受復健治療，項目分別為：語言治療67%，職能治療66%，物理治療54%。

**結論** 由此研究可以了解台中縣知動教室兒童之特性及其復健治療之需求情況，以作為以後推動醫療與教育結合，安排到校復健治療之參考。(中台灣醫誌 2000;5:43-8)

### 關鍵詞

注意力不足過動症，腦性麻痺，發展遲緩，智力障礙，復健

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