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Long-Term Impact of ICDS on Intellectual Development and Scholastic Achievement of Rural Children

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ABSTRACT

The present study is not only more comprehensive with regard to the number of variables studied, but it is a follow up of the earlier ICDS exposed and unexposed cohorts into school so that the long-term impact of the programme on intellectual and scholastic achievement can be documented. The study findings show that the ICDS programme has a beneficial long-term impact on intellectual development but limited effect on scholastic achievement of erstwhile Beneficiaries. In view of its long term benefits, it is recommended that the ICDS be expanded further to include all the under-privileged children. Keeping in view th e importance of newer and innovative information in stimulating intellectual development and possibly scholastic achievement, it is also recommended that the quality of teaching in rural schools be improved.

Key words :ICDS, Intellectual development, Scholastic achievement.

The term "early childhood education" is comprehensive and refers to the education of children between the ages of 2 and 6 years. It focuses upon the developmental processes and educational procedures suited to them.

Hebb(1949) emphasis on "primary learning" based on early perceptual experience and Harlow (1950) principle of "learning to learn" both affirm that early learning facilitates later learning forms the foundation upon and which subsequent learning is based. After a careful review of research evidence Bloom (1964) estimated, that normally children achieve half of adult intelligence by the age of four years.

Pre-school education (PSE) or early childhood education is expected to provide stimulating experiences to children that facilitate optimal cognitive development. It aims at developing competencies required for formal education, particularly in children from vulnerable sections of the population. PSE is considered as a distinct strategy to reduce dropouts and increase retention in the school system.

The idea, of pre-school education being the basic foundation for education has spread all over the world in a short time. Follow up studies of primary school children, with the early non-formal education in the AW, revealed improving scholastic performance. It was also observed that pre-school education promotes primary school enrolment. Seventy percent children who had received pre-school education were enrolled in primary schools with a cumulative dropout rate of forty percent in four years of schooling. Children with exposure to pre-school education were also better adjusted and picked up learning faster in the first two years of schooling (Sunderlal, 1981).

There is evidence that pre-school education brings about an improvement in various inter-related dimensions of child development such as social, emotional and cognitive development. Children attending the AW (pre-school) were found to be better than non-exposed children in the development of motor skills, language skills and psychosocial behaviour (Vazir & Kashinath, 1999; Anandalakshmy, 1986; Devadas, 1986; Sood, 1986; Bilquees, 1987). It was also observed that children attending AW performed significantly better on tasks of listening, comprehension, object vocabulary, sequential thinking and time perception (Khosla, 1985; Sahni, 1984).

In the 1930s, child psychologists made a detailed study of the effect of nursery-school experience on child development. The results of this effort established the fact that the nursery school movement enriches the experiences of children from deprived and impoverished backgrounds (Kuppuswamy, 1974).

1.2 ICDS- A Resume:

The Integrated Child Development Services (ICDS) is one of the largest multifaceted community outreach programmes, sponsored by the Government of India in 1975. It offers a powerful community based outreach system that functions as the convergent interface between the disadvantaged communities and governmental programmes such as the primary health care and education. The ICDS also provides increased opportunities for promoting early development, associated with improved cognitive and social skills, enrolment and retention in the early primary stage.

ICDS aims to reach all the needy children in the age group 0- 6 years, expectant and nursing mothers and women in the age group 15 to 45 years. It extends beyond the existing health and education systems and provides integrated package of services to children and their mothers in villages and slums.

The network of the ICDS consists of 4,200 projects, covering 75 percent of the country's community development blocks and 273 urban slum pockets. The specific objectives of ICDS are to:

! Lay the foundation for proper psychological, physical and social development of the child;

! Improve the nutritional and health status of children in the age group 0-6 years;

! Reduce the incidence of mortality, morbidity, malnutrition and school dropout;

! Achieve effective co-ordination at the policy and implementation levels amongst the various departments to promote child development, and

! Enhance the capability of the mothers to look after the normal health and nutritional needs of the child through proper nutrition and health education.

ICDS is implemented through state governments with 100 percent financial assistance from the central government for inputs other than the supplementary nutrition. The programme is also assisted by a few international organisations like UNICEF, WFP, CARE, NORAD, USAID and World Bank.

All the services of the ICDS essentially converge at the Anganwadi (AW). Early Childhood Care and Education (ECCE) may well be considered the backbone of the programme. This is the most joyful play-way-daily activity, visibly sustained for three hours a day for children 3-6 years of age. ECCE, as envisaged in the ICDS, focuses on total development of underprivileged children. It also includes promotion of early stimulation of the under-threes through interventions with mothers/ caregivers. The early non-formal pre-school education component of the ICDS, conducted through the medium of play, aims at providing a learning environment for promotion of social, emotional, cognitive, physical and aesthetic development of the child.

A recent large-scale study showed that the ICDS has a significant positive impact on both motor and mental development of beneficiaries even after controlling for relevant environmental factors likely to influence the growth and development of children (Vazir and Kashinath, 1999). A follow up of these children in school to assess the long-term benefits of the programme was one of the recommendations of this study.

A study was therefore undertaken with a view to evaluate the effect of ICDS programme on enrolment, retention and achievement in school and intellectual development of children exposed to the programme. The earlier study sample (Vazir and Kashinath, 1999) in 23 villages around Tirupati, was selected for the present study. Baseline information on psychosocial development, socio-economic status and demographic features of the sample (beneficiaries and controls coded) was available (Vazir and Kashinath, 1999). The following objectives were set for the study:

Over all objective

To assess the long-term impact of the ICDS on intellectual development and scholastic achievement of erstwhile Beneficiaries and control school children 7 to 9 years of age in A.P.

Specific Objectives

1. To assess differences in the IQ, and scholastic achievement of erstwhile ICDS beneficiaries and erstwhile control school going children.
2. To assess long term impact of the ICDS programme on scholastic achievement, IQ and classroom behaviour lasting over the number of years after entering formal school.

Table 1. Distribution (%) of Erstwhile ICDS and Non-ICDS Children Enrolled, Dropped Out of School, or Never Enrolled.

Sample	Erstwhile ICDS Beneficiaries	Erstwhile Non-ICDS Controls	Total
Enrolled in School	70.4 (259)	33.2(107)	(366)
Migrants (in School)	3.3(12)	0.9(3)	(15)
Not Enrolled	13.0(48)	40.4(130)	(178)
Dropout	12.5(46)	24.8(80)	(126)
Expired	0.8(3)	0.6(2)	(5)
Total	53.3(368)	46.7(322)	690

Figures in parenthesis indicate number of children.

Table 2. Distribution (%) of Erstwhile Beneficiaries and Control Children According to Age and Gender.

Age Groups	Study Groups				Total
	Erstwhile Beneficiaries		Erstwhile Controls		
	Boys	Girls	Boys	Girls	
7+ years	41.9(83)	34.3(68)	12.6(25)	11.1(22)	(198)
8+ years	48.6(52)	20.6(22)	17.8(19)	13.1(14)	(107)
9+years	29.5(18)	26.2(16)	22.9(14)	21.3(13)	(61)
Total	(153)	(106)	(58)	(49)	(366)

Figures in parenthesis indicate numbers studied.

MATERIAL AND METHODS

Poor socio-economic status, malnutrition and other adverse environmental factors are widely prevalent in developing countries. These are known to have a deleterious influence on growth and development of children. Before initiating intervention programmes, it is important not only to identify family and environmental factors influencing the growth and development of children, but also to monitor them and quantify their adverse influences on the specific areas of development using culture appropriate tests.

Measurement of physical growth among children can be carried out using standardized technology applicable through out the world. The intellectual development and scholastic achievement of the children can also be assessed using appropriate tests standardized on local populations. The culture-appropriate tests, schedules and questionnaires included for assessing the study variables and the procedures and methods used for measuring them are described below:

2.1 Intellectual Development:

Several psychologists have defined intelligence. But the most widely and globally accepted definition of intelligence is the one by Wechsler (1975). It defines intelligence as "the global capacity of an individual to think rationally, to act purposefully and to deal effectively with one's environment". Intelligence is assessed by the use of intelligence tests, which are suitable for different age groups and are culturally appropriate.

The following culture-fair intelligence tests were found to be appropriate after literature survey and hence used in the present study:

a) Binet-Kamat Intelligence Test for Indian Children
b) Draw-a Man test
c) Ravens Coloured Progressive Matrices

2.2 Scholastic Achievement:

The scholastic achievement of the children was assessed by using the modified NCERT scale. The scholastic achievement scale consists of two test batteries: one for first and second classes and the other for third and fourth classes. The questions in the two tests are arranged in an order of increasing difficulty or complexity. This test measures the language and arithmetic abilities of the children. The scale was pretested on a sample of 20 students to check the validity of the test.

2.3 Anthropometry:

In the present study, standard anthropometric techniques were used for the assessment of nutritional status. The anthropometric measurements included both height and weight of study children. The height and weight of children was measured using standard equipment, which included height rod for measuring height and the Tansi scales for measuring weight.

2.4 Assessment of Age:

In rural areas, accurate information on the chronological age of the child is difficult to obtain in the absence of birth certificate. The information is of utmost importance as both height and weight as well as intellectual assessment is dependent on the accurate information regarding the age of the child. The problem of obtaining the correct ages at the community level is largely mitigated by using a local events calendar, which can guide the calculation of age to the nearest month (Thimmayamma and Naidu, 1974). In the present study the ages of the children were calculated using a local events calendar prepared for the purpose.

2.5 Socio-economic Status:

Socio-economic status was assessed using the Socio-Economic Status Rating Scale (SESRS) developed by Narayan Rao (1984). The scale was first developed in 1973 and later revised in 1984. As the scale was standardized on a large sample from Andhra Pradesh region the scale is suitable especially for the population of this region.

2.6 Demographic profile:

An interview schedule inquiring information on child's age, gender, size of the family, socialization of the child, water and electricity supply, defecation facilities and home environment was pre-tested and standardized

RESULTS AND DISCUSSION

The results emerging from the analysis of the study variables are presented in this section. Means and standard deviations computed for intellectual test scores and scholastic achievement according to nutritional status and other variables are presented with levels of significance wherever obtained by applying appropriate tests.

3.1 Distribution of children:

Table 1 presents the distribution of children according to their erstwhile beneficiary and control group status in relation to school enrollment, school dropout and other details.

From the earlier cohort of 690 children, 13 percent (48) belonging to the erstwhile ICDS group against 40.4 percent (130) from the erstwhile non-ICDS had never enrolled in the primary school. The school dropout rate of children from the ICDS group was also lower (12.5%) compared to the non-ICDS group (24.8 %).

The observation that higher percentage of (73.7%) enrollment and lower percentage of (12.5%) dropouts in the ICDS group (compared with non-ICDS group) in this study was in strong agreement with the studies by Sunderlal (1981), Paranjpe (1983-85), Tarapore (1986) who reported that the preschool education resulted in higher enrolment and fewer dropouts in the primary school.

Among the 381 school children, 366 were attending primary schools located in the original study villages. Of these, 73.7 per cent (259) were erstwhile ICDS beneficiaries who had received preschool education and 34.1 per cent (107) were erstwhile non-ICDS control group children. These 366 children were available in the same villages at the time of psychological testing and formed the sample for the present study. Fifteen school children had migrated to other villages.

3.2 Age and gender wise distribution of children

The sample for the present study consisted of a total of 366 rural school-going children aged between 7-9 years. The children were located in 28 villages spread out in three mandals namely Srikalahasti, Yerpedu and Thottambedu in Chittoor district of Andhra Pradesh. The distribution (%) of the children in the two study groups according to gender and age groups with yearly intervals is presented in Table 2. The number of children in the two groups is not equal. The reason for this is that the same number of children studied in the earlier study (Vazir and Kashinath, 2000) was followed in the present study and the sample size in both groups originally was unequal.

The data in the above table clearly indicates that the percentage of boys and girls in the erstwhile beneficiary group were higher in all the age groups when compared with the percentages of boys and girls in erstwhile control group. Also, irrespective of beneficiary and control status, the percentage of boys enrolled in schools was higher than the percentage of girls in all age groups.

This finding that enrolment of boys was higher than that of girls was in agreement with the studies by Sunderlal (1981), Haughton & Haughton (1995), Colclough & Lewin (1993) King & Hill (1992) and Herz and Khandker, (1991) who observed that a gap in primary school enrollment between girls and boys exist indicating lower enrollment of girls than boys.

3.3 Mean intellectual scores of children according to age and study groups

For assessing intelligence, it is very important to use a battery of tests that can measure the various abilities comprising the IQ. It is also essential to use culture appropriate tests in order to ensure that the measured IQ correctly assesses the inherent intellectual abilities of the subject.

The mean intellectual scores of the erstwhile ICDS beneficiary and non-ICDS control boys and girls in the three age groups obtained by using three culture-appropriate tests are given in Table 3.

The tests used were Binet-Kamat Intelligence Test for Indian children (BK), Draw-a-man (DAM) test adapted by Phatak and Raven's Coloured Progressive Matrices (CPM-tile) for children. The three tests are culturally appropriate and measure different sets of intellectual abilities as well as some similar abilities. The performance on a battery of tests gives the subject a chance to reveal the direction of his or her intellectual potential.

Results obtained by administration of the Draw-a- man and Binet-Kamat intelligence tests indicated that the erstwhile ICDS beneficiaries achieved significantly higher mean IQ scores ($P<0.001$) compared to the erstwhile non-ICDS controls across the three age groups. It is also clear from the above table that although there are no statistically significant gender differences in the intellectual scores across age groups, the trends are in favour of boys in all the age groups.

It is also evident from Table 3 that there are significant differences between age groups and gender with younger children attaining higher IQ scores than the older and boys attaining higher IQs compared to girls. In the original study of the same cohort of children also, it was found that older children performed poorly compared to younger children on the test of psychosocial development (Vazir and Kashinath, 1999).

Factors explaining the variation in the IQ of the study children were analyzed using the Logistic Multiple Regression Models. Results on this are given in subsequent sections.

3.4 Scholastic achievement and intelligence

It is well known that scholastic achievement and intelligence are positively correlated. However, school achievement is also dependent to a large extent on the type and quality of teaching and a stimulating environment. The study data were analyzed in relation to the percentage marks obtained by the erstwhile ICDS beneficiaries and controls on a scholastic achievement test. Results are given in Table 4.

Results in Table 4 using ANOVA indicate that the erstwhile ICDS beneficiaries performed better and obtained significantly ($p<0.001$) higher marks on the scholastic achievement test compared to their erstwhile non-ICDS counterparts.

The results also show that the erstwhile ICDS 8+ year olds achieved highest percentage marks (74.6) followed by the 7+ year olds (55.2) and lastly by the 9+ year olds (49.9). Among the erstwhile non-ICDS, it was observed that the 7-

Table 3. Mean Intellectual Scores of Erstwhile Beneficiary and Control Boys and Girls According to Age groups.

Study groups	Age Groups					
	7-8 years		8-9 years		9+ years	
	Boys	Girls	Boys	Girls	Boys	Girls
DAM-IQ						
Erstwhile Beneficiaries	102.1± 11.09 (83)	101.4± 11.40 (68)	98.5± 10.92 (52)	93.8± 8.90 (22)	97.1± 9.14 (18)	91.9± 7.55 (16)
Erstwhile Controls	93.8± 9.37 (25)	91.2± 9.58 (22)	90.6± 5.86 (19)	89.5± 5.00 (14)	89.4± 7.41 (13)	88.3± 7.79 (14)
BK-IQ						
Erstwhile Beneficiaries	99.0± 8.35 (83)	96.4± 9.30 (68)	96.4± 8.52 (52)	92.0± 9.63 (22)	94.3± 11.15 (18)	92.1± 10.15 (16)
Erstwhile Controls	93.9± 8.31 (25)	87.7± 6.53 (22)	88.0± 6.20 (19)	85.0± 4.26 (14)	88.7± 6.76 (13)	86.8± 6.80 (14)
CPM- IQ						
Erstwhile Beneficiaries	52.7± 15.35 (83)	46.6± 18.55 (68)	49.6± 20.84 (52)	43.6± 26.75 (22)	36.1± 20.42 (18)	43.3± 23.72 (16)
Erstwhile Controls	31.1± 21.95 (25)	27.8± 20.21 (22)	26.4± 20.77 (19)	21.0± 17.33 (14)	27.1± 18.51 (13)	22.3± 21.15 (14)

Figures in parenthesis indicate numbers studied.

year-olds achieved lower marks (41.2) compared to both the 8-year-olds (70.6) and 9-year-olds (46.4). These results imply that the erstwhile ICDS beneficiaries started with an advantage when they enrolled in school and achieved higher percentage marks (55.2) compared to their erstwhile non-ICDS counterparts (41.2). They continued to do better than their erstwhile non-ICDS age mates even in the second year of school (74.6 vs 70.6). In their third year in school, their achievement was comparatively poorer (49.9) however; they were still found to be ahead of their non-ICDS age mates (46.4).

These results, indicating that the scholastic achievement of children in ICDS group was higher when compared to the non- ICDS group.

Conclusion

The ICDS programme is globally recognized as one of the world's largest and most comprehensive community-based outreach systems for promoting early childhood care for survival, growth and development. Since its inception in 1975, it has expanded and crossed many milestones. It has been evaluated by several institutions for its effects on growth, nutritional status and cognitive and school achievement. But most of the evaluations were one-time point effects of its impact on limited number of variables such as nutritional status, school marks or a measure of the IQ. The present study is not only more comprehensive with regard to the number of variables studied, but it is a follow-up of the earlier ICDS exposed and unexposed cohorts into school so that the long-term impact of the programme on intellectual development and school achievement can be documented. The long-term benefit of the ICDS

Table 4. Mean Scholastic Achievement Scores (% marks) of Erstwhile Beneficiaries and Control Children According to the Three Age Groups.

Study Groups	Age Groups (Years)			Total
	7+Mean ± SD	8+Mean ± SD	9+Mean ± SD	
Erstwhile Beneficiaries	55.2***±14.66	74.6 ***±17.84	49.9 ***±23.80	259
Erstwhile Controls	41.2±18.92	70.6±17.63	46.4±10.33	107
Total (N)	198	107	61	366

*** *P<0.001 (ANOVA)*

programme through such a study design throws up rich dividends, which had hitherto remained hidden.

The study was conducted with the overall objective to assess the long-term impact of the ICDS on scholastic achievement and intellectual development of school going children between 7-9 years of age who had earlier been exposed to the programme. The sample was drawn from 28 villages, covering three mandals viz., Srikalahasti, Yerpedu and Thottambedu. Efforts were made to locate the 690 ICDS beneficiaries and Non-ICDS control children who had been covered in the earlier study. The sample for the present study was drawn from the same cohort and all the 28 villages were surveyed to locate the children using the previous list of households. A total of 366 children who were enrolled in schools situated in the same villages was available and formed the sample of the present study. This sample also included the erstwhile non-ICDS controls matched for age, gender, socio-economic status and literacy of parents. However, the study was a single-way blind investigation in that the tester was unaware of their erstwhile status.

The results, indicating that the scholastic achievement of children in ICDS group was higher when compared to the non- ICDS group were in agreement with the findings of Sood, (1987) who made similar observations in scholastic performance and those of Chaturvedi (1987) who reported that children in the ICDS area were significantly better in all three school variables viz., regularity in attendance, academic performance and general behaviour in the school.

Specific studies on scholastic performance of erstwhile ICDS beneficiaries using independent scholastic achievement tests are few and the present study is more comprehensive in that the intellectual and nutritional profiles were also assessed. A logistic Multiple Regression Model to assess the factors explaining the variation in the scholastic achievement of the study children is also given in subsequent sections.

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