Original Article

Early language development in Indian children: A population-based pilot study

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Abstract

Objectives: To study the prevalence of language delay and to examine its socio-economic correlates in children less than 3 years. **Materials and Methods:** Participants were 130 children (males = 56%) aged 12-35 months (mean age = 1.81 years, SD = 0.58), from an urban center in north India. The language quotient (LQ) of the child was measured by the Clinical Linguistic Auditory Milestone Scale (CLAMS). Children with an LQ score of less than 70 were considered language delayed. **Results:** Overall, 6.2% of the children were language delayed with a higher prevalence found for girls (7%) than for boys (5.5%), although the difference was not statistically significant. Several significant correlations between socio-economic and demographic variables and the LQ of the child were found. Stepwise multiple regression analysis revealed that 31.4% of the variance in the LQ scores of girls was accounted for by income ($F = 23.80$, $P = 0.000$) and 18.1% of the variance in the LQ scores of boys was accounted for by education of the mother and income ($F = 15.67$, $P = 0.000$). **Conclusions:** Developmental problems in early years are often precursors of problems in later life and early intervention can facilitate favorable outcomes among children with multiple risks. The high prevalence of language difficulties in young children underscores the need to target language delay in early years, to reduce the likelihood of adverse outcomes and thus optimize chances of improvement.

Key Words

Children, language delay, socio-economic correlates

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Introduction

Speech and language development is one of the most useful pointers of a child's overall development and intellectual functioning.[1] Parents are most likely to raise speech and language delay concerns in their encounters with primary care clinicians.[2-3] Prevalence rates for language delay have been reported across wide age ranges and samples. For children aged less than 5 years, studies have reported prevalence rates ranging from 2.3% to 19%.[4-6] Evidence indicates that untreated speech and language delay in preschool children can persist in 40-60% of the children and these children are at a high risk for social, behavioral, emotional, and cognitive problems in their later years.[7] Early identification of children at risk for language and other developmental problems can lead to enrollment in intervention programs, which can ameliorate the impact of early risk considerably.[3,8] Several population-based studies have recommended that screening toddlers for language delays reduces the number of children who require special education, which leads to improved language performance.[4,6,9]

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Most of the studies on language development have been conducted in the developed countries and only a handful of studies from India have examined the prevalence and correlates of language delay in young children. In a recently conducted study of neurologic associations and factors related to speech and language delay, Parakh *et al*.[10] examined the medical records of 670 patients, with a mean age of 6.1 years (SD = 4.72), attending the pediatric neurology clinic of a tertiary care hospital over a period of 1 year. Prevalence of speech and language delay was found to be 16.27% and the male to female ratio was 2.76:1. Language delay was found to be associated with medical disorders such as seizure disorder, ADHD, autism, neonatal resuscitation, and epileptiform EEG with or without clinical seizure activity. In another study, Malhi and Singhi[11] evaluated 79 parent–child dyads who were seeking well-child pediatric services in the outpatient department of a tertiary care teaching hospital. Children in the age range of

2-5 years with no history of motor or sensory impairment, chronic illness, or perinatal problems were recruited to study the relationship between parents' concerns and the child's developmental status. Parental concerns were elicited using a standardized questionnaire, Parents Evaluation of Developmental Status.[12] Expressive language concerns were significantly more likely to be raised by parents of children with delayed development (23%) compared to parents of children with normal development (14%). The authors concluded that parents' concerns about expressive and receptive language and gross and fine motor development were moderately sensitive predictors of developmental delay in children between 2 and 5 years.

However, the findings of studies based on clinic-based samples cannot shed light on the language development of children in the general population. In a community-level study, Sidhu *et al*.[13] assessed 123 pre-school children aged two and a half to five years for developmental status using the Battelle Developmental Inventory-II.[14] Twenty-one (17%) children showed delayed expressive language functioning, defined as standard scores one standard deviation below the mean. Children with delayed language showed significantly lower scores on tasks that tested attention, memory, reasoning, academics, perception, and concepts. The authors concluded that language impairment in young children is associated with a broad spectrum of developmental impairments and there is need for multi-disciplinary developmental surveillance.

Several risk factors such as poverty, male sex, family history of speech and language delay, perinatal risk factors, family discord, family size, social stress, maternal depression, and poor parental education have been found to be associated with greater risk for language delay in children.[15-17] For example, Sidhu *et al*.[17] examined the relationship between cumulative biological and environmental risk factors and the language development of children less than 3 years using the Clinical Linguistic Auditory Milestone Scale (CLAMS).[18] Twelve possible risk factors, 4 biological and 8 environmental, were studied including preterm birth, low birth weight, history of birth asphyxia, history of neonatal jaundice, low income, large family size, minimal father's and mother's education, disadvantaged caste, low level of occupation of head of the household, absence of father, and higher birth order. A significant general downward linear trend in the language quotient (LQ) was found as the number of risk factors increased. Each risk factor reduced the LQ of the children by 2.63 points. The authors argued that the adverse effects of early exposure to risk factors for children living in disadvantaged and impoverished homes render children less likely to succeed in school, compromises their academic achievement, and impacts their potential to succeed in adult life.

Given the significance of early language skills for cognitive development, schooling, and academic achievement of children, it is important to study both the prevalence of language delay and the socio-economic risk factors associated with it. Moreover, early screening and detection of children with language delays is important as it can identify children who require intensive stimulation services, which in turn leads to improved language performance. Prevalence of language delay and its correlates in the community is virtually unknown in India. Most of the studies have been conducted on clinical samples of children, and these cannot be used to shed light on the correlates of early language delay in young children. The present study was therefore designed to provide preliminary data on the prevalence of language delay in young children from the community and to study its socio-economic and demographic correlates.

Materials and Methods

Participants

A total of 130 children (males = 56.15%) aged 12-35 months (mean age = 1.81 years, SD = 0.58) attending government and private crèches and play schools and hospitals for routine well child visits were recruited from an urban center in north India. The mean age of the children was 16.89 months (SD = 3.01) in the age group of 12-23 months and 29.76 months (SD = 3.21) in the age group of 24-35 months.

The data considered here are part of a larger study focusing on the assessment of children in multiple developmental domains. All children with a history of parent-reported sensory impairments or chronic illnesses were excluded from the study. A description of the sample is provided in Table 1.

Measures

A semi-structured interview schedule was used to elicit information from the primary caretaker on the socio-economic, demographic, and birth-related variables of the child. The language development of the child was measured by the CLAMS.[18]

Clinical linguistic auditory milestone scale

The main outcome measure was the LQ of the child as measured by the CLAMS,[18] which is a 43-item language assessment instrument that assesses the receptive and expressive language development skills and milestones in children aged 1-36 months of age. For example, orients towards bell – upward directly (9 months); whether the child

Table 1: Background characteristics of children and parents (*N*=130)

Characteristic	%
Boys	56.2
Only child	53
≥1 sibling	7
Education of father	
Up to 10th	50
11th-12th	37
Graduation and above	13
Education of mother	
Up to 10th	49
11th-12th	33
Graduation and above	18
Mothers employed	18
Socioeconomic status	
Lower	21.5
Middle	67
Upper	11.5

understands no (10 months); understand one step command with gesture (12 months); 3-word vocabulary (14 months); mature jargoning (18 months); 2-word phrases (21 months). The test uses standardized methods for obtaining information from parent report and from direct interaction between the examiner and the child. The CLAMS focuses on expressive and receptive language skills of children up to 3 years of age. The scale yields a language developmental age in months, which is then used to derive an LQ by dividing the language age by the chronological age and multiplying by 100. An LQ score less than 70 indicates a significant delay in language development. LQ scores between 70 and 90 indicate low average language developmental status, 91-110 represent average language skills, and LQ scores more than 111 depict above-average language development. The CLAMS has been used with Indian children and been found to be a useful test to measure language development.[3,17] The interview with the parent/caregiver and the language and developmental assessment of the child was conducted by a trained psychologist.

Socioeconomic status

The revised Kuppuswamy socio-economic status scale was used to assess the socio-economic status (SES) of the family.[19] The scale is based on 3 parameters: Education, occupation, and income of the family members. The scale assigns a score to each of these three categories, with higher scores indicating higher socio-economic status. The scale classifies the monthly income of the family into seven categories and assigns scores ranging from 1 to 12, with higher scores indicating higher income. Education is classified into 7 categories; the lowest score of 1 is assigned to a person who is illiterate and 7 to a professional degree holder. Occupation is also classified into 7 categories, with the lowest score of 1 being assigned to an unemployed person and the highest score of 10 being assigned to a person who is a professional. The scores on the 3 parameters are added to yield a total score that ranges from 3 to 29. Based on the total score of each family, 5 categories of socio-economic groups are identified: Upper (scores 25-29), Upper Middle (16-25), Lower Middle (11-15), Upper Lower (5-10), and Lower (<5). Higher scores indicate higher SES.

Results

Prevalence of language delay by age and sex

Table 2 presents the prevalence of language delay by age and sex. Overall 6.2% of the children had scores less than 70 on CLAMS and were language delayed. Although more girls (7%) compared to boys (5.5%) were language delayed, the difference was not statistically significant. There was no difference in the prevalence of language delay by age. Prevalence of language delay was found in 6.2% of the children less than 24 months of age and in 6.1% of children 24-35 months of age. The table also shows that the percentage of language delay tends to decline with age for boys and increase for girls, although no significant sex differences emerged in the prevalence of language delay at any age.

Socio-economic and demographic correlates of language development in children

Table 3 presents the inter-correlations between the LQ on the CLAMS and the socio-economic and demographic variables. Several significant correlations between socio-economic, demographic variables, and LQ of the child were found. The LQ of the child was positively correlated with education of the mother ($r = 0.42$, $P < 0.01$), education of the father ($r = 0.32$, $P < 0.01$), SES index ($r = 0.40$, $P < 0.01$), and household income ($r = 0.35$, $P < 0.01$), and negatively correlated with number of children in the family ($r = 0.18$, $P < 0.05$). The results indicate that children from relatively poorer homes, with parents with low levels of education, and belonging to lower socio-economic status families with more children were more likely to have lower LQs.

Stepwise multiple regression was performed to examine the crucial socio-economic and demographic predictors of the LQ of children. The analysis revealed that 31.4% of the variance in the LQ scores of girls was accounted for by income ($F = 23.80$, $P = 0.000$) and 18.1% of the variance in the LQ scores of boys was accounted for by education of the mother and income ($F = 15.67$, $P = 0.000$).

Discussion

This paper provides a rare examination of the prevalence of language delay in Indian children less than 3 years of age from the community setting and highlights that a sizeable minority have language delay. Language delay was found in 6.2% of

Table 2: Prevalence of language delay by age and sex of child

Age	Boys % delayed (*N*)	Girls % delayed (*N*)	Total sample % delayed (*N*)
12-23 months	6.0 (50)	6.5 (31)	6.2 (81)
24-35 months	4.3 (23)	7.7 (26)	6.1 (49)
12-35 months	5.5 (73)	7.0 (57)	6.2 (130)

Table 3: Inter correlations of the socio-economic and demographic characteristics with language quotient

	LQ	Age of child	Education of father	Education of mother	Household income	Number of children in the family	Socio-economic status
LQ	-						
Age of child	0.005	-					
Education of father	0.32**	−0.06	-				
Education of mother	0.42**	−0.07	0.82**	-			
Household income	0.35**	−0.16	0.43**	0.44*	-		
Number of children in the family	−0.18*	0.15	−0.46**	−0.46**	−0.18*	-	
Socio-economic status	0.40**	0.12	0.75**	0.76**	0.57**	−0.36**	-

LQ=Language quotient, *P<0.05, **P<0.01

the children less than 3 years of age. Our results are in line with results from studies conducted in the West, which also report prevalence rates for speech and language delay in the range of 2-8%.[4,20,21] There is considerable evidence to show that untreated speech language delay in young children is associated with diminished reading skills, behavioral problems, social skills deficits, and psychosocial adjustment problems. In turn, these difficulties may lead to overall poor academic achievement and lower IQs.[22,23] Furthermore, longitudinal data on early language delay suggests that these children continue to show poor academic skills even as adolescents.[24] Since language delay has long-term cognitive and behavioral sequelae, the high prevalence of language difficulties in young children found in the present community sample underscores the need to target language delay in early years, to reduce the likelihood of adverse outcomes and optimize chances of improvement. Most language problems in children can be identified at an early stage in the preschool period when interventions are most effective.[25,26]

No sex differences in language delay at any age were found and the female advantage in language development observed in the developed countries[27,28] was not replicated in the present study. Interestingly, more boys than girls were language delayed at less than 24 months of age, and more girls were delayed after the age of 24 months, although these sex differences were not statistically significant. Perhaps the strong son preference along with a general neglect of the girl child prevalent in the north Indian states negates the language advantage accruing to girls all over the world.[29,30] It is noteworthy that the percentage of girls with delayed language increases with age wherein for boys it decreases with age.

Income and maternal education emerged as significant contributing factors to the LQ of the child. Evidence indicates that socio-economic disadvantage is associated with inadequate food, poor nutrition and hygiene, poor maternal education, inadequate stimulation at home, inadequate schooling, and suboptimal physical environment at home.[31-37] Children from socio-economically disadvantaged families begin their lives with a poorer platform of health and a reduced capacity to benefit from the economic and social advances experienced by the rest of the society. Better educated mothers not only talk more to their children but also use more complex words and hence provide a cognitively enriched environment, which in turn enhances the child's language skills.[38-42] Maternal education is therefore a proxy measure of the quality of home environment that parents provide to their developing children.

There are some limitations of the study that should be taken into account while generalizing the results of the study. First, the small sample size does not represent the population and more controlled studies are required to elaborate and confirm the findings. However, the study provides preliminary data and this can be used to generate hypotheses for future investigations. Secondly, cross-sectional data are used to study the prevalence of language delay in the various ages; longitudinal data would have provided more accurate and precise measures of prevalence. Finally, only one measure of language development was used to measure the language skills of the child. Multiple measures may have provided a more accurate measure of the child's language development skills than a single assessment measure.

Nevertheless, the results of this study have implications for professionals involved in providing services to children. The study highlights the potential value of assessing and incorporating instructions for language development into treatment programs for preschool children. Research shows that developmental problems in early years are often precursors of problems in later life and early intervention programs are a promising way to facilitate favorable outcomes among children with multiple risks.[43,44] Moreover, recent studies indicate that the "wait and watch policy" used by professionals for children showing even uncomplicated expressive language delay can no longer be the norm, given the newer findings that majority of these delayed toddlers do not outgrow this delay.[44,45]

Several developmental programs have been launched by the Indian government to counter the deleterious impact of poverty and disadvantage in early childhood, the most comprehensive being the Integrated Child Development Services (ICDS). It provides counseling to pregnant and lactating mothers, growth monitoring for children less than 5 years of age, immunization, feeding, and preschool centers for children 3-6 years of age. Evidence indicates that the ICDS has improved the nutritional status and school attendance rates of preschool children, which are covered by this program.[46,47] To what extent these programs provide an impetus to the language development of young children, however, needs to be investigated.

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