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Research Paper

Developmental Delay and Disability among 0-6 Year Children in Rural and Urban Kashmir India

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ABSTRACT

Background: every high risk child is most vulnerable to developmental delay, early detection of delay in this group and identification of associated prenatal, postnatal factors and there prevention can prevent disability in later life. ***Methods***: An observational cross sectional study was conducted during the period of June 2017-Jan2018 in the clinical posting of department of physical therapy composite regional bemina Srinagar Jammu and Kashmir India. As a group of 115 objects were taken for the study at randomly developmental screening was conducted by the special trained physiotherapists using standard tools like denver developmental screening tool II, Trivandrum developmental screening chart and amiel tison method of tone assessment. Associated prenatal and postnatal factors were identified, early intervention was initiated on those detected with developmental delay. ***Results***: Developmental delay was detected 39.1% of the study population over all incidence of developmental delay differ significantly among the various age groups but maximum was detected in the age group of >24-36 months 22.2%, neonatal illness like sepsis pneumonia, meningitis and convulsions also show association with developmental delay of 45 with developmental delay 8 were preterm, 34 were LBW, with history of sepsis in 9, birth asphyxia in 8, severe jaundice in 6 , convulsions in 7 and meningitis in 4 ***Conclusion:*** Incidence of developmental delay was higher in >24-36v age group and in LBW Childs, prematurity and neonatal illness are major contributors most of Childs go undetected , and early intervention of the grass root level will down the incidence of developmental challenges and will decrease the burden of future disability in this vulnerable group.

Keywords: *Developmental Delay, Disability*

Every newborn baby has to go through a complex process of growth and development at various levels to ultimately emerge as a normal adult. Any deviation in these stages of development will lead to developmental disability. Such disability may express in various forms, which include delayed in gross and fine motor development ,delayed mental

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development(include educational, psycho-social speech) and visual & hearing problems, speech & language disorders, learning disabilities and many more. Developmental challenge in children is an emerging problem across the globe, which is largely associated with improved neonatal survival.1 Improved newborn care is leading to salvage of many critically ill newborns, but many of them survive with brain damage, leading to ultimate developmental disability. Sick neonates, particularly preterm babies, very low birth weight (VLBW) and extremely low birth weight (ELBW) babies (birth weights less than 1500 and 1000 g respectively) with prenatal hypoxia and hypoxic-ischemic, encephalopathy, meningitis, convulsions, sepsis, severe jaundice etc. are most vulnerable to developmental delay Insult to the developing brain may lead to gross and fine structural changes resulting in smaller brain size, reduced white and grey matter, ventriculomegaly, decreased callosal projections and altered fiber tract organization, which eventually affects neural function.3

Hence, a close neuro developmental assessment of these high-risk newborns is essential for early detection of any brain damage, to prevent or restrict a neurodevelopment delay and disability through early intervention. Intrauterine and neonatal insults substantially affect the global burden of disease, measured in disability-adjusted life-years, because they contribute to both premature mortality and long-term disability.

However, little is known about the severity and distribution of long-term impairments after intrauterine or neonatal insults. As a result, sequelae from intrauterine and neonatal insults have not been adequately captured in estimates of the global burden of disease.

With this background, we ventured to do a screening of the babies who were admitted in the composite Regional Centre Bemina Srinagar J & K India to study the prevalence of delayed development in high risk babies and identify their various aetiological factors and associations. Simultaneous provision of early intervention was also initiated as a preventive and therapeutic measure.

Objectives of the Study

1. To assess and study the developmental outcome of high risk new borns.
2. To identify the factors associated with developmental delay in the study population.
3. To study the awareness in developmental delay population.

METHODOLOGY

This community based observational cross sectional study was conducted (during the period of June 2017 to Jan 2018) in the clinical posting of the Department of physical therapy in composite regional centre bemina Srinagar to assess the developmental outcome of high risk new borns, to study the awareness in developmental delay population, to identify the factors associated with developmental delay population, childrens were selected at random from different areas of the rural and urban Kashmir. In this study we have done random sampling 115 childrens were taken in the age group of 0-6 year and The neuro-developmental screening process involved attainment of detailed clinical profile including full prenatal

history, demographic and socio-economic profile through a structured questionnaire. The exact age of the child was computed from the child's date of birth. When data on the exact date of birth was not available, the age as told by the mother was used, corrected to the nearest month, Anthropometry was done using an electronic weighing scale, and measuring tape to record weight, length or height, mid-arm circumference (MAC) and head circumference. General examination, a brief neurological examination and neuro-motor assessment by Amiel Tison Method 9, were conducted, passive tone assessment was also done, which also was quite informative.10

Developmental screening was performed using the following tools:

1. TDSC (Trivandrum Developmental Screening Chart) in children up to 2 years of age: this is a simple screening tool with 17 items covering the motor, cognitive and language domains of development, based on Bailley developmental screening tool, developed and validated in India.
2. DDST II (Denver Developmental Screening Tool II) for children >2 years of age: an internationally accepted and widely used screening tool covering the 4 domains of gross motor, fine motor-adaptive, personal social and language.
3. Hearing assessment in children above 1 year was done with a pediatric audiometer.

RESULTS

Table 1 The following table shows the Distribution and developmental outcome of the childrens with their respective age

Age in months	Normal		Delay		Total		Chi-square
	N	%age	N	%age	N	%age	
0-12	38	54.3%	6	13.3%	44	38.3%	X^2 = 31.068 df = 5 P =0.0001
>12-24	17	24.3%	8	17.8%	25	21.7%	
>24-36	2	2.9%	10	22.2%	12	10.4%	
>36-48	4	5.7%	5	11.1%	9	7.8%	
>48-60	6	8.6%	7	15.6%	13	11.3%	
>60-72	3	4.3%	9	20.0%	12	10.4%	
Total	70	100.0%	45	100.0%	115	100.0%	

The above table shows the children's of different age groups, Though overall incidence of developmental delay differ significantly among the various age groups (P=0.01), maximum incidence of developmental delay was detected in the age group of >24-36 months, (22.2%) followed by >60-72 (20.0%).

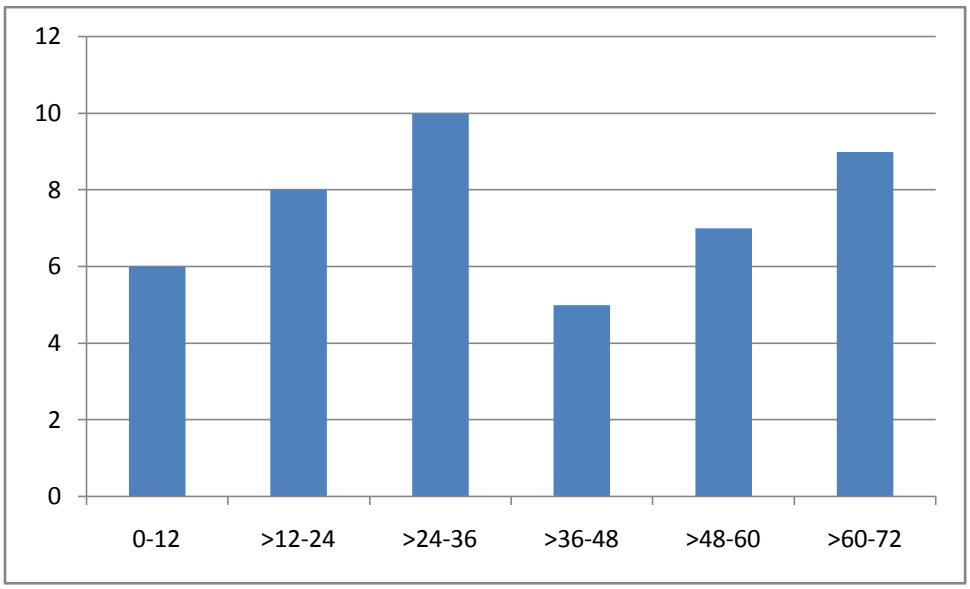

Fig 1. The following graph shows the Distribution and developmental outcome of the childrens with their respective age

Table 2 The following table shows the Distribution and developmental outcome of the childrens with their respective gender

female male	**Normal**		**Delay**		**Total**	**Chi-square**
	N	**%age**	**N**	**%age**	**Count**	X^2=5.804
Male	29	41.4%	29	64.4%	58	
female	41	58.6%	16	35.6%	57	df =1
Total	70	100.0%	45	100.0%	115	p= 0.016

The above table shows that the maximum incidence of developmental delay was detected in male childes giving the incidence of 64.4% though developmental delay which differed significantly from the normally developing group(p= 0.016).

Table 3 The following table shows the Distribution and developmental outcome of the childrens with their respective Birth weight

Birth weight in kg	**Normal**		**Delay**		**Total**	**Chi-square**
	N	**%age**	**N**	**%age**	**Count**	X^2=10.231
≤2kg	18	25.7%	18	40.0%	36	df =2
3kg	39	55.7%	27	60.0%	66	P =0.006
4kg	13	18.6%	0	0.0%	13	
Total	70	100.0%	45	100.0%	115	

The above table shows that the , Low birth Weight (LBW) was recorded amongst 40% LBW babies had developmental delay which differed significantly from the normally developing group of childrens P =0.006

Table 4 The following table shows the Distribution and developmental outcome of the childrens among rural and urban areas

urban rural					chi-square
	Normal		Delay		Total	
	N	%age	N	%age	Count	
Urban	27	38.6%	22	48.9%	49	X^2=1.19 df= 1 p= 0.27
Rural	43	61.4%	23	51.1%	66	
Total	70	100.0%	45	100.0%	115	

The above table shows that the (51.1%) of the delayed childrens were from rural area while as 48.9% were from urban area Though overall incidence of developmental delay did not differ significantly among the normal developing group(p= 0.27)

Table 5: The following table shows the Distribution and developmental outcome of the childrens with respect to the gestational age

Gestational age	normal		Delay		Total	Chi-square
	N	%age	N	%age	Count	X^2=1.308 df= 1 p= 0.253
Term	60	85.7%	40	88.8%	100	
Preterm	10	14.3%	5	11.2%	15	
Total	70	100.0%	45	100.0%	115	

The above table shows that overall incidence of developmental delay did not differ significantly among the normal developing group p=0.253 which includes that there is insufficient evidence

Table 6 Distribution of number of childrens suffering from different neonatal illnesses by different developmental challenges (Total children: 115; normal development: 70; developmental delay: 45)

Problems	Motor delay	Tone abnormality	Cerebral palsy	Speech delay	Global developmental delay	Total	Normal development	P value
Sepsis and pneumonia	4	1	1	2	1	9	10	0.0007
Meningitis	-	-	1	2	1	4	0	-
Convulsion	2	1	1	2	1	7	5	0.0552
Birth asphyxia	4	1	1	1	1	8	0	0.0020
Severe jaundice	1	1	1	2	1	6	15	0.0495
Respiratory disease	1	-	-	1	1	3	20	-
Congenital anomalies	2	-	-	-	1	3	5	-
Others	2	1	1	1	0	5	15	0.0253
Total	16	5	6	11	7	45	70	

P value <0.05 is considered as significant.

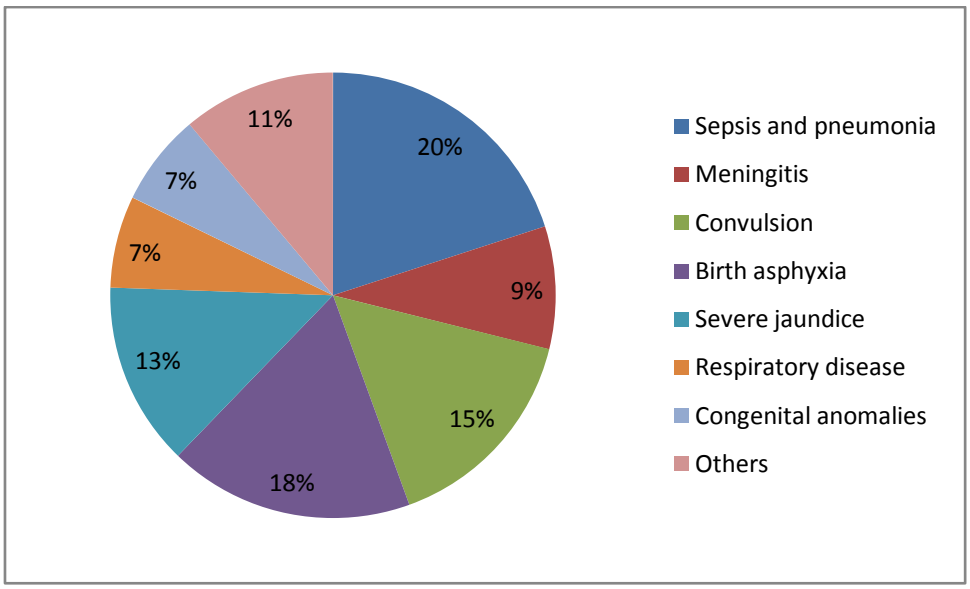

Fig. 2 Pie chart showing relative proportions of different etiologies of developmental delay among children in the study population.

DISCUSSION

The present study population revealed the following basic data: 130 children's were admitted over the study period, out of whom I have traced 120 (92.3%), of Out of these 120, 115 children attended the screening camp (95.8% of identified children), while 5 children did not turn up for the screening, Lack of health awareness was also a contributing factor. On screening 115 children, 45 were found to have some developmental delay/challenge (39.1% prevalence). Profile of study population (n=115) Sex distribution: male: 58 (50.4%); female: 57 (49.6%). Age distribution: 0-12 mo: 44 (38.3%), >12-24 mo: 25 (21.7%), >24-36 mo: 12(10.4%), >36-48 mo: 9 (7.8%), >48-60 mo: 13 (11.3%) >60-72 mo: 12 (10.4%) (Gestation: 8 (6.9%) were preterm (<37 weeks gestation) and 107 (93.1%) were term (37weeks or more) babies.. Birth weight: 34 had a birth weight less or equal than 2 kg and 64 were 3 kg 13 have 4kg birth weight and 4 have no birth weight recorded. Twins: 10 were twins, i.e., 8.6% twin births reported. Neonatal illnesses: birth asphyxia in 8 (17.7%), sepsis and pneumonia in 9 (20%), severe jaundice in 6 (13.3%) convulsions in 7(15.5%) meningitis in 4(8.8%) respiratory disease in 3 (6.6%) congenital problems in 2(4.4%)Other problems were noted in 6 (13.3%) childrens. Aprox one fourth (22.2%) of the study population were in the age group of more than 24 months, followed by 20% in the 60-72 month age group. Though overall incidence of developmental delay differ significantly among the various age groups (P=0.01), maximum incidence of developmental delay was detected in the age group of >24-36 months,

As for as the etiology is concerned out of 45 children's 9 had sepsis,4 had meningitis 7 had convulsion, 8 had birth asphyxia, 6 had jaundice. 3 had a respiratory disease 2 had a congenital problem and 6 had other problems In relation with type of delay out of 45 children where as 16 had a motor delay 5 had a tone abnormality 6 had cerebral palsy 11 had speech delay and 7 had a global developmental delay (GDD).

Prevalence of developmental delay was higher among twins (17.8%) than in singletons. Out of 10 twin sibs 2 had motor delay, 2 had hearing impairment, 1 had a tone abnormality 3 had speech delay and 2 had global developmental delay (GDD).. Of the 6 babies with cerebral palsy, only 3 gave a history of birth asphyxia. Of the 45 babies screened 9 gave a history of sepsis but discharge documents did not state whether they were clinical suspects of probable sepsis or culture proven ones. 4 had definite history of meningitis. In the cases of 7 babies there was definite mention of convulsions, without evidence of sepsis. It may be presumed that these were cases of metabolic alterations, most likely hypoglycemia. In the group with sepsis, incidence of developmental delay showed no difference from the general population. While all 4 babies with meningitis were also affected. This points to the fact that insult to the neonatal brain in the form of infections or metabolic derangement may be detrimental to development. Of the 45 with developmental delay, 4 were preterm, 18 LBW, Many children presented with more than one developmental challenge whereas many gave history of more than one neonatal illness, so a direct association of the developmental challenge with an etiological factor was difficult to deduce.

CONCLUSIONS

The overall result of the present study indicates that early intervention of the grass root level will down the incidence of developmental challenges and will decrease the burden of disability in this vulnerable group**.**

We have various evidence from developed countries that early identification, assessment and intervention at the primary, secondary and tertiary levels is effective in preventing or reducing the burden of developmental difficulties for children, their families and the community. Early identification, assessment and intervention should not end when the child reaches a certain age, but should link seamlessly with services provided as needed throughout the life-cycle. Emphasis should be given to transition periods, when new circumstances and new needs may emerge.

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