

How Effectively Do Parents Discern Their Children's Cognitive Deficits at a Preschool Age?

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Background: This hospital-based study explored how effectively parents discern their children's cognitive deficits at a preschool age since few studies have addressed preschool children's cognitive problems.

Methods: One hundred and forty-six preschool children suspected of possessing a cognitive deficit were recruited and subjected to further cognitive assessments. All parental concerns for their children were elicited and categorized into various child developmental domains. The cognitive performances amongst children whose parents expressed specific concerns were compared.

Results: With regard to the children whose parents expressed multiple concerns about their child's developmental problems, the Performance Intelligence Quotient (PIQ), Verbal Intelligence Quotient (VIQ) and Full Scale Intelligence Quotient (FSIQ) scores were significantly lower than they were for the children whose parents had behavior concerns ($p < 0.01$). For children whose parents had raised concerns about their child's speech developmental problems, the VIQ and FSIQ scores were found to be significantly lower than they were for the children whose parents had raised behavior concerns ($p < 0.01$). In addition, it was found that parental concerns about multiple domains of developmental problems could produce relatively higher sensitivity and positive predictive value in the deficits of both verbal and non-verbal cognitive abilities. Parental concerns about only speech developmental problems were noted to yield high positive predictive value regarding verbal-cognitive deficits.

Conclusion: The results indicate that parents' initial concerns about their children's multiple or speech developmental problems were relatively highly correlated with cognitive deficits. It is recommended that clinicians should guide parents to voice and organize their concerns regarding the perception of their children's developmental progress, and further precisely analyze and utilize significant information. [*J Chin Med Assoc* 2007;70(10):445-450]

Key Words: cognitive development, parental concerns, preschool children

Introduction

Cognitive development refers to the increasing ability of children to perform in the process of thinking and knowing, including attending, perceiving, interpreting, classifying, and remembering certain information; evaluating ideas; inferring principles and deducing rules; imaging possibilities; generating strategies; and fantasizing.¹ Children with undetected cognitive delays prior to school entrance commonly suffered from academic delays, particularly in the basic skills of reading, spelling, writing, and mathematics; moreover, some nonacademic impacts are indigenous to dysfunctions

themselves, whereas other sequelae are secondary to persistent failure, embarrassment, and frustration.² As a consequence, it follows that the early identification of children with developmental delays is of paramount importance. In past years, numerous review articles have been devoted to summarizing the efficacy of early intervention for infants and preschoolers with developmental disabilities, and it has been demonstrated that well-designed and timely early intervention programs may be effective not only in improving some individual child cognitive outcomes, but can also lead to important improvements in family function.³⁻⁷

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Psychologic assessment is useful in determining the quality of an individual child's cognitive abilities; nonetheless, most clinicians rely upon clinical judgment including observing children, the reviewing of certain typical developmental milestones, informal checklists and listening to parents' concerns owing to physicians' typically excessive practice commitments and children's, at times, uncooperative attitude to unfamiliar persons during tests. Unfortunately, such management restrictions seem to result in the under-referral to specialist practitioners of children featuring borderline or even significant developmental delays/disabilities among preschoolers.^{8,9}

Parental concerns regarding their child's development have been verified to function much like a type of prescreening mechanism,¹⁰⁻¹² although such concerns do warrant confirmation of authenticity by standardized child developmental measurement tests. It has been suggested previously that skilful observation and identification of parental concerns regarding their child's development be advanced as a sensitive, time- and cost-effective approach to the detection of children with developmental delays.¹⁰⁻¹³ Furthermore, it has been recognized by a number of workers that parental concerns regarding their child's development may span a range of developmental areas, and that some types of parental concerns were more useful than others for their use as parameters in the early detection of children's developmental problems.^{10,13-16} In 1990, Dulcan et al indicated that if parents raised concerns about their child's development to a clinician, or when such concerns were elicited by a physician, physicians were 13 times more likely to not only notice psychiatric problems in the involved children, but were also much more likely to make needed referrals of such children.¹⁷ In 1989, Triggs and Perrin also emphasized the importance of better communication between parents and pediatricians when parents organized and articulated their observations and concerns regarding their children's development to pediatricians.¹⁸ Surveying a cluster of concerns, Glascoe's research^{13,15} on the value of parents' concerns elicited via a standardized developmental surveillance tool, the Parents' Evaluations of Developmental Status (PEDS)¹⁹ presented an evidence-based approach to elicit, categorize, and score parents' concerns. To interpret parents' concerns and make clinical decisions, it was indicated in an algorithm that the presence of 2 or more parental concerns was a significant predictor of disabilities.¹³ However, parents' concerns about behavior or other nonsignificant areas was not found to be predictive of developmental disabilities.^{10,13,15}

In previous research, the relationship between clusters of parental concerns for their child's development

and the corresponding child's pass/fail scores for global tests of development was explored, and a number of major texts focused on children's behavioral/emotional problems.^{17,18,20-22} However, to the best of our knowledge, after a thorough review of the literature, it would appear that few studies have effectively addressed preschool children's cognitive developmental problems.¹⁴ The purpose of our study was to disclose the nature of parents' initial concerns about their children who were inferred to possess previously undetected cognitive deficits, and to compare the discrepancies of children's cognitive performance amongst those children whose parents raised diverse concerns regarding their child's development.

Methods

Subjects

One hundred and forty-six preschool children (aged from 3 to 7 years) suspected of possessing cognitive deficits were recruited into this study. All children were comprehensively assessed by experts from various departments in this hospital: the rehabilitation physician, psychiatrist, pediatric neurologist, physical therapist, occupational therapist, speech therapist, psychologist, social worker, and other associated specialists. Evaluation included diagnosis confirmation, classification of the delays, determination of possible underlying diseases, and the arrangement of or referral to appropriate rehabilitation, support, and community resources. Patients who already had previously determined diagnoses of certain diseases or disorders related to developmental delay/disability were excluded, and none of the children in this study were diagnosed concerning their developmental problem prior to this study.

Measures

All parental concerns regarding their children's development were probed and elicited subsequent to the structural interview. The following questions were asked: "Why have you come to our clinic for help?", "What are your chief concerns about your child's development?", "Do you have any concerns about your child as regards his/her performance during activities involving the use of his/her arms and legs? ... performance during activities involving the use of his/her hands or fingers to do things? ... understand what you or others say? ... talks? ... behaves and interacts with peers? ... is learning to do things?" Once the parents raised any one or more concerns about the specific developmental domains, it was defined that they had significant concerns in those domains. The concerns of parents were

categorized into various developmental domains by the same observer. The categories included speech, motor, behavioral, and learning problems. The typical and frequent responses of parental concerns regarding their children's development in the various categories are listed in Table 1. The children were divided into 4 subgroups based on the concerns of their parents: the children whose parents had concerns with regard to their child's speech, behavioral, learning or more than a single domain of problems.

The Wechsler Preschool and Primary Scale of Intelligence-Revised (WPPSI-R) was administered by the same well-trained psychologist for all children who were appraised by clinicians as possessing cognitive deficits or associated developmental impairments. The WPPSI-R is an individually administered clinical instrument for assessing the cognitive functional performance of children aged from 3 years to 7 years and 3 months of age. The whole test is organized with 1 group of primarily perceptual-motor (Performance) subtests and a second group of Verbal subtests.²³ Based upon previously established local sample norm values, scores as regards Performance and Verbal subtests yield, respectively, the Performance Intelligence Quotient (PIQ) and Verbal Intelligence Quotient (VIQ) values, and the score for both subtests combined yields the Full Scale Intelligence Quotient (FSIQ). The pass result in individual subtests was determined by the IQ score of 70; a cognitive deficit was defined if the child failed the subtest when IQ fell below 70. Sensitivity, specificity and the positive predictive value of various parental

concerns regarding their child's development were analyzed according to individual cognitive performance outcomes (PIQ, VIQ, FSIQ).

Statistical analysis

Statistical differences for continuous data pertaining to subjects (age at first medical assessment, PIQ, VIQ and FSIQ scores) were compared using 1-way ANOVA with *post hoc* test for different subgroups of children. Intergroup differences in categorical data (gender distribution) were determined using the χ^2 ratio test. Values of $p < 0.05$ were considered to represent statistically significant difference.

Results

The age of the children at first medical evaluation, gender distribution, and cognitive performance including PIQ, VIQ and FSIQ parameters amongst different subgroups of children were compared (Table 2). The age of children when they were first brought to be evaluated ranged from 36 to 85 months. Of the 146 participating test subjects, 102 were boys (70%) and 44 were girls (30%). There appeared to be no significant difference as regards the average age of the children at first medical assessment and gender distribution amongst the subgroups.

Most parents ($n = 61$, 42%) mentioned more than 1 domain of concern regarding their child's development. In the subgroup of children whose parents had

Table 1. Categories of parental concerns regarding their children's development

Category	Typical responses
Speech	Not talking like he should, uses short sentences, can't always say what he means, doesn't always make sense, doesn't understand what we say
Motor	Clumsy, falls a lot, limps, poor balance, can't draw shapes
Behavior	Inattention, overly active, refuses static activity, stubborn, aggravating
Learning	Slow response, can't remember things or skills just taught, knows things 1 day but not the next

Table 2. Children's cognitive performance of various parental concerns*

	Speech concern ($n = 37$)	Behavioral concern ($n = 42$)	Learning concern ($n = 6$)	Multiple concerns ($n = 61$)
Age (mo)	55.8 ± 11.1	60.1 ± 10.6	63.0 ± 6.6	57.9 ± 12.7
Age range (mo)	36-85	36-85	54-69	37-83
Gender (M:F)	23:14	32:10	5:1	42:19
PIQ	75.0 ± 22.0 [†]	87.5 ± 23.5 ^{†§}	81.7 ± 22.4	68.1 ± 17.6 [§]
VIQ	68.3 ± 20.0 [†]	88.5 ± 23.4 ^{†§}	83.3 ± 23.4	66.1 ± 17.5 [§]
FSIQ	69.6 ± 20.7 [†]	87.3 ± 23.7 ^{†§}	81.5 ± 23.3	64.8 ± 17.7 [§]

*Continuous data (age, PIQ, VIQ, FSIQ) are expressed as mean ± standard deviation; [†] $p < 0.05$; [‡] $p < 0.01$, speech concern vs. behavioral concern; [§] $p < 0.01$, behavioral concern vs. multiple concerns. PIQ = Performance Intelligence Quotient; VIQ = Verbal Intelligence Quotient; FSIQ = Full Scale Intelligence Quotient.

multiple concerns, 29 (48%) parents were concerned about speech and behavioral developmental problems. In the case of a single domain of concerns only, behavioral and speech concerns for their children were the features most commonly mentioned by parents. There were 42 (29%) parents worried about their child's behavioral problems such as inattention, overactivity or a variety of other aberrations. Thirty-seven (25%) parents were concerned about speech problems; only 6 (4%) parents were concerned about their child's development of learning skills, whilst no parents were concerned about their child's motor developmental skills.

As a whole, the subgroup of children whose parents were concerned about behavioral problems regarding their child's development demonstrated average cognitive abilities (PIQ, 87.5; VIQ, 88.5; FSIQ, 87.3). There were significant differences in cognitive performance among the subgroups. For the children whose parents had expressed more than a single concern, the PIQ, VIQ and FSIQ scores were significantly lower than those in children whose parents were concerned only about their behavior problems ($p < 0.01$). With regard to speech development, there were significant differences in the values of VIQ and FSIQ for children whose parents were concerned about their children's speech development compared to children whose parents raised behavioral concerns, the former subgroup revealing lower mean values for these 2 test parameters ($p < 0.01$) (Table 2).

Table 3 lists the sensitivities, specificities and positive predictive values of the various parental concerns in detecting cognitive deficits. It was found that parental concerns about 2 or more domains of developmental problems could produce relatively higher sensitivity and positive predictive value as to the deficits of both verbal and non-verbal cognitive abilities. The single domain of parental concern about speech deficit problems was noted to yield a high positive predictive value regarding verbal-cognitive deficits.

Discussion

With respect to the children suspected of having cognitive deficits, the nature of parents' initial perception of their child's developmental problems revealed diverse values to clinical evaluation, and some types of parental concerns were more related to their cognitive delays. Normally, parents are inclined to raise their concerns about their child's developmental manifestations when they are easily observed and perceived, and parents usually mention their specific concerns about the child's development according to their priority. In our study, it was found that cognitive deficits were significantly correlated to when parents had 2 or more concerns regarding their child's development. Such an outcome suggests that provided that parents express multiple domains of their concerns about their children's development to clinicians, clinical physicians should be conscious of a relatively high possibility of cognitive deficits among their child patients. In addition, parental concern about speech was also valuable for identifying children who exhibited cognitive deficits in verbal function. It revealed that parents could contribute an accurate and valuable insight with regard to their children's speech problems to a clinician in order for that clinician to arrive at an accurate clinical diagnosis. Glascoe¹⁴ corroborated such findings in a study of a randomly selected group of children, reporting that 83% of children who possessed global/cognitive delays could be identified by existing parental concerns pertaining to behavior and/or speech-language. Moreover, a chart review by Montgomery²⁴ found that speech delay was, overall, the most common prior complaint of parents faced with the presentation of mental retardation in their children.

Child behavioral problem concerns expressed by their parents were not related to the children's cognitive deficits in clinical assessment. Most of the parental concerns regarding their children's behavioral characteristics in this study manifested as either child inattention or overactivity. Mental retardation should be

Table 3. Relationship between cognitive deficits and parental concerns

Concerns	Performance cognitive deficit			Verbal cognitive deficit			Full-scale cognitive deficit		
	Sensitivity	Specificity	PPV	Sensitivity	Specificity	PPV	Sensitivity	Specificity	PPV
Speech	26	75	49	32	81	59	27	76	51
Behavior	16	58	26	12	56	19	14	58	24
Learning	1	94	17	1	94	17	1	93	17
Multiple	56	71	64	54	69	61	57	72	65

PPV = positive predictive value.

suspected to be a possibility for any child exhibiting behavioral or learning problems, or overactivity and/or poor attention that mimics attention deficit hyperactivity disorder (ADHD). Kube et al found that 16% of children referred for evaluation of ADHD possessed mental retardation.²⁵ In our study, there appeared to be average cognitive performance and limited sensitivity/positive predictive value for the children whose parents had experienced behavioral concerns. We therefore speculate that some children who do reveal severe behavioral aberrations might not be sufficiently compliant to be able to complete an entire test procedure in spite of the approach of testing children repeatedly over a longer period of time,²⁶ and would thus have been excluded from a certain test. In addition, some concerned parents might be inclined to be somewhat intolerant of their child's presumed errant behavior, and/or be overanxious when handling the child's behavioral problems due to the parents' poor parenting skills, and the recommended response of clinicians is to provide parent education.^{13,27}

In addition to the conclusions in the above reports, all previous studies would appear to agree that parents are equally able to raise important concerns regardless of the differences in their level of education, socioeconomic status, and child-rearing experience;^{10-16,20,28} the reason for this appearing to be that most parents reported that their concerns emanated from a comparison of their child's activity with the activity of other children. Making such comparisons for parents is a relatively simple cognitive skill, and the results of such comparisons would appear to cut across socioeconomic strata and differences in parenting ability.^{10,12-15} Therefore, parents of varying levels of parenting experience and education would appear to be equally capable of raising important concerns with regard to their children's development.

To sum up, most previous research investigations have discussed the relationship between parental concerns regarding their children's perceived behavioral or developmental problems and their children's pass/fail scores for global tests of development.^{10,11,14-17,20-22} To the best of our knowledge, most major texts have devoted little or no space to dealing with information relating to various parental concerns regarding their children's development and the children's cognitive performance in a quantitative comparison except traditional measurements of sensitivity, specificity, and positive predictive value.

This study explored how effectively parents discern their children's cognitive developmental problems and associated impairments at a preschool age and has revealed that multiple and speech concerns of parents

were significant indicators of cognitive deficits. From the results of this research, it is suggested that clinicians should encourage parents to voice and organize their concerns regarding their perception of their children's developmental progress, and that they should precisely categorize the information so provided. In addition, it is further suggested that clinicians should refer the administering of accurate wide-ranging screening instruments involving the assessment of all developmental domains in response to significant parental concerns regarding their children's developmental progress.

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