

VALIDITY OF EARLY INTERVENTION DEVELOPMENTAL PROFILE IN INDIAN POPULATION

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ABSTRACT

Background: In the context of disability and mental deficiency, early identification of the handicapped child is important to lessen the impact of the handicapping conditions on the child and society. However, mere screening is of no consequence unless identification is followed by developmental programs and curriculum. The aim of the present study was to determine the concurrent validity of Early Intervention Developmental Profile (EIDP) by Rogers et al - a curriculum based assessment schedule in the Indian population. Concurrent validity of the schedule was determined by correlating measures of EIDP and Vineland Social Maturity Scale (VSMS) (Indian adaptation). **Method:** The sample consisted of 60 children below 3 years of age of both sexes. Among them, 30 were children with developmental delays and 30 were normal children. Both EIDP and VSMS (Indian adaptation) were applied on the subjects. **Results :** Both EIDP and VSMS were found to be significantly correlated ($P<0.01$), domain wise and also in terms of developmental quotient (DQ) and social quotient (SQ). Discriminant analysis was done and it was found that the schedule was more efficient in identifying delayed children (96.7%) than normal children (80%). **Conclusion:** Significant correlation among domains of Early Intervention Developmental Profile in normal, delayed and combined group indicate that both instruments measure similar constructs. Misclassification of normals point out to the need for modification of some items according to Indian context.

Key words : *Disability, Concurrent validity, Early Intervention Developmental Profile, Vineland Social Maturity Scale*

Introduction

The first 3 years are unique in the life span of an individual since this is the period when growth is extraordinarily rapid. 75% of brain growth is completed by 2 years of age (Shonkoff & Marshall, 1992).

All children upon conception and their birth become subject to hazards of human existence and environment in which they live. Out of total children born about 7% have congenital anomalies involving genetic, physical or biological defect. Approximately 1/3rd are recognizable at birth. Disabilities of remaining 2/3rd become apparent during infancy and childhood (Anastasiow, 1986).

With increasing awareness of the significance of the early years in human development, early childhood intervention has gained momentum in recent years. Early childhood intervention consists of multidisciplinary services provided to developmentally disabled children from birth to age 3 years and their families, designed to enhance child development, minimize potential delays, remediate existing problems to prevent further deterioration (Shonkoff & Marshall, 1992).

Effective early intervention requires early identification of children "at risk". The earlier children with developmental delays are intervened the greater the chances are of lessening the impact of the handicapping conditions on the child.

Identification begins with both medical and educational screening to locate children at "high risk" of developmental problems. However, mere screening is of no consequence unless followed by developmental programs aimed at targeting and improving skill deficits.

In India, problems in screening are related to some of the common problems related to the nature of assessment schedules or tests used for screening. The problems include use of tests which lack ecological validity. Moreover, very few instruments focus on the developmental aspects of behavior during early infancy periods. Most of the tests are for older children between 5-11 years of age (Saraswathi & Dutta, 1988). Most of the tests have the goal of quantifying the child's abilities. They are restricted to the cognitive domain for assessment placing undue emphasis on Intelligent Quotient/ Developmental Quotient (I.Q. /D.Q.).

Considering the lacunae in most traditional tests, an attempt has been made in the present study to determine the concurrent validity of Early Intervention Developmental Profile (EIDP) in the Indian context by correlating it with Vineland Social Maturity Scale (VSMS) (Indian adaptation). An attempt was also made to see whether EIDP could discriminate between normal and delayed children.

Method

Sample

This cross-sectional study was carried out with outpatients from two sites, Central Institute of Psychiatry (CIP) and Deepshikha Institute for Child Development and Mental Health (ICD & MH). The normal sample was selected from children attending the immunization program at Public Health Center Kanke, Ranchi.

Sixty children of both sexes between the age group of 0-36 months were selected. Among them 30 were children with developmental delays and 30 were normal children. They were all screened with the help of Screening Schedule (below three years) developed by National Institute for the Mentally Handicapped, Secunderabad (NIMH, 1989). The schedule contains 11 items related to normal developmental milestones from 0-3 year's age level. Using this schedule, if any child was found to be delayed in any one of the items or if the child had fits or physical disability, "developmental delay" was diagnosed. In absence of the above criteria, children were declared to have normal development. Informed consent was obtained from the parents of the participants.

Measures

All participants were assessed with Early Intervention Developmental Profile (Rogers et al, 1981) whose concurrent validity was to be determined along with Vineland Social Maturity Scale (VSMS) (Indian adaptation by Malin, 1992) which was selected as the criterion test. VSMS is extensively used in India and found to have good psychometric properties (Jayashankarappa, 1986; Bharat Raj, 1992). Items in this scale are drawn from areas like self-help general, self-help eating, self-help dressing, self direction, socialization, occupation, communication and locomotion. Studies have shown consistent and high correlation between Vineland Social Maturity Scale (VSMS) and Stanford Binet Scale.

Statistical Analysis

Statistical analysis was done using Statistical Package for Social Sciences (SPSS, Inc., Chicago, Illinois) version 10.0. Pearson's correlation (r) was done to see the correlation between different domains of Early Intervention Developmental Profile and Vineland Social Maturity Scale and also between Developmental Quotient (DQ) obtained from EIDP and Social Quotient (SQ) which was obtained from VSMS. Discriminant analysis was done for Early Intervention Developmental Profile to examine its ability to discriminate between normal and delayed children. Qualitative analysis was done to see the areas where the normal children were misclassified. This was done by assigning specific scores to average, below average and above average developmental level, determined in terms of developmental age reached in each domain for each individual. In this study a level of significance (α) of < 0.05 (two-tailed) was taken to consider a result statistically significant.

Results

The two sample groups did not differ significantly with respect to age and sex. The normal group consisted of 15(50%) males and 15(50%) females while the delayed group had 20(67%) males and 10(33%) females. The age range for normal group was 11-33 months (mean=22.57, SD=10.63) and 9-29 months (mean=19.40, SD=9.97) for the delayed group.

Analysis revealed significant ($P < 0.01$) correlation between developmental quotient and social quotient in normal, delayed and combined groups (Table 1). Significant correlation ($P < 0.01$) was also found among different domains of Early Intervention Developmental Profile (EIDP) and Vineland Social Maturity Scale (VSMS) in normal group (Table 2a), delayed group (Table 2b) and normal and developmentally delayed groups combined (Table 2c).

Table 1: Pearson correlation between Developmental Quotient (DQ) and Social Quotient (SQ) in normal, developmentally delayed and combined groups

	r	P
Normal group (Gr-I)	.996	0.01**
Delayed (Gr-II)	.764	0.01**
Combined group (Gr-I + Gr-II)	.839	0.01**

**Correlation is significant at 0.01 level

Table 2a: Pearson correlation among different domains of Early Intervention Developmental Profile (EIDP) and Vineland Social Maturity Scale (VSMS) in normal group (N = 30).

Domains (VSMS)	Domains (EIDP)								
	PM	COG	LAN	SOC	FE	TOL	DR	SEL-C	GM
SHG	.960**	.945**	.952**	.947**	.902**	.932**	.914**	.926**	.922**
SHE	.921**	.883**	.915**	.909**	.885**	.947**	.844**	.892**	.905**
SHD	.942**	.941**	.945**	.924**	.919**	.964**	.891**	.968**	.913**
SOC	.741**	.744**	.715**	.714**	.777**	.736**	.699**	.955**	.744**
OCC	.941**	.939**	.952**	.947**	.887**	.936**	.879**	.967**	.910**
COM	.886**	.917**	.902**	.883**	.901**	.854**	.845**	.963**	.876**
LOC	.822**	.828**	.806**	.797**	.853**	.783**	.770**	.956**	.815**

** Correlation significant at 0.01 level

VSMS (Domains) EIDP (Domains)
 SHG: Self-help general
 SHE: Self-help eating
 SHD: Self-help dressing
 SOC: Socialization
 OCC: Occupation
 COM: Communication
 LOC: Locomotion

PM: Perceptual/fine motor
 COG: Cognition
 LAN: Language
 SOC: Socialization
 FE: Feeding
 TOL: Toileting
 DR: Dressing
 SEL-C: Self-care (Feeding+Toileting+Dressing)
 GM: Gross Motor

Table 2b: Pearson correlation among different domains of Early Intervention Developmental Profile (EIDP) and Vineland Social Maturity Scale (VSMS) in developmentally delayed group (N = 30)

Domains (VSMS)	Domains (EIDP)								
	PM	COG	LAN	SOC	FE	TOL	DR	SEL-C	GM
SHG	.915**	.808**	.855**	.900**	.905**	.797**	.830**	.775**	.937**
SHE	.893**	.787**	.818**	.852**	.888**	.791**	.822**	.827**	.914**
SHD	.802**	.778**	.781**	.753**	.809**	.737**	.793**	.813**	.855**
SOC	.831**	.783**	.879**	.817**	.728**	.778**	.798**	.906**	.806**
OCC	.860**	.824**	.839**	.803**	.843**	.725**	.760**	.965**	.824**
COM	.767**	.859**	.826**	.735**	.747**	.677**	.682**	.978**	.685**
LOC	.801**	.810**	.774**	.763**	.792**	.692**	.750**	1.00**	.822**

** Correlation significant at 0.01 level

VSMS (Domains) EIDP (Domains)
 SHG: Self-help general
 SHE: Self-help eating
 SHD: Self-help dressing
 SOC: Socialization
 OCC: Occupation
 COM: Communication
 LOC: Locomotion

PM: Perceptual/fine motor
 COG: Cognition
 LAN: Language
 SOC: Socialization
 FE: Feeding
 TOL: Toileting
 DR: Dressing
 SEL-C: Self-care (Feeding+Toileting+Dressing)
 GM: Gross Motor

Table 2c: Pearson correlation among different domains of Early Intervention Developmental Profile (EIDP) and Vineland Social Maturity Scale (VSMS) in the normal and developmentally delayed groups combined (N = 30)

Domains (VSMS)	Domains (EIDP)								
	PM	COG	LAN	SOC	FE	TOL	DR	SEL-C	GM
SHG	.945**	.888**	.879**	.927**	.923**	.889**	.887**	.925**	.937**
SHE	.916**	.847**	.844**	.890**	.906**	.894**	.854**	.910**	.917**
SHD	.904**	.887**	.872**	.882**	.898**	.892**	.877**	.915**	.908**
SOC	.811**	.792**	.792**	.793**	.800**	.791**	.777**	.813**	.806**
OCC	.924**	.899**	.899**	.907**	.898**	.876**	.853**	.901**	.900**
COM	.866**	.932**	.932**	.888**	.878**	.824**	.858**	.866**	.865**
LOC	.845**	.841**	.841**	.822**	.859**	.804**	.804**	.838**	.848**

** Correlation significant at 0.01 level

VSMS (Domains)
 SHG: Self-help general
 SHE: Self-help eating
 SHD: Self-help dressing
 SOC: Socialization
 OCC: Occupation
 COM: Communication
 LOC: Locomotion

EIDP (Domains)
 PM: Perceptual/fine motor
 COG: Cognition
 LAN: Language
 SOC: Socialization
 FE: Feeding
 TOL: Toileting
 DR: Dressing
 SEL-C: Self-care (Feeding+Toileting+Dressing)
 GM: Gross Motor

Discriminant analysis of Early Intervention Developmental Profile revealed that it had correctly classified 24 (80%) out of 30 children in the normal group and 29 (96.7%) children in the delayed group (Table 3a). Across various domains Early Intervention Developmental Profile could discriminate 63.3% - 66.7% of the cases in the normal and 66.7% - 93.3% of the cases in the delayed group (Table 3b).

Table 3a: Discriminant analysis of Early Intervention Developmental Profile (EIDP) in normal and developmentally delayed group

	No. of cases	Predicted group membership	
		Group-I	Group-II
Normal group (Gr-I)	30	24 (80%)	6 (20%)
Delayed group (Gr-II)	30	1 (3.3%)	29 (96.7%)

Table 3b: Domain wise discriminant analysis of Early Intervention Developmental Profile (EIDP) in normal & delayed groups

	PM	COG	LAN	Domains (EIDP)		TOL	DR	SEL-C	GM
				SOC	FE				
Normal group (Gr-I)	63.3%	63.3%	63.3%	63.3%	63.3%	66.7%	66.7%	66.3%	66.7%
Delayed group (Gr-II)	80%	90%	93.3%	86.7%	80%	76.7%	66.7%	76.7%	76.7%

PM: Perceptual/fine motor
 COG: Cognition
 LAN: Language
 SOC: Socialization
 DQ: Developmental Quotient
 FE: Feeding
 TOL: Toileting
 DR: Dressing
 SEL-C: Self-care (Feeding+Toileting+Dressing)
 GM: Gross Motor

Qualitative analysis of scores of Early Intervention Developmental Profile in different domains reveal maximum misclassification of normal children in the cognition and

feeding domains, 12 and 13 respectively (Table 4a). Misclassification of delayed children was in the socialization and dressing domains, 2 and 5 respectively (Table 4b).

Table 4a: Frequency of normal children falling under different categories in different domains of Early Intervention Developmental Profile (EIDP)

		PM	Domains (EIDP)		SOC	FE	TOL	DR	GM	DQ
		COG	LAN							
Categories	Above Average	3	1	2	6	0	7	3	2	2
	Average		20	17	19	21	17	20	20	21
	Below Average	7	12	9	3	13	3	7	7	5

PM: Perceptual/fine motor
 LAN: Language
 FE: Feeding
 DR: Dressing
 DQ: Developmental Quotient
 COG: Cognition
 SOC: Socialization
 TOL: Toileting
 GM: Gross Motor

Table 4b: Frequency of developmentally delayed children falling under different categories in different domains of Early Intervention Developmental

		PM	Domains (EIDP)		SOC	FE	TOL	DR	GM	DQ
		COG	LAN							
Categories	Above Average	-	-	-	-	-	-	-	-	-
	Average	-	-	-	2	-	-	5	-	-
	Below Average	30	30	30	28	30	30	25	30	30

PM: Perceptual/fine motor
 LAN: Language
 FE: Feeding
 DR: Dressing
 GM: Gross Motor
 COG: Cognition
 SOC: Socialization
 TOL: Toileting
 SEL-C: Self-care (Feeding+Toileting+Dressing)

Discussion

The aim of the present study was to determine concurrent validity of Early Intervention Developmental Profile in the Indian population and also to examine its ability to discriminate between normal and developmentally delayed children.

The finding of significant correlation between Early Intervention Developmental Profile and Vineland Social Maturity Scale indicated that on the whole both attempted to measure the same constructs as they were significantly correlated with respect to respective domains as well as developmental quotient and social quotient.

This finding was consistent with the study that reported significant correlation ($P < 0.01$) between the two scales with the exception of the self-care domain of Early Intervention Developmental Profile that showed significant correlation at 0.05 level (Rogers et al, 1981).

However, discriminant analysis of Early Intervention Developmental Profile revealed that the scale was more efficient in identifying delayed children (96.7%) than normal group (80%).

Qualitative analysis of Early Intervention Developmental Profile revealed that when individual domains were taken into consideration maximum number of normal children fell under the below average category in the domains of cognition and feeding. One of the possible reasons for this could be the nature of some of the items in which most children faced difficulties. In case of the cognition area it were the items like being able to i) deduce location of object after multiple displacement (item no. 81), ii) anticipating path of the ball by detouring around object (item no. 82) iii) matching two sets of objects by color (item no. 85), iv) recognizing pictures from reduced cues (item no. 87).

In the feeding domain difficulties arose in the items of i) using fork to eat (item no 200) ii) getting drink without help (item no. 201) iii) spoon feeding (item no. 202) that most of the children have failed. Children failed in these items irrespective of their socio-economic status. So it could be tentatively inferred that the items were not appropriate to the Indian context. In case of the delayed group when individual domain was considered it was found that some children were in the average category in the social and feeding domains. This finding in the present study endorses the view that it is not enough to denote development in terms of IQ or DQ. Greater emphasis should be given on the qualitative aspects of the data, emphasizing an individual's strengths and weaknesses (Mishra & Tripathi, 1993).

Domain wise discriminant analysis of Early Intervention Developmental Profile also revealed that misclassification was more in the normal group than delayed group. It could correctly classify 66.3%-66.7% of cases across various domains in normals and 66.7%-93.35% of the cases in the delayed group. Thus, it is apparent that Early Intervention Developmental Profile has high sensitivity in identifying developmentally delayed children. However, its specificity is lower than the sensitivity. Consequently, the instrument may be more suitable for mentally retarded population than developmentally normal children.

In conclusion it can be stated that both Early Intervention Developmental Profile and Vineland Social Maturity Scale on the whole attempts to measure the same constructs as they are significantly correlated with respect to respective domains as well as developmental quotient and social quotient. At the same time, Early Intervention Developmental Profile needs

to be used with reservation when they are applied on the normal population. It appears not be directly applicable for the Indian population and would require modifications. It appears to be more appropriate for identifying particular areas of developmental delay and for planning intervention strategies and measuring intervention outcome. In the absence of adequate psychometric properties this scale is not suitable for assessing the normal developmental pattern in normal children. There is a need to develop separate norms for normal as well as delayed children.

References

- Anastasiow, N. (1986) The research base for early intervention. *Journal of the Division for Early Childhood*, 99-105.
 - Bharat Raj, J. (1992) Vineland Social Maturity Scale- Indian Adaptation: Enlarged Version. Mysore: Swayamsiddha Prakashanam.
 - Jayashankarappa, B. S. (1986) Intellectual tests and social adaptive behavioral scales used for the assessment of the mentally handicapped in India. *Journal of Personality and Clinical Studies*, 2, 89-98.
 - Malin, J.A. (1992) Indian Adaptation of Vineland Social Maturity Scale. In: Raj, D.B., (Ed.), *Vineland Social Maturity Scale and Manual - Indian Adaptation*, pp.1-2, Swayamsiddha Prakashana: Mysore.
 - Mishra, G. & Tripathi, K. N. (1993) The Concept and Context of Human Development. In: Saraswathi, T. S. & Kaur, B., (Eds.), *Human Development and Family Studies in India: An Agenda for Research and Policy*, pp.100-102, Sage: New Delhi.
 - National Institute for the Mentally Handicapped (1989). *Mental Retardation: A manual for psychologists*. National Institute for the Mentally Handicapped, Secunderabad.
 - Rogers, S. J., Donovan, C.N., D'Eugenio, D.B., et al (1981) Early Intervention Developmental Profile. In: Schafer, D.S. & Moersch, M.S., (Eds.), *Early Intervention Developmental Profile*, University of Michigan: USA.
 - Saraswathi, T. S. & Dutta, R. (1988) Current trends in developmental psychology: A lifespan perspective. In: Pandey, J., (Ed.), *Psychology in India- The state of the art*, Sage: New Delhi.
 - Shonkoff, J.P. & Marshall, P.C. (1992) Biological bases of developmental dysfunction. In: Meisels, S.J. & Shonkoff, J.P., (Eds.), *Handbook of Childhood Intervention*, pp. 35-49, Cambridge University Press: USA.
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