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Prevalence of developmental delay in special new born care unit follow up children between 12 – 24 months of age

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Abstract

Aim: To estimate prevalence of developmental delay among nursery graduates between 12 to 24 months of age

Materials & Methods: Children who were admitted in SNCU for longer than 24 hours and who are between 12-24 months were initially screened using Trivandrum development screening chart (TDSC) and assessed for growth. Children who "failed" in TDSC were assessed for developmental delay using DASII.

Results: On screening 202 babies, 26.2% of the children were found to have developmental delay. Mean DQ (Developmental Quotient) of VLBW, ELBW, very preterm babies (28-32 weeks), twins, Small for Gestational Age(SGA) babies were found to be significantly lower. Failure to gain adequate weight and head circumference was higher in children with developmental delay.

Conclusion: Every one in four children were having developmental delay on follow-up screening, indicating high prevalence of developmental delay among SNCU graduates.Timely and appropriate screening is essential to provide early interventions.

Keywords: Developmental delay, neonatal follow-up, DASII

Introduction

Recent advances in the field of neonatology and advent of technological tools has reduced neonatal mortality to a large extent in recent times. But that increase in survival has been found to be associated with increased incidence of chronic morbidities [1,2].

To address the issue of high and stagnant neonatal mortality and use the opportunity of increasing institutional delivery for improving new born survival, Government of Madhya Pradesh (M.P.) with technical support of UNICEF has put a strong focus on

strengthening facility based new born care by establishing Special Newborn Care Units (SNCUs) which are primarily meant to provide specialized care to small and sick new born who account for 80% of newborn deaths. The state initiated simultaneous steps to develop infrastructure, ensure availability of equipments and attract adequate human resources to facilitate rapid scale up. Thereby making M.P., the first state in the country to achieve universal coverage of SNCUs at district level as per the norms recommended by Government of India. These efforts are having a positive impact on survival rates of sick newborns but their quality of life with respect to growth and development remains largely unmonitored especially in the background of poor follow-up rates both at community ad institutional levels. Current recommendations are to follow these children up to 1 year of age and the scenario after that is unknown.

In view of this existing lack of data from the region, this study has been planned to look for the prevalence of developmental problems in neonates being discharged from our SNCU.

Materials & Method

Neonates who were admitted in Special New born Care Unit for longer than 24 hours were called for follow up between 12 to 24 months of age and were included in the study. Initially, the babies were screened with Trivandrum development screening chart and assessed for growth. Any child who fails to achieve any item that falls short on the left side of vertical line in the chart, is considered to have developmental delay. These children will be assessed for hearing and vision followed by assessment of developmental delay using Developmental Assessment Scale for Indian Infants (DASII). Both mental development index and psychomotor development index were calculated by DASII. The age placement of the item at the total score rank of the scale is noted as the child's developmental age. This converts the child's total scores to his motor age (MoA) and mental age (MeA). The respective ages are used to calculate his motor and mental development quotients respectively by comparing them with his chronological age and multiplying it by 100.

The composite DQ is derived as an average of DMoQ and DMeQ.

The motor and mental indices are standardised scores that are distributed in the same manner as IQ scores with a population mean of standard deviation of 16. Abnormal neurodevelopmental outcome was considered if MoQ or MeQ is less than 70% on DASII. Statistical analysis was done using SPSS25 software.

Results

On screening 202 children who attended follow-up between age of 12 and 24 months of age, 53 were found to have developmental delay (26.2% prevalence), confirmed by DASII. **Table 1** This study the number of girls were 86(42.57%) and boys were 116 (57.42%). Children born term and preterm were almost equal in number. Twins were 15(7.42%) and children were Large for gestational age was 10(4.09%). As shown in table 2 Developmental quotients of VLBW infants (<1500g) was significantly lower than that of normal birth weight infants ($p<0.05$) and no significant difference was found in mean DQ of LBW and normal birth weight children. 27% of the preterm babies had developmental delay (with mean DQ <70). Developmental delay was found in 28.9% of moderate to late preterm babies and 50% of children with very preterm birth. Mean DQ of very preterm children was 68.0 and moderate to late preterm children was 87.9 both of which were significantly lower when compared to term babies (p value 0.003 and 0.004 respectively). As shown in **Table 2**, 27% of the preterm babies had

developmental delay (with mean DQ <70). Developmental delay was found in 28.9% of moderate to late preterm babies and 50% of children with very preterm birth.

Mean DQ of very preterm children was 68.0 and moderate to late preterm children was 87.9 both of which were significantly lower when compared to term babies (p value 0.003 and 0.004 respectively). Incidence of growth failure was higher in babies with developmental delay (p 0.03 for weight and 0.02 for head circumference) as shown in **Table 3**.

Table 1: Characteristics of the study subjects (n=202):

Characteristics	Value N (%)
Age group of children (months)	
12-16	89(44.05%)
17-20	61(30.19%)
21-24	52(25.74%)
Girls	86(42.57%)
Gestational age	
Preterm	89(44.05%)
Term	103(50.99%)
Post term	10(4.09%)
Maturity	
SGA	70(34.65%)
AGA	120(59.40%)
LGA	12(5.90%)

Table 2: Developmental Quotient according to gestational age

Gestational age	Motor DQ (SD)	Mental DQ (SD)	Mean DQ (SD)
Very preterm(28 -31+6 w)	65.8 (12.2)	70.2 (11.4)	68 (13.2)
Moderate to late preterm (32-36+6 W)	86.4 (9.84)	89.4(10.2)	87.9 (12.2)
Term (>37weeks)	100.2 (10.8)	104.3(9.8)	102.2 (9.66)

Table 3: Comparision of growth parameters among children with normal outcome and children with developmental delay

Parameters	Normal outcome (n=149)	Developmental delay (n=53)	P value
Normal weight	137	38	0.03
Weight <3SD	12	15	
Normal HC	147	41	0.02
HC <3rd centile	02	12	
Normal length	145	47	0.06
Length <3rd centile	03	06	

Table 4: Concern regarding developmental delay among parents:

	Developmental delay (n=53)	Normal development (n=149)
Concerned	09	02
Unconcerned	44	147

Discussion

This study revealed a high prevalence of 26.3% developmental delay according to DASII among children belonging to age group of 12 to 24 months who were discharged from our SNCU. Similar high prevalence rate was revealed by the study conducted by Nandita chattopadhyay et al,[3] which revealed 31.6% of developmental delay in SNCU graduates. Paul V K et al.,[4] found developmental delay of 15% in high risk infants at 1year of age using BSID(. Higher prevalence rates in this study could be because of inclusion of more morbidities in comparison to referred study which included only 4 categories of 'high-risk infants' in study population.

A systemic review of 153 studies across the globe having 22,161 survivor babies of either intrauterine or neonatal insults revealed that the overall median risk of at least one sequalae in any of the four domains as 39.4% [5].

Many studies [6-7] have shown that there is an inverse relationship between birth weight and gestational age with risk of developmental delay, with increasing incidence as the Birth Weight/gestation age is lesser. Kanya mukhyopadhyay et al.,[8] included a large number of ELBW babies had a similar DQs with mean Motor DQ of 74.5 and mean mental DQ of 76.8. Our ELBW babies showed a similar DQ with mean Motor DQ of 76.5 +/-8.9 and mean mental DQ of 79.8+/-12.2.This is in accordance with studies [9-10] where the developmental quotients of ELBW babies was significantly low when compared to VLBW and normal birth weight babies.

In this study the VLBW babies showed mean Motor DQ of 86.2+/-8.9 and mean mental DQ of 88.3+/-12.2. A study on neurodevelopmental outcome [11] found that the mean mental DQ and Motor DQ of 80.4 and 77.2 respectively among VLBW babies at 1 year of age. The differences in the Developmental quotients in our study and this study could be due to lower incidence of comorbidities such as Intraventricular hemorrhage and culture proven sepsis. Our findings regarding developmental delay in VLBW babies is in accordance with multiple studies conducted on VLBW Babies[12-13].

Assessment of growth of children of this study revealed that failure to gain adequate weight and head circumference was significantly higher among infants with developmental delay, owing to the wrong feeding practices such as weaning, due to lack of awareness and increased incidence of inter current illnesses among them. Hack et al.,[14] concluded that Sub normal head circumference at 8 months of age was associated with lower I.Q.scores, receptive language and speech abilities as well as poor academic performance at 8-9 years of age. Lam B et al.,[15] in a cohort of their LBW (<2.5kg) babies of which 1/3rd were SGA observed that at 6-12 months of age, 33-35% of babies were still short as compared to 7-8% of AGA babies. We found that 37% of babies of SGA were short in comparison to 12.2% AGA babies. The difference could be due to length measurement done at a later age and inclusion of babies of

birth weight >2.5 kg as opposed to above mentioned study which had only LBW babies.

In the backdrop of high prevalence of developmental delay and poor rates of follow-up attendance the need of community follow-up to pick up the children with developmental delay is of prime importance. We found that about half of parents' of children with developmental delay were apparently unaware of the developmental status of their child. A study conducted in Chandigarh concluded that In comparison to children with normal development, parents of children with delayed development were more likely to raise concerns regarding expressive language, gross motor, global/cognitive and self help.Of the children who had IQ scores lower than 70, 61.5%of parents raised one or more significant concern while 38.5% either raised no concern or raised non significant concerns[16]. Community follow-up thus can give opportunity to pick up children with developmental delay before they reach the stage of disability.

The most worrisome part is that 83% of the parents were apparently unaware of the developmental abnormality in their children, lack of awareness regarding development, illiteracy, lack of timely community follow-up seems to be the reasons for this.

Conclusion

Every one in four children were found to have developmental delay on follow-up screening indicating high prevalence of developmental delay among SNCU graduates.Merely saving the newborns is not enough but ensuring that they have minimum impact of perinatal morbidity on their lives requires re-emphasizing of preventive strategy for justified risk factors leading to developmental delay as well as screening of all discharged newborns irrespective of their neurological status at the time of discharge, making parents aware and provided with early intervention. Those who fail to come to the institutional follow-up are to be provided with the community screening and interventional services at their door step so that no child is denied with the opportunity to develop and grow to his/her complete potential.

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